

Passumpsic River Watershed Water Quality and Aquatic Habitat Assessment Report

Updated through February 2013



Calendar Brook 2008

Passumpsic River up to the branches and some tributaries

Assessment/Listing Status 2012

The following is from the 2012 303(d) List of Waters and the List of Priority Surface Waters Outside the Scope of Clean Water Act Section 303(d).

Part A – Impaired Surface Waters in need of a TMDL

Id #	Waterbody	Uses impaired	Pollutant	Problems
VT15-01.01	Passumpsic River from Pierce Mills dam to 5 miles below Passumpsic dam	CR (contact recreation)	E. coli	St. Johnsbury WWTF CSOs

There are no lower Basin 15 waters on the **Part B – Impaired Surface Waters not needing a Total Maximum Daily Load Determination list.**

Part C – Stressed Waters in need of Further Assessment

Id #	Waterbody	Uses stressed	Pollutant	Issues
VT15-01	Passumpsic River, East-West Branches confluence to Vail Station (5.6 miles)*	ALS, AES, CR	Sediment, E. coli	Urban runoff
VT15-01	Passumpsic River, Great Falls Dam to Pierce Mills Dam (1.5 miles)*	ALS, AES, CR	Sediment, E. coli	Urban runoff
VT15-03	Simpson Brook	ALS	Undefined	Impacts to the fish community have been seen – unknown sources
VT15-05	Unnamed Outlet Stream of Lily Pond	DWS	Priority organics (TCE), metals in sediments	Parker Landfill received haz waste, contaminated groundwater

There are no lower Basin 15 waters on the **Part D – Waters with Completed and Approved TMDLs.**

There are no lower Basin 15 water on **Part E – Waters Altered by Invasive Aquatic Species** or on **Part F – Waters Altered by Flow Regulation.**

**These stretches will likely be removed in 2014 as there is no evidence of sediment and E. coli problems from urban runoff. The biological community is in good health.*

Biological Sampling Results from 2000 to 2012

Wbid	River or Stream	Town	Station (river-mile)	Date	Aquatic community	Assessment
VT15-01	Passumpsic River	Waterford	6.7	9/21/2000	Macro-invertebrate	Excellent
VT15-01	Passumpsic River	Waterford	6.7	9/06/2005	Macro-invertebrate	Very good
VT15-01	Passumpsic River	Waterford	6.7	9/10/2012	Macro-invertebrate	Exc-vgood
VT15-01	Passumpsic River	St. Johnsbury	8.6	9/21/2000	Macro-invertebrate	Very good
VT15-01	Passumpsic River	St. Johnsbury	8.6	9/10/2012	Macro-invertebrate	Exc-vgood
VT15-01	Passumpsic River	St. Johnsbury	12.9	9/21/2000	Macro-invertebrate	Very good
VT15-01	Passumpsic River	Lyndon	18.3	9/10/2010	Macro-invertebrate	Very good
VT15-03	Water Andric	Barnet	0.8	9/02/2010	Macro-invertebrate	Good
VT15-03	Water Andric	Barnet	0.8	9/02/2010	Fish	Good
VT15-03	Water Andric	Barnet	3.3	9/21/2000	Macro-invertebrate	Very good
VT15-03	Water Andric	Barnet	3.3	9/25/2000	Fish	Excellent
VT15-03	Water Andric	Danville	6.5	9/02/2010	Fish	Excellent
VT15-03	Water Andric	Danville	6.5	9/10/2012	Macro-invertebrate	Good
VT15-03	Water Andric	Danville	6.6	9/10/2012	Macro-invertebrate	Very good
VT15-03	Simpson Brook	Waterford	0.4	9/16/2005	Macro-invertebrate	Exc-Very good
VT15-03	Simpson Brook	Waterford	0.4	9/05/2006	Macro-invertebrate	Very good-good
VT15-03	Simpson Brook	Waterford	0.4	9/16/2005	Fish	Poor
VT15-03	Simpson Brook	Waterford	0.4	9/05/2006	Fish	Poor
VT15-03	Simpson Brook	Waterford	1.5	9/05/2006	Fish	Good
VT15-05	Roberts Brook	St. Johnsbury	0.1	9/08/2005	Macro-invertebrate	Good
VT15-05	Roberts Brook	St. Johnsbury	0.1	9/08/2005	Fish	Poor
VT15-05	Roberts Brook	St. Johnsbury	0.1	9/05/2006	Macro-invertebrate	Good
VT15-05	Roberts Brook	St. Johnsbury	0.1	9/05/2006	Fish	Very good
VT15-05	Barnes Brook	Kirby	0.1	9/16/2005	Macro-invertebrate	Excellent
VT15-05	Barnes Brook	Kirby	0.1	9/16/2005	Fish	Excellent
VT15-05	South Wheelock Branch	Wheelock	5.2	9/20/2005	Fish	Excellent

The Passumpsic River station/rivermile (rm) 6.7 is located below the St. Johnsbury WWTF. Rm 8.6 is located above the WWTF. Rm 12.9 is located below the Route 5 bridge north of St. Johnsbury Center. Rm 18.3 is located below the Lyndon WWTF.

Hazardous Waste Sites update in the Passumpsic mainstem watershed

Speedwell Gas in Lyndonville (site # 95-1904) is a hazardous waste site as a result of contamination discovered when nine underground storage tanks (mostly gasoline but also no. 2 fuel oil and diesel) were removed. The site is near the edge of the floodplain of the Passumpsic River. In December 2008 sampling, "dissolved petroleum contamination continues to be detected in groundwater collected at the Site at concentrations greater than the VGES. The core of the plume remains concentrated in the vicinity of the UST system and monitoring well MW-3." The natural processes of dispersion, dilution, and biodegradation are not occurring at a very fast pace and the site is not expected to fall below the Vermont Groundwater Enforcement Standards until 2035. The recommendation is to do some remediation at the site to reduce or remove the contamination.

In May 2009, the consultants KAS proposed a "Work Plan and Cost Estimate for a Corrective Action Feasibility Investigation". However in January 2010, an e-mail from a DEC Waste Management Division staff person stated that he didn't "anticipate moving forward with any significant corrective action at this site at this time".

The most recent report on the site by KAS consultants was done in June 2012 and the following conclusions are made: 1) Dissolved petroleum contamination continues to be detected in groundwater collected at the Site at concentrations greater than the VGES. The core of the plume remains concentrated in the vicinity of the former UST system and monitoring well MW-3; 2) No LNAPL was measured on during the June 1, 2012 semi-annual groundwater monitoring event; 3) The total VOC concentrations in the vicinity of monitoring wells MW-1 and MW-3 have decreased slightly since the most recent sampling event in November 2011 and in the vicinity of MW-6 concentrations have increased by five-fold since November 2011. However, concentrations are within historic levels; 4) Overall, contaminant concentrations have decreased at MW-1 since spikes were reported in 2003; 5) Contaminant concentrations have remained fairly high and persistent at MW-3 and have fluctuated over time at MW-6; 6) The total VOC concentrations have decreased to non-detection from samples taken from MW-2 since a spike was reported in 2000; 7) The full downgradient extent of the contamination plume is not defined but it likely terminates in the vicinity of MW-6; 8) No impacted sensitive receptors other than soil and groundwater are known at this time; and, 9) It is expected that dissolved contaminant levels will decrease, in part, due to the natural processes of dispersion, dilution, and biodegradation.

Based on the above conclusions, KAS recommends the following:

1. Since select compounds were detected in groundwater samples at concentrations exceeding their respective VGES, groundwater sampling from the site-related monitoring wells should continue on a semi-annual basis. The next semi-annual sampling event should be scheduled for November 2012. Groundwater samples should be collected from monitoring wells MW-1, MW-2, MW-3, and MW-6 and all monitoring wells should be

gauged to obtain liquid levels. Groundwater samples should be analyzed for VOCs via EPA Method 8021B;

2. The lack of decline in contaminant concentrations and the persistent presence of LNAPL, indicates that corrective action at this Site is warranted. A work plan to conduct a Corrective Action Feasibility Investigation was sent to Mr. Tim Cropley of the VTDEC on June 2, 2009.

The Lewis Oil company site (#98-2484) was sampled in 2006 by Leggette, Brashears and Graham (LBG) Inc for Lewis Oil. During that June 2006 sampling round, free product was measured and then removed from six wells. In addition, benzene was above the Vermont Groundwater Enforcement Standards (VGES) in three wells; 1,2,4-trimethylbenzene was above the VGES in four wells; 1,3,5-trimethylbenzene was above the VGES in three wells; and naphthalene was above the standard in one well.

From October to December 2008, LBG conducted a “dual phase extraction” pilot study at the site during which vacuum was applied to four extraction wells. The results from the study indicated that dual phase extraction would be an effective way to reduce the petroleum mass onsite. A Corrective Action Plan has been written and approved but no corrective action is yet underway. The site is owned by the Vermont Agency of Transportation and they are responsible for remediation now at the site.

Special Waters for Extra Protection

Chandler Pond in Wheelock and Bean Pond in Lyndon are both mesotrophic, high alkalinity ponds that scored in the top 100 lakes or ponds as part of the biological diversity ranking project (the Natural Resources Mapping Project aka “Biofinder”). Chandler Pond scored in the top 20% on the “Best Lakes” list created using the biological diversity ranking, a water quality score, and unusual scenic or natural features rating and Bean Pond in Lyndon was in the top 10% group of best lakes.

Joes Brook and tributaries

Assessment/Listing Status 2012

Joes Brook and its tributaries are not found on the 2012 lists: **Part A – Impaired Surface Waters in Need of a TMDL**; **Part B – Impaired Surface Waters – No Total Maximum Daily Load Determination Required**; **Part C – Waters in Need of Further Assessment**; **Part D – Waters with Completed and Approved TMDLs**; and **Part E – Waters Altered by Invasive Aquatic Species**.

A tributary to Joes Brook, Brown Brook, has been listed as potentially altered due to water withdrawal from the Danville water supply through the 2012 cycle (see footnote below).

Part F – Waters Altered by Flow Regulation

Id#	Waterbody	Uses affected	Problem	Action
VT15-02*	Brown Brook	ALS	Possible lack of minimum flow below water supply withdrawal point	WSID #5037 - Danville

** This entry will likely be removed from Part F in 2014 as Brown Brook has been inactive since around 1994 and is only considered an emergency supply in the Drinking Water and Groundwater Protection Division database.*

Biological Sampling

Macroinvertebrate sampling was done on Joe's Brook at rm 10.8 and rm 10.5 below Joe's Pond on June 27, 2012 after a major sediment release into the brook at the GMP generation station in West Danville. The sediment release occurred on June 15, 2012 as a result of a catastrophic failure of the penstock just above the generation building. Although the sampling was outside of the index period, the above and below samples showed severe harm to the macroinvertebrate community. There was a huge drop in abundance from above to below (90%) and richness and EPT taxa metrics also showed the impacts. Embeddedness was < 5% above and > 75% below. Hopefully high water events will flush the sediment from the stream to restore its once high quality.

Frye's Quarry

The Frye Quarry in Danville had an individual discharge permit for seepage water and stormwater collected in the quarry sump. The permit expired in 2004 and was finally renewed in December 2010. The delay occurred because the treatment system, which consists of two detention ponds, was not constructed as designed. The owner evidently made the necessary modifications so that the treatment system fully complies; monthly monitoring can occur; and thus the permit was renewed.

Special Waters for Extra Protection

Joes Brook is a very special brook with unique and beautiful cascades, rapids, sculptured rocks and ledges providing excellent places to swim, photograph, picnic, fish, and whitewater boat. There are three swimming hole sites identified in the *Vermont Swimming Hole Study*. There are nutrient inputs and likely temperature changes to the brook below Joes Pond because of the developed area runoff into the pond and heating of the impounded waters that are a threat to the health of the brook's aquatic community but the brook itself flows through long wooded stretches and is shaded and protected for much of its length. Designation of the brook as an outstanding resource water should be explored.

Keiser Pond in Danville is a mesotrophic, high alkalinity pond that scored in the top 100 lakes or ponds as part of the biological diversity ranking project . Keiser Pond came out in the top 10% of the "Best Lakes" list.

Stannard Pond in Stannard, which is at the headwaters of Steam Mill Brook, is a mesotrophic, moderate alkalinity pond that also scored in the top 100 lakes or ponds as part of the biological diversity ranking project. Stannard Pond also came out in the top 10% of the "Best Lakes" list.

Joes Pond in Danville came out in the top 25% in the "Best Lakes" list.

Sleepers River and tributaries

Assessment/Listing Status 2012

Part A – Impaired Surface Waters in need of a TMDL

Id #	Waterbody	Uses impaired	Pollutant	Problems
VT15-04.01	Lower Sleepers River in St. Johnsbury	CR	E. coli	St. Johnsbury WWTF CSOs

There are no Sleepers River watershed streams on the **Part B – Impaired Surface Waters not needing a Total Maximum Daily Load Determination** list.

Part C – Stressed Waters in need of Further Assessment

Id #	Waterbody	Uses stressed	Pollutant	Issues
VT15-04	Sleepers River	ALS	Metals (Ni)	Elevated levels of nickel in sediment
VT15-04	Sleepers River	AES, CR, 2CR	Oil	Fairbanks Morse Foundry site – oil spills, other contaminants

There are no Sleepers River watershed streams on the **Part D – Waters with Completed and Approved TMDLs** list; on the **Part E – Waters Altered by Invasive Aquatic Species**; or on the **Part F – Waters Altered by Flow Regulation**.

Biological Sampling Results from 1999 to 2012

The most recent biological sampling on the Sleepers River was lower on the stream at rm 0.4 in 2010. The Biological Index was slightly elevated indicating that there was a shift in community composition with more nutrient tolerant taxa present. The functional group composition also indicated some nutrient enrichment. Iron precipitate was present for 20 – 50 meters of stream on about 1/3 the stream channel width but this did not seem to impair the community as a whole.

Houghton Brook was sampled in 2010 and both the fish and macroinvertebrate communities were healthy with “excellent” and “very good” as the community assessments respectively.

Following are the aquatic community assessments from 1999 to the present.

Wbid	River or Stream	Town	Station (rivermile)	Date	Aquatic community	Assessment
VT15-04	Sleepers River	St. Johnsbury	0.4	09/08/2010	Macro-invertebrate	Vg-Good
VT15-04	Sleepers River	St. Johnsbury	1.1	09/06/2005	Macro-invertebrate	Vg-Good
VT15-04	Sleepers River	St. Johnsbury	4.4	09/06/2005	Macro-invertebrate	Vg-Good
VT15-04	Burroughs Brook	St. Johnsbury	0.9	09/21/2000	Macro-invertebrate	Very good
VT15-04	Burroughs Brook	Danville	2.8	10/08/1999	Macro-invertebrate	Excellent
VT15-04	Pope Brook	Walden	3.2	10/08/1999	Macro-invertebrate	Good
VT15-04	Pope Brook Trib	Danville	0.1	09/07/1999	Macro-invertebrate	Excellent
VT15-04	Houghton Brook	Danville	0.8	09/12/2005	Fish	Very Good
VT15-04	Houghton Brook	Danville	1.6	09/08/2010	Macro-invertebrate	Very good
VT15-04	Houghton Brook	Danville	1.6	09/08/2010	Fish	Excellent
VT15-04	North Brook	Danville	0.4	09/12/2005	Fish	Excellent
VT15-04	Roy Brook	St. Johnsbury	0.1	09/21/2005	Fish	Good
VT15-04	Roy Brook	Danville	1.3	10/23/2012	Macro-invertebrate	Very good

Hazardous Waste Sites update in the Sleepers Brook watershed

Fairbanks Morse/Colt Industries/Coltec site (Vermont DEC #870029)

An October 2011 Status Report on the Petroleum Remediation for the Coltec site done by The Johnson Company found that "approximately 11,300 gallons of fuel oil have been recovered from the site as of May 20, 2011. The remedial system continues to demonstrate its effectiveness in removing fuel oil from the subsurface and preventing emanation of sheens to the adjacent Sleepers River." The rate of recovery has been declining as more of the product is removed. Johnson suggests that once the goal of less than 0.01 feet of free product thickness in all the wells is met that the remedial system be shut down but left in place. The second half of the goal is that there is no longer an active seep to the river, however, the consultant thinks that there will be sporadic seeps for years to come due to fuel trapped in soil pores that will be released when there is high groundwater. They suggest that the goal be revisited with Vermont DEC to see if it makes sense to have the remediation system shut down once the fuel thickness goal is met with the option of re-activating it if the sheens are too frequent or significant.

Millers Run and tributaries

Assessment/Listing Status 2012

Millers Run and its tributaries are not found on the 2012 lists: **Part A – Impaired Surface Waters in Need of a TMDL; Part B – Impaired Surface Waters – No Total Maximum Daily Load Determination Required; Part C – Waters in Need of Further Assessment; Part D – Waters with Completed and Approved TMDLs; Part E – Waters Altered by Invasive Aquatic Species and Part F – Waters Altered by Flow Regulation.**

Biological Sampling Results from 2000 to 2011

Wbid	River or Stream	Town	Station (by river-mile)	Date	Aquatic community	Assessment
VT15-06	Millers Run	Lyndon	5.0	9/16/2005	Macro-invertebrate	Vg-Good
VT15-06	Millers Run	Wheelock	6.9	9/23/2004	Macro-invertebrate	Exc-Vgood
VT15-06	Millers Run	Sheffield	11.6	9/20/2005	Macro-invertebrate	Very good
VT15-06	Millers Run	Sheffield	11.6	09/20/2005	Fish	Excellent
VT15-06	Nation Brook Trib 3	Sheffield	0.8	10/12/2009	Macro-invertebrate	Very good
VT15-06	Nation Brook Trib 3	Sheffield	0.8	09/17/2010	Macro-invertebrate	Excellent
VT15-06	Nation Brook Trib 3	Sheffield	0.8	09/17/2011	Macro-invertebrate	Excellent
VT15-06	Nation Brook Trib 3	Sheffield	0.8	09/11/2012	Macro-invertebrate	Excellent

Physical Assessment of Millers Run

A geomorphic assessment of Millers Run was done by the Caledonia County Natural Resources Conservation District (NRCD) and reported in *Miller's Run River Corridor Plan* dated October 2009. A summary of the results of this work is given in a "Passumpsic River SGA summary - February 7, 2012 - East and West Branch, Millers Run, Moose River" done by Ben Copans, ANR DEC Watershed Coordinator.

Special Waters for Extra Protection

Bruce Pond in Sheffield is a mesotrophic, moderate alkalinity pond that scored in the top 100 lakes or ponds as part of the biological diversity ranking project. Bruce Pond is in the top 10% of the "Best Lakes" listing.

West Branch Passumpsic River and tributaries

Assessment/Listing Status 2012

The West Branch Passumpsic River and its tributaries are not found on the 2012 lists: **Part A – Impaired Surface Waters in Need of a TMDL; Part B – Impaired Surface Waters – No Total Maximum Daily Load Determination Required; Part C – Waters in Need of Further Assessment; Part D – Waters with Completed and Approved TMDLs; Part E – Waters Altered by Invasive Aquatic Species and Part F – Waters Altered by Flow Regulation.**

Biological Sampling Results from 2000 to 2012

Wbid	River or Stream	Town	Station (rivermile)	Date	Aquatic community	Assessment
VT15-07	West Branch Passumpsic R.	Lyndon	3.4	9/14/2010	Macro-invertebrate	Excellent
VT15-07	Calendar Brook	Sutton	4.8	09/13/2010	Macro-invertebrate	Excellent
VT15-07	Calendar Brook	Sutton	4.8	09/13/2010	Fish	Good
VT15-07	Calendar Brook	Sutton	5.3	09/22/2005	Macro-invertebrate	Excellent
VT15-07	Calendar Brook	Sutton	5.3	09/22/2005	Fish	Good
VT15-07	Calendar Brook	Sutton	5.5	08/18/2009	Fish	Very Good
VT15-07	Calendar Brook	Sheffield	11.2	10/09/2006	Macro-invertebrate	Very Good
VT15-07	Calendar Brook	Sheffield	11.2	10/12/2009	Macro-invertebrate	Good
VT15-07	Calendar Brook	Sheffield	11.2	09/12/2011	Macro-invertebrate	Exc-Vgood
VT15-07	Calendar Brook	Sheffield	11.2	09/11/2012	Macro-invertebrate	Exc-Vgood
VT15-07	Calendar Brook Trib 22	Sheffield	0.4	10/12/2009	Macro-invertebrate	Excellent
VT15-07	Calendar Brook Trib 22	Sheffield	0.4	09/13/2010	Macro-invertebrate	Very Good
VT15-07	Calendar Brook Trib 22	Sheffield	0.4	09/12/2011	Macro-invertebrate	Excellent
VT15-07	Calendar Brook Trib 22	Sheffield	0.4	09/11/2012	Macro-invertebrate	Excellent
VT15-07	Clark Brook	Sheffield	0.2	10/12/2009	Macro-invertebrate	Very Good
VT15-07	Clark Brook	Sheffield	0.2	09/13/2010	Macro-invertebrate	Very Good
VT15-07	Clark Brook	Sheffield	0.2	09/12/2011	Macro-invertebrate	Exc-Vgood
VT15-07	Clark Brook	Sheffield	0.2	09/11/2012	Macro-invertebrate	Exc-Vgood
VT15-07	Clark Brook	Sheffield	0.2	09/13/2010	Fish	Very Good
VT15-07	Arcadia Brook	Westmore	2.0	09/17/2009	Macro-invertebrate	Good

Calendar Brook rivermile 4.8 is south of the village of Sutton adjacent to Calendar Brook Road where it begins to parallel the brook; rivermile 5.3, is located about 20 meters upstream of the Wheelock Road bridge in Sutton; rivermile 11.2 is located below the H frame power line crossing. Calendar Brook Trib 22 is located below an old logging road and is referred to as North Tributary to Calendar Brook by some.

Physical Assessment of the West Branch Passumpsic River

A Phase II geomorphic assessment of the West Branch was done by the Caledonia County Natural Resources Conservation District (CCNRCD) . The data were reviewed and then summarized in the *West Branch Passumpsic River & Calendar Brook Corridor Plan*, Caledonia County, Vermont, August 18, 2010 by Fitzgerald Environmental Associates under contract to the CCNRCD. A further summary of the results of this work is given in a "Passumpsic River SGA summary - February 7, 2012 - East and West Branch, Millers Run, Moose River" done by Ben Copans, ANR DEC Watershed Coordinator.

East Branch Passumpsic River and tributaries

Assessment/Listing Status 2012

There are no East Branch Passumpsic River watershed streams on the **Part A – Impaired Surface Waters in Need of a TMDL** or on the **Part B – Impaired Surface Waters not needing a Total Maximum Daily Load Determination** lists.

Part C – Stressed Waters in need of Further Assessment

Id #	Waterbody	Uses stressed	Pollutant	Issues
VT15-08	Dish Mill Brook – mouth to rm 1.3	ALS	Sediment, hydrologic change, stormwater runoff	Scour events from increased peak flows due to the ski area and development, periodic sediment issues
VT15-08	Dish Mill Brook Trib	ALS	Sediment	Erosion from ski area parking areas, high embeddedness

There are no East Branch Passumpsic River watershed streams on the **Part D – Waters with Completed and Approved TMDLs** list; on the **Part E – Waters Altered by Invasive Aquatic Species**; or on the **Part F – Waters Altered by Flow Regulation**.

Biological Sampling Results from 2000 to 2012

Wbid	River or Stream	Town	Station (by river-mile)	Date	Aquatic community	Assessment
VT15-08	East Branch Passumpsic R.	Lyndon	1.7	9/23/2004	Macro-invertebrate	VGood-Good
VT15-08	East Branch Passumpsic R.	Burke	3.8	9/07/2005	Macro-invertebrate	Excellent
VT15-08	East Branch Passumpsic R.	Burke	5.3	08/03/2001	Macro-invertebrate	VGood-Good
VT15-08	East Branch Passumpsic R.	Burke	5.3	10/03/2005	Macro-invertebrate	Excellent
VT15-08	East Branch Passumpsic R.	Burke	5.3	09/23/2007	Macro-invertebrate	Very good
VT15-08	East Branch Passumpsic R.	Burke	5.3	09/12/2012	Macro-invertebrate	Excellent
VT15-08	East Branch Passumpsic R.	Burke	5.7	09/10/2001	Macro-invertebrate	VGood-Good
VT15-08	East Branch Passumpsic R.	Burke	5.7	09/23/2007	Macro-invertebrate	VGood-Good
VT15-08	East Branch Passumpsic R.	Burke	5.7	09/12/2012	Macro-invertebrate	Good

VT15-08	East Branch Passumpsic R.	East Haven	8.9	10/03/2005	Macro-invertebrate	Excellent
VT15-08	East Branch Passumpsic R.	East Haven	8.9	09/14/2010	Macro-invertebrate	Exc-VGood
VT15-08	Dish Mill Brook	Burke	0.8	09/07/2006	Macro-invertebrate	Good-Fair
VT15-08	Dish Mill Brook	Burke	1.3	09/07/2005	Macro-invertebrate	Good-Fair
VT15-08	Dish Mill Brook	Burke	1.3	09/07/2006	Macro-invertebrate	Good-Fair
VT15-08	Dish Mill Brook	Burke	1.3	09/14/2010	Macro-invertebrate	Good-Fair
VT15-08	Dish Mill Brook	Burke	1.3	09/14/2010	Fish	Excellent
VT15-08	Dish Mill Brook Trib 2	Burke	0.1	09/07/2005	Macro-invertebrate	Fair
VT15-08	Dish Mill Brook Trib 2	Burke	0.1	09/07/2006	Macro-invertebrate	Good
VT15-08	Dish Mill Brook Trib 2	Burke	0.2	09/14/2010	Macro-invertebrate	Excellent
VT15-08	Dish Mill Brook Trib 2	Burke	0.2	09/14/2010	Fish	Excellent
VT15-08	Bean Brook	Newark	4.8	09/14/2010	Macro-invertebrate	Exc-Vgood

Physical Assessment of the East Branch Passumpsic River

A geomorphic assessment of the East Branch Passumpsic River was done by the Caledonia County Natural Resources Conservation District (NRCDC) and reported in *East Branch Passumpsic River Corridor Plan: Burke and Lyndon*, Vermont, November 2009. A summary of the results of this work is given in a "Passumpsic River SGA summary - February 7, 2012 - East and West Branch, Millers Run, Moose River" done by Ben Copans, ANR DEC Watershed Coordinator.

Special Waters for Extra Protection

Center Pond in Newark is a mesotrophic, moderate alkalinity lake that scored in the top 100 lakes or ponds as part of the biological diversity ranking project. Center Pond also ranked in the top 10% of the "Best Lakes" list.

Bald Hill Pond in Westmore is in the top 10% of the lakes in the "Best Lakes" list as well.

Moose River and tributaries

Assessment/Listing Status 2012

There are no Moose River watershed streams on **Part A – Impaired Surface Waters in Need of a TMDL**; **Part B – Impaired Surface Waters not needing a TMDL**; **Part D – Waters with Completed and Approved TMDLs**; **Part E – Waters Altered by Invasive Aquatic Species**; or on **Part F – Waters Altered by Flow Regulation**.

Part C – Stressed Waters in need of Further Assessment

Id #	Waterbody	Uses stressed	Pollutant	Issues
VT15-09	Chesterfield Valley Brook & Moose River below it	CR	E. coli	Elevated E. coli; Ag bmps installed in 2008 - improvements noted

Biological Sampling Results from 2000 to 2012

Wbid	River or Stream	Town	Station	Date	Aquatic community	Assessment
VT15-09	Moose River	St. Johnsbury	0.1	9/21/2000	Macro-invertebrate	Very good
VT15-09	Moose River	St. Johnsbury	0.1	9/06/2005	Macro-invertebrate	Very good
VT15-09	Moose River	St. Johnsbury	1.7	9/06/2005	Macro-invertebrate	Very good
VT15-09	Moose River	St. Johnsbury	3.9	9/22/2004	Macro-invertebrate	Exc-Vgood
VT15-09	Moose River	Granby	26.8	09/13/2012	Macro-invertebrate	Excellent
VT15-09	Stiles Brook	St. Johnsbury	0.1	9/08/2005	Macro-invertebrate	Exc-Very good
VT15-09	Chesterfield Valley Brook	St. Johnsbury	0.1	09/13/2007	Fish	Excellent
VT15-09	Rogers Brook	Victory	0.6	09/13/2010	Macro-invertebrate	Excellent
VT15-09	Rogers Brook	Victory	0.6	09/13/2010	Fish	Good

Physical Assessment of the Moose River

A geomorphic assessment of the Moose River was done by the Essex County Natural Resources Conservation District (NRCD) and reported in the *Phase II Stream Geomorphic Assessment Moose River: Essex and Caledonia Counties, Concord and St. Johnsbury, Vermont*, Final Report August 2009. A summary of the results of this work is given in a "Passumpsic River SGA summary - February 7, 2012 - East and West Branch, Millers Run, Moose River" done by Ben Copans, ANR DEC Watershed Coordinator.

References

- 1) *Semi-Annual Groundwater Monitoring Report: Speedwell Mini Mart, Lyndonville, Vermont*, June 2012. Done by KAS, Williston.
- 2) July 2009 Groundwater Monitoring Report: Lewis Oil Bay Street, St. Johnsbury, Vermont, August 28, 2009. Prepared for Fred W. Lewis Oil Company by Leggette, Brashears & Graham Inc, Essex Junction, Vermont.
- 3) *Water Quality and Chemistry Above and Below the Effluent Discharges of Twenty Wastewater Treatment Facilities in Vermont*, December 10, 2011. Vermont ANR DEC Water Quality Division, Waterbury, Vermont.
- 4) Vermont ANR DEC Watershed Management Division, Monitoring, Assessment, and Planning Program biological sampling data and assessment.
- 5) *Status Report Petroleum Remediation COLTEC (formerly Colt Industries) Site # 870029, High Street, St. Johnsbury*, October 2011, Prepared by The Johnson Company Inc. for COLTEC Industries, Charlotte, North Carolina.
- 6) John Schmeltzer, Vermont ANR DEC Waste Management Division - update on the Parker Landfill, November 2011.
- 7) *Phase II Stream Geomorphic Assessment Moose River: Essex and Caledonia Counties*, Concord and St. Johnsbury, Vermont, Final Report August 2009. Done by the Essex County Natural Resources Conservation District (NRCD).
- 8) East Branch Passumpsic River Corridor Plan: Burke and Lyndon, Vermont, November 2009. Done by the Caledonia County Natural Resources Conservation District.
- 9) *West Branch Passumpsic River & Calendar Brook Corridor Plan*, Caledonia County, Vermont, August 18, 2010 by Fitzgerald Environmental Associates under contract to the Caledonia County NRCD.
- 10) Miller's Run River Corridor Plan dated October 2009. Done by the Caledonia County NRCD.
- 11) Final Overall Best Lakes List and Basin # plus a table of the 100 lakes that ranked as the top for the ANR Natural Resources Mapping Project. Vermont ANR DEC WSMD Lakes and Ponds Section.