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Founded in 1953, the Farmington River Watershed Association has been working six decades to protect the river that connects us all and to restore the natural resources of the watershed.

The FRWA is a citizen-based, non-profit 501(c)(3) organization at the forefront of restoration and conservation issues such as water quality, water allocation, recreational usage, open space, and wetland and floodplain protection. We work with federal, state and local governments, business and industry, and the people of the watershed's 33 communities to protect the river and the region's natural resources.

We invite you to join us and become a part of this important effort.

Watershed Assessment Associates (WAA), a New York State-certified female-owned business enterprise, is an environmental consulting and education firm located in Schenectady, NY. We are a team of skilled scientists dedicated to delivering superior ecological services with integrity.

WAA provides environmental consulting, taxonomy services, and educational programming to federal, state and county governmental agencies, environmental organizations, institutions, watershed associations, and private consulting companies.

We believe that through detailed biological, physical, chemical and geographic data assessment and analysis we can enhance awareness of ecological condition, identify concerns, and formulate viable solutions.

This project was funded by *the Massachusetts Environmental Trust*. The Trust is supported by the purchase of Massachusetts environmental license plates. <http://www.mass.gov/>



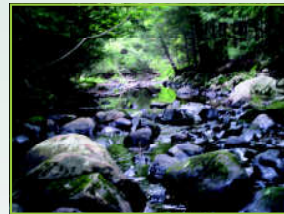
For more information regarding MA DEP benthic macroinvertebrate field collection and laboratory processing methods go to <http://www.mass.gov/dep/water/resources/biomon.htm>



Fall River



Valley Brook



Sandy Brook

## RIVER STEWARDSHIP IN THE FARMINGTON WATERSHED

### 2010 WATER QUALITY ASSESSMENTS

BY THE FARMINGTON RIVER WATERSHED ASSOCIATION IN PARTNERSHIP WITH WATERSHED ASSESSMENT ASSOCIATES  
 FUNDED BY THE MASSACHUSETTS ENVIRONMENTAL TRUST

The Farmington River Watershed Association (FRWA), a 501(c)(3) nonprofit organization, received a Massachusetts Environmental Trust (MET) grant, for a 3-year pilot project *River Stewardship in the Farmington Watershed*, to assess and prioritize road crossing improvement projects, build volunteer stewardship projects, and conduct stream assessments on benthic macroinvertebrate (stream insects) communities.

Stream water quality assessments support the objectives and goals of the project to develop and enhance community involvement and awareness. The purpose of this report card is to communicate the stream assessment results collected from 8 locations during August 2010 within the Farmington River watershed in order to enhance public awareness of regional water quality. Assessments (biological, physical and chemical) on 6 streams will be conducted annually, by Watershed Assessment Associates (WAA), following Massachusetts Department of Environmental Protection (MA DEP) methods; the results will be conveyed to the general public and provided to the MA DEP as supplemental data for the Farmington River watershed.

Evaluation of stream biological communities has been widely implemented as a useful, cost-effective method of providing information on the degree of water quality. Stream community population attributes (such as number of unique taxa, tolerance to pollutants, and similarity to a regional reference stream) are used to detect or infer the water quality condition. Although a variety of biological communities may be used in stream assessments, benthic macroinvertebrate (stream insect) communities are advantageous. Benthic macroinvertebrates are abundant in most streams, relatively easy and inexpensive to sample, and are sensitive to a wide range of environmental stressors. Also, benthic communities serve as indicators of overall, integrated water quality, including effects of intermittent discharges and lapses in treatment, synergistic effects, sediment pollution, impacts from upstream land use, and non-chemical impacts to surrounding habitat.

The surface waters of the Massachusetts portion of the Farmington River watershed represent the headwaters for the entire watershed and support the biodiversity and water quality of downstream streams and rivers. Continued assessment, development and maintenance of stewardship projects, and community involvement will assist in protecting these valuable resources.



Hubbard Brook



Clam River



West Branch Farmington River



Stream Name (Station) Water Quality	Community Assessment Description
Hubbard Brook (FR09) Reference	Hubbard Brook flows through undeveloped land cover through the Granville State Forest into steeper high gradient areas, finally merging with Valley Brook to form the East Branch Farmington River. The habitat assessment score* was 184/200, the highest among all the stations. The benthic community metrics indicated non-impacted conditions. Many intolerant (sensitive to pollution) taxa were present in the sample; however this site had the highest percent dominance by one taxon, and this was a cold clean water intolerant taxon. The habitat and benthic results were similar to the 2001 assessment performed by MA DEP; this supports the continued designation as a reference station.
WB Farmington River (FR01A) Non-impacted	The West Branch Farmington River forms from Hayden Pond and flows southeast through several wetlands and impoundments into a low gradient area, accepting the waters of several tributaries and finally entering the Colebrook River Reservoir at the MA/CT border. The habitat assessment score was 176/200. The overall score was affected by suboptimal embeddedness (an accumulation of fine sediments) and a reduction of available instream cover. The benthic metrics indicated non-impacted conditions, 85% similar to the reference station. Low EPT richness affected the score. However, percent dominance and scraper to filter-collector feed groups (SC/FC ratio) were closer to "best attainable" than the reference station. This station was assessed in 2006 by MA DEP; the results have not been publically released as of this printing.
WB Farmington River (UN02) Non-impacted	See above for description of the tributary. The habitat score was 162/200. Suboptimal channel flow status, vegetative bank cover, bank stability, and riparian vegetative width reduced the overall habitat score. The benthic metrics indicated non-impacted conditions, 100% similar to the reference station. HBI (organic pollution index) was slightly higher relative to the reference station. The station had higher EPT richness, taxa richness, and SC/FC ratio than the reference station. Fewer sensitive taxa were present in the sample than the reference. This site has not been assessed by MA DEP.
Clam River (FR06A) Non-impacted	The Clam River originates from a wetland, flows through several impoundments, a steep valley, floodplains, and reservoir, finally merging with Buck River. The habitat score was 159/200. Slightly suboptimal instream habitat, embeddedness, and riparian vegetative width reduced the habitat score. The benthic metrics indicated non-impacted conditions, 100% similar to the reference. The HBI result was slightly higher than the reference site. Many cold clean water taxa were present in the sample. Taxa richness and SC/FC were higher and percent dominance was lower than the reference. The habitat and benthic results were similar to the 2001 assessment performed by MA DEP.
Clam River (UN01) Non-impacted	See above for description of the tributary. The habitat score was 157/200. Suboptimal embeddedness and marginal riparian vegetative width affected the overall habitat score. The benthic metrics indicated non-impacted conditions, 100% similar to the reference. The HBI result was slightly higher than the reference site. However, this station had greater taxa richness, EPT richness, and more balanced ratio of EPT abundance to midge abundance than the reference station. This site has not been assessed by MA DEP.
Valley Brook (FR10) Reference	Valley Brook originates from a wetland and flows through undeveloped land to form the East Branch Farmington River with Hubbard Brook. The habitat score was 177/200. Suboptimal channel flow status and instream cover reduced the overall habitat score. The benthic metrics indicated non-impacted conditions. The percent dominance of a net spinning caddisfly (greater than 20%) reduced the overall benthic metric score. The habitat and benthic results were similar to the 2001 assessment performed by MA DEP; this supports continued designation as a reference station.
Sandy Brook (FR08A) Non-impacted	Sandy Brook originates from York Lake, flows through a series of ponds, wetlands and impoundments into a steep valley at the MA/CT border. The habitat assessment score was 173/200. The habitat score was affected by suboptimal embeddedness and marginal riparian vegetative width on the left bank due to the adjacent road. Benthic community metrics indicated non-impacted conditions, 100% similar to the reference station. The habitat and benthic results were similar to the 2001 assessment performed by MA DEP.
Fall River (FR03) Slightly impacted	Fall River originates, for the most part, from Big Pond and Otis Reservoir and flows into the West Branch Farmington River; flows are influenced by Otis Reservoir outlet structures. The habitat score was 164/200. Suboptimal riparian vegetative width and velocity depth combinations and presence of channel alteration (bridge abutments) affected the habitat score. Benthic community metrics indicated the station to be slightly impacted, 75% similar to the reference station. Low EPT richness and SC/FC ratio affected the score. This station had the lowest score among the sites. The habitat and benthic assessments performed by MA DEP in 2001 indicated non-impacted conditions. Taxa within the filter-collector feeding group dominated the sample; similar results were noted by MA DEP in 1996 and 2001, most likely related to the upstream impoundments.

\*The habitat assessment score (Barbour et al. 1999) rates the following stream attributes from 0 (lowest, "poor") to 20 (highest, "optimal"): epifaunal substrate/available cover, embeddedness, velocity/depth regime, sediment deposition, channel flow status, channel alteration, frequency of riffles (or bends), bank stability, vegetative protection, and riparian vegetative zone width. This information helps to determine whether the stream community is more impacted by pollution or habitat limitations (Nuzzo 2003).

Metric	Description	Interpretation
Taxa Richness	Number of unique taxa present in a sample	Higher richness indicates better condition
EPT Richness	Number of species in the sample in the orders Ephemeroptera, Plecoptera, and Trichoptera (mayfly, stonefly, caddisfly)	Higher richness indicates better condition
EPT/Chironomidae (abundance ratio)	Measure of the ratio of the abundance of the intolerant EPT orders to the generally tolerant Diptera family Chironomidae (midges)	The higher the ratio indicates better condition
Hilsenhoff Biotic Index- HBI	Measure of the macroinvertebrate assemblage tolerance toward organic (nutrient) enrichment (Hilsenhoff 1987).	Higher values indicate poorer condition
Scraper/Filtering Collector (SC/FC) Ratio	The abundance of taxa in the scraper feeding group divided by the abundance of taxa in the filtering collector feeding group.	Higher ratios indicate better condition
Percent of Dominant Taxon	Percentage of the most dominant macroinvertebrate taxon	Higher percentages indicates poorer condition
Percent Reference Affinity	Measure of order level similarity (7 groups) to a model based on the reference streams (Novak and Bode 1992).	Higher percentages indicate condition similar to reference community structure

