

Inappropriate Criteria Presentation



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August 2, 2005

Mr. James Pease
VT ANR-Water Quality Division
103 South Main Street
Building 10 North
Waterbury, VT 05671-0408

Re: Moon Brook

Dear Jim,

Moon Brook, from its confluence with Otter Creek to a point 2.3 miles upstream has been placed on the EPA 303(d) list as an impaired water. The impaired use is listed as ALS (aquatic life support).

The evidence supporting this designation is summarized in the document "Biological and Aquatic Life Use Attainment Assessment of Moon Brook" (*BioAssessment Report*) as prepared by the Vermont Department of Environmental Conservation, updated February 7, 2004.

Based upon the evidence considered and information available at the time the designation was proposed the conclusion drawn was reasonable enough. However, subsequent field investigation and other research have convinced the City that the designation as "Impaired" is unwarranted.

We would like to be clear that we are not questioning the competence or methodology of those performing the environmental analysis. By reputation and quality of work, we have come to respect their professionalism. We also understand that their responsibilities are many and state-wide and therefore they do not have the opportunity to closely scrutinize aspects of a waterway beyond their assigned area of concern.

"The 2004 Vermont Surface Water Assessment Methodology including Vermont Listing Methodology" recognizes the serious impacts that the designation of a stream as Impaired can have upon the function and future of a community. In "Chapter One, Introduction to Surface Water Assessment Methodology" the VTDEC writes:

"The methods used for making these determinations are important as the determination of whether the waters meet or do not meet the water quality standards informs and directs water quality management strategies for each waterbody and may lead to significant regulatory consequences. It is essential that determinations are accurate and defensible."

We agree. In years past when the "regulatory consequences" were the same for "Impaired" and "Un-impaired" waters (i.e. none), any water that might be impaired could be included without significant negative impacts upon the affected community and property owners. This listing was helpful in that it kept a focus on those waters for future study. But now, when the "Impaired" designation reduces property values, increases development costs, complicates project design, and discourages investment in a community, fairness dictates that caution be used when assessing such a designation. We trust that you agree.

The Assessment Methodology document also states *"The Department implements biocriteria only when appropriate reference conditions have been described."*

Although other issues may be argued, the primary reason for our disagreement with the impaired designation of Moon Brook is the lack of an appropriate reference stream.

The *BioAssessment Report* examined two components of aquatic life; the macroinvertebrate and fish communities.

Macroinvertebrates:

There are three reference streams for macroinvertebrate study listed in the "Wadeable Stream Biocriteria Development and Implementation Methods for Fish and Macroinvertebrate Assemblages in Vermont Wadeable Streams and Rivers" as published by the VTDEC Water Quality Division, Biomonitoring and Aquatic Studies Section (*Criteria Manual*).

- *Small High Gradient Streams (SHG)*
- *Medium-size High Gradient Streams (MHG)*
- *Warmwater Medium Gradient Streams and Rivers (WWMG)*

Given those choices, the assessors selected the least inappropriate of the three for Moon Brook: WWMG.

The *Criteria Manual* describes WWMG as

"Larger streams, fourth to sixth order in size or small streams within the Champlain Valley, all at lower elevations averaging 369 ft. Typically more open, averaging 30% canopy cover, and warmer based on the dominate species. Gradients are moderate with substrates dominated by gravel/cobble/boulder, and averaging 7% fines. The drainage areas can range widely but are often quite large (with the exception of Champlain Valley streams with small watersheds) with an average size of 480 km². Alkalinities are typically high, averaging 70 mg/l."

The discussion in section 7.A of the *Criteria Manual*: "Reference conditions for Three Macroinvertebrate Community Stream Categories" Ends with the caution:

"Macroinvertebrate criteria have been developed by the VTDEC that are stream category specific. Other macroinvertebrate stream categories have been identified but current data are insufficient to adequately describe the range of reference conditions for macroinvertebrate communities. The criteria presented here shall be applicable to all streams that can be appropriately designated as one of the three macroinvertebrate stream categories described above."

Moon Brook cannot be "*appropriately designated as one of the three macroinvertebrate stream categories described above*" for the following reasons:

Gradient: The WWMG gradient is characterized as "moderate". The gradient of Moon Brook is not moderate. An analysis of the elevation information provided to the City by the J. W. Sewall Company as part of its GIS contract (which information was not available to the Stream assessors) show the gradient to be considerably less than moderate, averaging 0.3% in the reaches encompassing sample sites 0.3, 0.7 and 1.3. The slope of reaches containing the samples sites were shown to be:

Site	Slope
0.3	0.6%
0.4	0.6%
0.7	0.2%
1.3	0.5%
2.3	1.0%

(see enclosed slope map)

Substrate: The WWMG substrate is characterized as "dominated by gravel/cobble/boulder, and averaging 7% fines". This is a critical characteristic of

the sampled stream in that this environment is necessary for a large mayfly-stonefly-caddisfly (EPT) population.

The macroinvertebrate method used for determination of aquatic life support relies on eight factors. Those factors along with a simplistic description are:

- Density - relative abundance of animals
- Richness – number of species
- EPT Index – number of Ephemeroptera, Plecoptera, and Trichoptera (EPT)
- Percent Model Affinity of Orders (PMA-O) – comparison of ratios of species to reference conditions
- Hilsenhoff Biotic Index BI (0-10) – assigns a weighted value biased towards tolerant species (such as EPT)
- % Oligochaeta
- EPT/EPT & Chironomidae – ratio of intolerant to tolerant species + intolerant
- Pinkham-Pearson Coefficient of Similarity – Functional Groups (PPCS-F) – similar to PMA-O, but using feeding groups

Four of these factors (EPT Index, PMA-O, BI and EPT/EPT+C) depend upon the plentiful presence of the EPT species for passing scores. Two of the remaining factors (PPCS-F and % Olig) also would seem to be influenced by the presence or absence of EPT.

These intolerant insect species are useful indicators of water quality if the proper physical environment is present. Soils maps and descriptions included in the "Soil Survey of Rutland County, Vermont" published by the United States Department of Agriculture, Natural Resources Conservation Service and Forest Service indicate that this preferred EPT environment does not exist throughout much of the reach of Moon Brook and is noticeably absent in the reaches scoring most poorly using the WWMG criteria.

The attached Table 2 showing the soils characteristics along Moon Brook was compiled from information presented in the USDA publication. As shown in the table, from the confluence with Otter Creek to mile 2.3, the underlying soils forming the substrate for Moon Brook are composed of fine soils with a scarcity of fragments greater than 3" (boulders and cobbles).

A hand-shoveled excavation in the stream bed upstream and downstream of sample site 0.3 confirmed the fine grained characteristics of the substrate. As a further check, a test hole was dug by backhoe on October 25, 2004. The excavation was made in the field south of the site at a location about ten feet from the stream to a depth below stream bed. Again, the fine grained nature of the substrate was confirmed.

This discussion begs the question: If there are no cobbled bottomed riffles at this location, why were samples taken here?

At the Forest Street bridge, there is a cobble bottom riffle. However 20 to 25 feet upstream or downstream the substrate is as one would expect from the soils maps and as verified by the field investigations. After some research, we conclude that the stones in the brook at this location (some of which are cut stones) are the discarded remnants of the stone abutments of the old wooden bridge that was demolished in 1927 to construct the bridge with its concrete abutments.

As previously mentioned, it is unlikely that the samplers had the opportunity explore the stream, given the volume of work and other responsibilities.

Fish:

There are two indexes available for assessing the fish population health in Vermont streams; the Cold Water Index of Biotic Integrity (CWIBI) and the Mixed Water Index of Biotic Integrity (MWIBI).

The *BioAssessment Report* states that the lower 2.3 miles of Moon Brook were evaluated using the Mixed Water Index of Biotic Integrity (MWIBI) for the fish community.

This is similar to the macroinvertebrate situation in that neither index is appropriate given the grade and dominate substrate on Moon Brook. This is made clear in the *Criteria Manual* on page 60 where it is stated:

“Application of both IBI’s: The MWIBI and CWIBI may be applied to Wadeable moderate to high gradient warm and coldwater streams in Vermont. *They should not be used to assess low-gradient, sand bottomed streams or very small warmwater streams supporting less than five native species.* These two stream types appear to be dominated by tolerant generalist feeders, regardless of the level of human impact present. Since the IBI model is sensitive to trophic level proportions and number of tolerant species, even minimally impacted low gradient and small warmwater sites often generate low IBI scores.” (Emphasis added).

We trust that upon consideration of the above, you will agree that there is insufficient evidence to definitively declare that Moon Brook should be included on the 303(d) list.

Considering the inhibitions and costs of the regulatory consequences now associated with an impaired designation, it is critically important that caution is used when making that determination. There have been a few projects in Rutland that were considered but subsequently abandoned in the face of the impaired watershed requirements. These are only the potential projects that we are aware of, there are probably others. Right now there are two doctors in the City who are considering building a new medical facility, but they are becoming very apprehensive about what the implications may be regarding storm water management. The complexities and logistics of the Offset program are also worrisome to them. A moderate income housing project was abandoned due, in part, to impaired water stormwater concerns.

We do not believe that it is the intent of the Agency to impede development. I attended several of the Stormwater Advisory Group meetings last summer. The way in which those meetings were conducted convinced me that the true goals of the Agency are to protect and improve Vermont's streams and to rescue those that have become impaired.

While continued economic growth and opportunities are important, another issue that concerns us is the fact that by using inappropriate criteria to determine impairedness, the State is making it impossible to get Moon Brook off the impaired list since the natural stream conditions will never produce the required data.

This is particularly troubling since we are working in a proactive manner on several projects with various partners to improve habitat and water quality in Moon Brook including:

- Extensive GIS mapping of the Moon Brook watershed
- Cooperative assistance to VTDEC and it's consultants in various studies
- Habitat improvement with shade tree planting on private property (with the Rutland Natural Resources Conservation District (RNRCD) and ANR)
- Modifications to a private on-stream pond and installation of sediment control and thermal abatement (Rutland City Department of Public Works (DPW) and ANR)
- Negotiations with the owner of another private on-stream pond to allow modifications and sediment control and thermal abatement (DPW).
- Water temperature and water quality monitoring of Moon Brook. (DPW and Upper Otter Creek Watershed Initiative (UPOCWI))
- Discussions with commercial property owners along Routes 4 & 7 regarding possible installation of sediment control devices (DPW)
- Organization and coordination of riparian landowners to improve streamside habitat and activities. (with RNRCD and ANR)

We and our partners are making significant commitments of resources in an effort to improve Moon Brook. We want to succeed and while this commitment goes well beyond getting it off the Impaired List, we cannot have achieved success while it is still on that list. Human nature being what it is there would be little incentive to continue if our task is predetermined to be impossible.

The City of Rutland intends to play by the rules as adopted. We expect those rules to be administered fairly and when newly presented evidence calls into question an earlier conclusion, we expect that the new evidence be considered and adjustments made as appropriate.

We recognize that the State can not immediately remove a stream from the Impaired Waters list. Therefore we are requesting that the Agency issue a determination that due to recently reported evidence, VTDEC will propose that Moon Brook be delisted because these waters were inaccurately placed on the Impaired Waters List. We also request that beginning immediately and until such time as Moon Brook is found to be impaired using newly developed appropriate criteria and protocol, all development within the Moon Brook watershed be subject only to the Stormwater Management Rule for Unimpaired Waters.

We are optimistic that, with the efforts and progress that we and our partners are making, once appropriate criteria are applied, there will not be the requisite instances of failed sampling to put Moon Brook on the list.

Thank you for your consideration.

Sincerely,

A handwritten signature in cursive script, appearing to read "Alan J. Shelvey".

Alan J. Shelvey, P.E., L.S.
City Engineer

Cc: Mayor Cassarino
Paul Clifford, Commissioner of Public Works
Jeffrey Wennberg, Commissioner, VTDEC

**Macroinvertebrate and Fish Sampling Results
Moon Brook - Rutland**

Moon Brook	Macroinvertebrates		Fish	
River Mile	Date	Result	Date	Result
Moon 0.3	9/12/91	Poor	-	-
Moon 0.3	10/6/93	Poor	Oct-93	Poor
Moon 0.3	9/20/94	Fair-Poor	-	-
Moon 0.3	9/25/96	Fair-Poor	-	-
Moon 0.3	10/4/01	Fair-Poor	-	-
Moon 0.7	9/12/91	Poor	Sep-91	Fair
Moon 0.7	-	-	Sep-02	Poor
Moon 1.3	10/4/01	Good	Oct-01	Fair
Moon 1.3			Sep-02	Poor
Moon 2.3	9/12/91	Poor	Oct-01	Poor
Moon 2.6	10/4/01	Ex-Vgood	-	-
Moon2.7	9/12/91	Vg-Good	-	-
Moon2.7	10/4/01	Good	Oct-01	Good
Mussey 0.1	-	-	Sep-02	Poor

from: "Biological and Aquatic Life Use Attainment Assessment of Moon Brook"
updated February 7, 2004 - VTDEC

Table 1 - Macroinvertebrates Fish Sampling Results

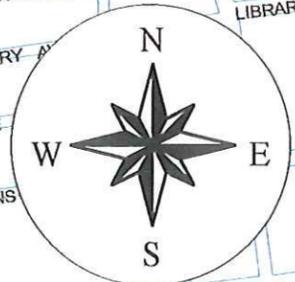
Moon Brook Soils From USDA Soils Mapping											
Sample Site in Reach	River Mile		Dist. (mi)	Soils No.	Soils Name	Fragments > 3" (%)	Percent passing Sieve #				
	From	To					4	10	40	200	
0.3	0.00	0.51	0.51	21	Rippowam fine sandy loam	0-10	70-100	45-100	25-75	0-25	Gravel too sandy
	0.51	0.57	0.06	96	Udipsaments, nearly level						
	0.57	0.63	0.07	26A	Raynham silt loam	0	100	95-100	80-100	70-95	excess fines
	0.63	0.74	0.11	96	Udipsaments, nearly level						
	0.74	0.91	0.17	95	Udorthents loamy						
	0.91	0.98	0.07	86	Linwood muck	0-20	90-100	75-100	45-100	20-95	excess fines
1.3	0.98	1.09	0.11	95	Udorthents loamy						
	1.09	1.28	0.19	106	Middlebury loam	0-5	40-100	35-100	20-100	0-35	Probable
	1.28	1.44	0.16	25B	Belgrade silt loam	0	75-100	55-100	35-100	15-90	excess fines
	1.44	1.66	0.22	25A	Belgrade silt loam	0	75-100	55-100	35-100	15-90	excess fines
	1.66	1.89	0.23	25B	Belgrade silt loam	0	75-100	55-100	35-100	15-90	excess fines
2.3	1.89	2.15	0.26	66B	Georgia and Amenia soils	0-20	50-100	45-100	30-95	20-80	excess fines
	2.15	2.30	0.15	67B	Georgia and Amenia soils	0-25	50-100	45-100	30-95	20-90	excess fines

Moon Brook Soils From USDA Soils Mapping											
Sample Site in Reach	River Mile		Dist. (mi)	Soils No.	Soils Name	Fragments > 3" (%)	Percent passing Sieve #				
	From	To					4	10	40	200	
2.6	2.40	2.69	0.29	15A	Walpole fine sandy loam	0-20	55-100	50-100	25-80	2-30	Probable
	2.69	2.82	0.13	14B	Sudbury fine sandy loam	10-40	35-70	25-65	15-45	0-10	Probable

Notes: The percent fragments >3' is the maximum range of the horizons
The percent passing sieve is the maximum range of the layers between 24in and 60 in below grade (representing bottom of incised streambed).

Data is from Table 15 of USDA Soils map Book, except column "Gravel" which is from table 13

Table 2 - Underlying Soils Characteristics

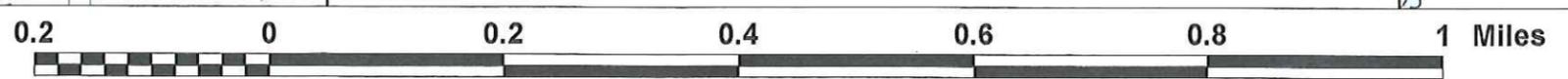


Moon Brook Watershed

Stream Soils

- 106 Middlebury
- 14B Sudbury
- 15A Walpole
- 21 Rippowan
- 25A Belgrade 0-3%
- 25B Belgrade 3-8%
- 26A Raynham
- 66B Georgia & Amenia 3-8%
- 67B Georgia & Amenia stony
- 86 Linwood muck
- 95 Udorthents
- 96 Udipsamments
- Sample Sites

Moon Brook Soils Map



Prepared by Rutland City DPW - Engineering Division - July, 2005

