Preliminary Water Quality Screening:
The Aspetuck Watershed
Summer 2012

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Watershed Overview

The Aspetuck River is an important tributary of the Housatonic River, located in Litchfield County, Connecticut. The Aspetuck River’s watershed is approximately 51 square miles in area and drains lands located Kent, Warren, Washington, and New Milford before emptying into the Housatonic River approximately a half mile north of the Route 202 bridge in New Milford. The Aspetuck River proper is actually less than a mile long, formed by the convergence of its eastern and western branches less than a mile upstream from its mouth. The branches are commonly referred to as the East Aspetuck and West Aspetuck rivers.

The western branch of the Aspetuck River (i.e. West Aspetuck River) is an elongated north-to-south flowing basin located in Kent and New Milford, Connecticut. The headwaters of the river stem from North and South Spectacle Ponds in East Kent. From the North Spectacle Pond outflow (South Spectacle Pond drains north), the West Aspetuck River flows south for approximately 13 miles down into New Milford, where it converges with the East Aspetuck River. Major tributaries within the West Aspetuck River basin include Denman Brook and Merryall Brook.

The eastern branch of the Aspetuck River (i.e. East Aspetuck River) begins in Warren, Connecticut, where Lake Waramaug Brook and a small unnamed stream flow are dammed to form Lake Waramaug on the Warren-Washington Town Line. The East Aspetuck flows southwest out of Lake Waramaug in Washington, following Route 202 and then Paper Mill Road, into New Milford. Major tributaries within the East Aspetuck River basin include Lake Waramaug Brook and Baldwin Brook. The East Aspetuck River, from the Lake Waramaug outflow to the river’s confluence with the Housatonic, is managed by CT Department of Energy and Environmental Protection’s Inland Fisheries Division as a Class 3 Wild Trout Management Area. The river is lightly to moderately stocked with wild brown trout each year and special fishing restrictions apply within this portion of the watershed.

The most common land cover type in the watershed is deciduous forest, which was estimated to cover 68% of the watershed in 2006 (CLEAR). Agricultural lands, turf and grasses (18.3% in 2006) and developed land (9.3% in 2006) are also present in the watershed, with less than 5% of the watershed area consisting of water bodies and wetlands or other land uses (e.g. barren lands, utility lines). Development in the watershed is concentrated near Lake Waramaug and the Route 202 corridor in the east branch of the watershed, as well as in the southern reaches of the western branch of the watershed, near the confluence with the Housatonic River. Agriculture is fairly evenly distributed between the east and west branches of the watershed.
Figure 1. The Aspetuck Watershed includes the West Aspetuck River and East Aspetuck River drainage areas in the towns of Kent, Warren, Washington, and New Milford, Connecticut.
**Watershed Regional Significance**

Recent studies citing the watershed’s importance as critical habitat for the State’s dwindling Eastern Brook Trout population has elevated local interest in the watershed, particularly among leaders of the land conservation community in the region. In order to prioritize and better coordinate future land conservation efforts in the Aspetuck River watershed, additional information regarding the distribution of high quality Brook Trout habitat within the watershed is needed.

![Map of Connecticut, Massachusetts, and Rhode Island showing the Aspetuck River watershed. The map highlights regional watersheds color-coded by Population Integrity index, a component of total CSI score. The West Aspetuck River scored 11 out of 15 points, while the East Aspetuck River scored 7.](image)

**Figure 2.** Trout Unlimited recently developed a Conservation Success Index (CSI) to characterize the status of native coldwater fish across their historic range. The West Aspetuck River scored highest among Connecticut watersheds for overall CSI score, generating increased interest in the watershed as an priority area for land conservation. The map above depicts regional watersheds color-coded by Population Integrity index, a component of total CSI score. The West Aspetuck River scored 11 out of 15 points, while the East Aspetuck River scored 7.
Figure 3. A map produced by the CT Department of Energy and Environmental Protection (Bellucci 2008) identifies sites with documented high brook trout densities (i.e. 1600 trout/hectare). A high density brook trout site was documented on the West Aspetuck River (red arrow).

**Existing Water Quality Information**

Every two years the State of Connecticut’s Department of Energy and Environmental Protection (DEEP) assesses the quality of the state’s waterbodies, including inland rivers and streams. This information is compiled into the Connecticut Integrated Water Quality Report (IWQR) and submitted to Congress for review. When considering if a water body is meeting State water quality standards, one of the major factors considered is whether the water body has suitable habitat for fish and other aquatic life and wildlife. This is also referred to as assessing whether the waterbody meets Aquatic Life Use Support (ALUS) standards. ALUS is assessed primarily by examining the biological community living within the stream or river being assessed. (The biological community of a stream, such as the benthic macroinvertebrate community or fish community, integrates the effects of pollutants and other conditions
over time, making it one of the best and most direct ways to measure ALUS.) Before making a final determination of whether ALUS criteria are met, DEEP will also consider additional information related to the physical conditions observed in the stream, chemistry and toxicity data, and records of water quantity (i.e. stream flow).

Because there are over 5,000 stream and river miles in Connecticut, not every waterbody is able to be assessed during every reporting cycle. In addition, among those waterbodies assessed, it is typical for only one or two sites to be utilized to predict the overall water quality of the given river system.

The East and West Aspetuck Rivers were assessed for ALUS during both the 2010 and 2012 monitoring and reporting cycles. The sites assessed on both the East Aspetuck and West Aspetuck rivers were reported as being in full attainment of (i.e. they ‘meet’) the State’s ALUS water quality standards, indicating the rivers provide suitable habitat for fish and other aquatic life and wildlife at the sites sampled.

Table 1. Connecticut Integrated Water Quality Report to Congress Results: ALUS Attainment Status for Waterbodies within the Aspetuck River Watershed.

<table>
<thead>
<tr>
<th>Waterbody</th>
<th>Location</th>
<th>2010</th>
<th>2012*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>West Branch of Watershed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Aspetuck River</td>
<td>From the Housatonic Avenue crossing in New Milford, upstream to headwaters at North Spectacle Pond outlet in Kent. (Includes Aspetuck River mainstem and West Aspetuck River.) 15.04-mile segment.</td>
<td>Fully Supporting</td>
<td>Fully Supporting</td>
</tr>
<tr>
<td>South Spectacle Pond</td>
<td>East central Kent at headwaters of the West Aspetuck River. 82.26-acres.</td>
<td>Fully Supporting</td>
<td>Fully Supporting</td>
</tr>
<tr>
<td><strong>East Branch of Watershed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Aspetuck River (Downstream)</td>
<td>From confluence with West Aspetuck River, upstream to Wellsville Avenue Crossing, New Milford. 1.27-mile segment.</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>East Aspetuck River (Middle)</td>
<td>From Wellsville Avenue upstream to Wheaton Road, New Milford. (Middle section of East Aspetuck River.) 5.07-mile segment.</td>
<td>Fully Supporting</td>
<td>Fully Supporting</td>
</tr>
<tr>
<td>East Aspetuck River (Upstream)</td>
<td>From Wheaton Road Crossing in New Milford, upstream to Lake Waramaug outlet dam in Washington. 3.49-mile segment.</td>
<td>Not Assessed</td>
<td>Insufficient Information</td>
</tr>
<tr>
<td>Lake Waramaug Brook</td>
<td>From mouth at Lake Waramaug upstream to headwaters at Eel Pond outlet dam in Warren. 5.17-mile segment.</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>Lake Waramaug</td>
<td>Southwest corner of Warren, Northwest corner of Washington; headwaters of East Aspetuck River. 640.81 acres.</td>
<td>Fully Supporting</td>
<td>Fully Supporting</td>
</tr>
</tbody>
</table>

*At the time of this report, the 2012 State of Connecticut Integrated Water Quality Report had not been finalized. The results presented are those contained in the initial draft report, released September 18, 2012.
While this information is encouraging, only one site on each branch of the Aspetuck River system was assessed. In addition, the smaller tributary streams in the watershed (e.g. Merryall Brook, Denman Brook, Lake Waramaug Brook) were not assessed in the latest IWQRs. Therefore, while the IWQR reports are able to provide general insight into the relative quality of the waters in the Aspetuck River watershed, the reports are not able to provide insight into potential spatial variations in the quality of aquatic habitat and water quality within the Aspetuck system, including its various tributaries.

**HVA Preliminary Aspetuck River Water Quality Assessment Study**

On August 13 and August 14, 2012, HVA collected benthic riffle-dwelling macroinvertebrates from four sites within the Aspetuck watershed in order to conduct a preliminary assessment of water quality conditions within the basin and to determine the suitability of using the CTDEEP Rapid Bioassessment by Volunteers (RBV) program to assess and monitor water quality conditions throughout the watershed in the future.

The RBV program was developed by CTDEEP to encourage and enable volunteer monitors to collect meaningful water quality information for their own use and use by the CTDEEP Water Protection & Land Reuse Bureau (WLPR) for water quality assessments. The goal of RBV is to provide volunteer monitoring programs with a quick, efficient, and standardized methodology for the collection of macroinvertebrate community data from wadeable streams (i.e. streams that can be walked across). This data can be used to screen for either very high or very low water quality and augment monitoring conducted by WPLR. HVA has successfully organized an annual RBV program in the Shepaug River watershed since 2009, and selectively monitors various other sites within the Housatonic River watershed using the RBV method each fall and spring.

The four sites sampled in August within the Aspetuck River watershed were four of eleven potential sites flagged for sampling this summer by HVA Water Protection Program staff. Sampling was dependent on staff availability as this assessment was a preliminary, unfunded effort to help guide development of a more robust program which would be implemented during 2013 (assuming the necessary funding will be secured). The four sites sampled are shown in Table 2 below.

**Table 2. HVA Summer 2012 Water Quality Assessment Locations**

<table>
<thead>
<tr>
<th>Site #</th>
<th>Stream</th>
<th>Town</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Date Sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>West Aspetuck River</td>
<td>New Milford</td>
<td>41.604771</td>
<td>-73.428857</td>
<td>8/14/12</td>
</tr>
<tr>
<td>2</td>
<td>Merryall Brook</td>
<td>New Milford</td>
<td>41.624238</td>
<td>-73.429037</td>
<td>8/14/12</td>
</tr>
<tr>
<td>3</td>
<td>East Aspetuck River – Downstream</td>
<td>New Milford</td>
<td>41.59265</td>
<td>-73.42072</td>
<td>8/13/12</td>
</tr>
<tr>
<td>4</td>
<td>East Aspetuck River – Upstream</td>
<td>New Preston</td>
<td>41.66260</td>
<td>-73.37112</td>
<td>8/13/12</td>
</tr>
</tbody>
</table>
Site #1 was selected to determine overall water quality exiting the West Aspetuck basin, and includes drainages from both the Merryall Brook and Denman Brook subbasins. The site was located approximately 150 meters upstream of the Aspetuck Ridge Road crossing in New Milford.

**Figure 4.** (Left) View of the West Aspetuck River from Site 1 facing downstream towards Aspetuck Ridge Road. **Figure 5.** (Right) Site 1 facing upstream.

**Figure 6.** An aerial view of Site #1 (2012 Terra Metrics imagery and Google map data).
Site 2 – Merryall Brook, New Milford

Site #2 was selected to assess the water quality of Merryall Brook, a subbasin within the West Aspetuck River basin. Merryall Brook is a tributary that flows southeast from Kent to join the West Aspetuck River along the southern end of Merryall Road in New Milford. The sampling site was located approximately 150 meters upstream of the Aspetuck Ridge Road crossing in New Milford. (This stream crossing is located upstream of the Aspetuck Ridge Road/Merryall Brook crossing.)

Figure 7. (Left) View of Merryall Brook from Site 2 facing downstream towards Aspetuck Ridge Road.

Figure 8. (Right) Site 2 facing upstream

Figure 9. An aerial view of Site #2 (2012 Terra Metrics imagery and Google map data).
Site 3 – East Aspetuck River (Downstream), New Milford

Site #3 is located on the East Aspetuck River above its confluence with the West Aspetuck River. This site was selected to assess the overall water quality leaving the East Aspetuck River, including drainage from Lake Waramaug and upstream tributary subbasins. The site is located approximately 150 meters upstream of the East Aspetuck River/Wells Road crossing in New Milford.

**Figure 10.** (Left) View of the East Aspetuck River from Site 3 facing downstream towards Wells Road. **Figure 11.** (Right) Site 3 facing upstream

**Figure 12.** An aerial view of Site #3 (2012 Terra Metrics imagery and Google map data).
Site 4 – East Aspetuck River (Upstream), Washington

Site #4 was selected to assess the water quality contribution of Lake Waramaug and the New Preston section of Washington to the East Aspetuck River. The site is located approximately 150 meters upstream of the East Aspetuck River/Route 202 crossing (immediately downstream of the East Aspetuck River/Findlay Road crossing) in Washington.

Figure 13. (Left) View of the East Aspetuck River from Site 4 facing downstream towards Route 202.
Figure 14. (Right) Site 4 facing upstream

Figure 15. An aerial view of Site #4 (2012 Terra Metrics imagery and Google map data).
Preliminary results from the August sampling efforts are shown in Table 3 below. A voucher was prepared for each site sampled and will be submitted to CTDEEP staff for review in order to confirm the assessment results presented in Table 3. (The voucher contains one specimen of each macroinvertebrate genus found preserved in alcohol.)

Table 3. HVA Summer 2012 Water Quality Assessment Preliminary Results

<table>
<thead>
<tr>
<th>Site #</th>
<th>‘Most Wanted’</th>
<th>‘Moderely Wanted’</th>
<th>Least Wanted Types</th>
<th>Other Types</th>
<th>TOTAL # TYPES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drunella</td>
<td>Isonychia</td>
<td>Epeorus</td>
<td>Peltoperlae</td>
<td>Perla</td>
</tr>
<tr>
<td>1</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

Sites are assigned a water quality rating based upon the number of ‘Most Wanted’ macroinvertebrate genera collected at the site (Table 4). The Most Wanted genera are those that are very pollution intolerant. Therefore, their presence at the site is an indication that water quality at that site is likely high. (If the water quality was degraded, it is expected that the Most Wanted genera would not be able to tolerate the suboptimal conditions and would die off at the site.) Sites that support five or more of these ‘Most Wanted’ genera are rated ‘Exceptional’ in terms of water quality. Sites with three to four ‘Most Wanted’ genera are considered ‘Excellent’, while those with one to three are considered ‘Very Good’. (The overlap between the Excellent and Very Good categories is intentional. When three genera are found, a water quality rating of either ‘Excellent’ or ‘Very Good’ is assigned based upon the professional judgment of DEEP staff.) Sites at which no ‘Most Wanted’ genera are found require additional information to assess the water quality.

Table 4. Preliminary Summer 2012 Water Quality Ratings

<table>
<thead>
<tr>
<th>Site #</th>
<th>Stream</th>
<th>Location</th>
<th># Most Wanted Types</th>
<th>Total # Types</th>
<th>Water Quality Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>West Aspetuck</td>
<td>Aspetuck Ridge Road New Milford</td>
<td>2</td>
<td>9</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>Merryall Brook</td>
<td>Aspetuck Ridge Road New Milford</td>
<td>3</td>
<td>9</td>
<td>Very Good to Excellent</td>
</tr>
<tr>
<td>3</td>
<td>East Aspetuck</td>
<td>Wells Road New Milford</td>
<td>3</td>
<td>6</td>
<td>Very Good to Excellent</td>
</tr>
<tr>
<td>4</td>
<td>East Aspetuck</td>
<td>Route 202 New Preston/Washington</td>
<td>2</td>
<td>7</td>
<td>Very Good</td>
</tr>
</tbody>
</table>
Of the four sites sampled in August 2012, none were considered ‘Exceptional’ in terms of water quality based upon the RBV sampling effort. Sites ranged from ‘Very Good’ to, potentially, ‘Excellent’ water quality.

There were no obvious differences in quality between the East and West basins of the Aspetuck watershed, however the spatial extent of the sampling effort was limited. Within the Eastern basin (i.e. the combined results of the two sites sampled), four ‘Most Wanted’ genera were found, and a total of eleven genera were observed. Within the West basin, three ‘Most Wanted’ genera were found, and a total of fourteen genera were observed. It is possible that the diversity of macroinvertebrate genera is higher within the West basin, however additional, more detailed sampling is needed to confirm this.

**CONCLUSION: NEXT STEPS**

Interestingly, none of the four sites sampled for benthic macroinvertebrates using the CTDEEP RBV method resulted in an ‘Exceptional’ classification for water quality. Two sites may be classified as ‘Excellent’ depending on DEEP review, but overall the sites appeared to show only ‘Very Good’ water quality. These results were somewhat surprising, as in the West Branch in particular, the Aspetuck River is often thought of as a higher quality stream system. It is possible, that the relatively low water quality scores are due to the time of sampling (August), as the RBV methodology is intended to be implemented between September and November each year.

In order to better guide local land conservation and brook trout preservation efforts, it is recommended that sampling be repeated in spring (i.e. March-June) and fall (i.e. September-November) of 2013 at each of the four locations studied. Additional sites should be added to the program as well, in order to expand the spatial coverage of the monitoring effort and to ensure inclusion of the tributaries. Sites recommended for addition include locations just above the mouth of the following tributaries:

- Denman Brook
- Lake Waramaug Brook
- Baldwin Brook

In addition, it is recommended that additional sites be added along both the West Aspetuck River and East Aspetuck rivers’ main stems, in particular:

- On the West Aspetuck River upstream of Merryall Brook and downstream of Denman Brook
- On the West Aspetuck River upstream of Denman Brook
- On the East Aspetuck River upstream of Baldwin Brook
- On the East Aspetuck River downstream of Baldwin Brook
The increased interest and attention on the Aspetuck River Watershed is due to concern about the local brook trout population. Brook trout require cold, clean, highly-oxygenated water to survive and also require certain habitat types within a stream in order to reproduce. Therefore, it is also recommended that habitat assessments be conducted at each site at the time of macroinvertebrate sampling. Thermal monitoring should also be incorporated into the program with air and water temperature probes installed at each site during spring 2013, with data retrieved and batteries replaced during each subsequent spring and fall macroinvertebrate sampling effort. Finally, if funding allows, sites should be monitored monthly for flow and dissolved oxygen during the first period of study (March-November).

All of the above recommended next steps should be conducted in cooperation with local stakeholder groups (e.g. land conservation organizations, municipalities, etc.) and in consultation with state fishery and water quality experts (i.e. DEEP Inland Fisheries Division and DEEP Bureau of Water Protection and Land Reuse).
The Housatonic Valley Association, founded in 1941, works to conserve the natural character and environmental health of our communities by protecting and restoring the lands and waters of the Housatonic Watershed for this and future generations.