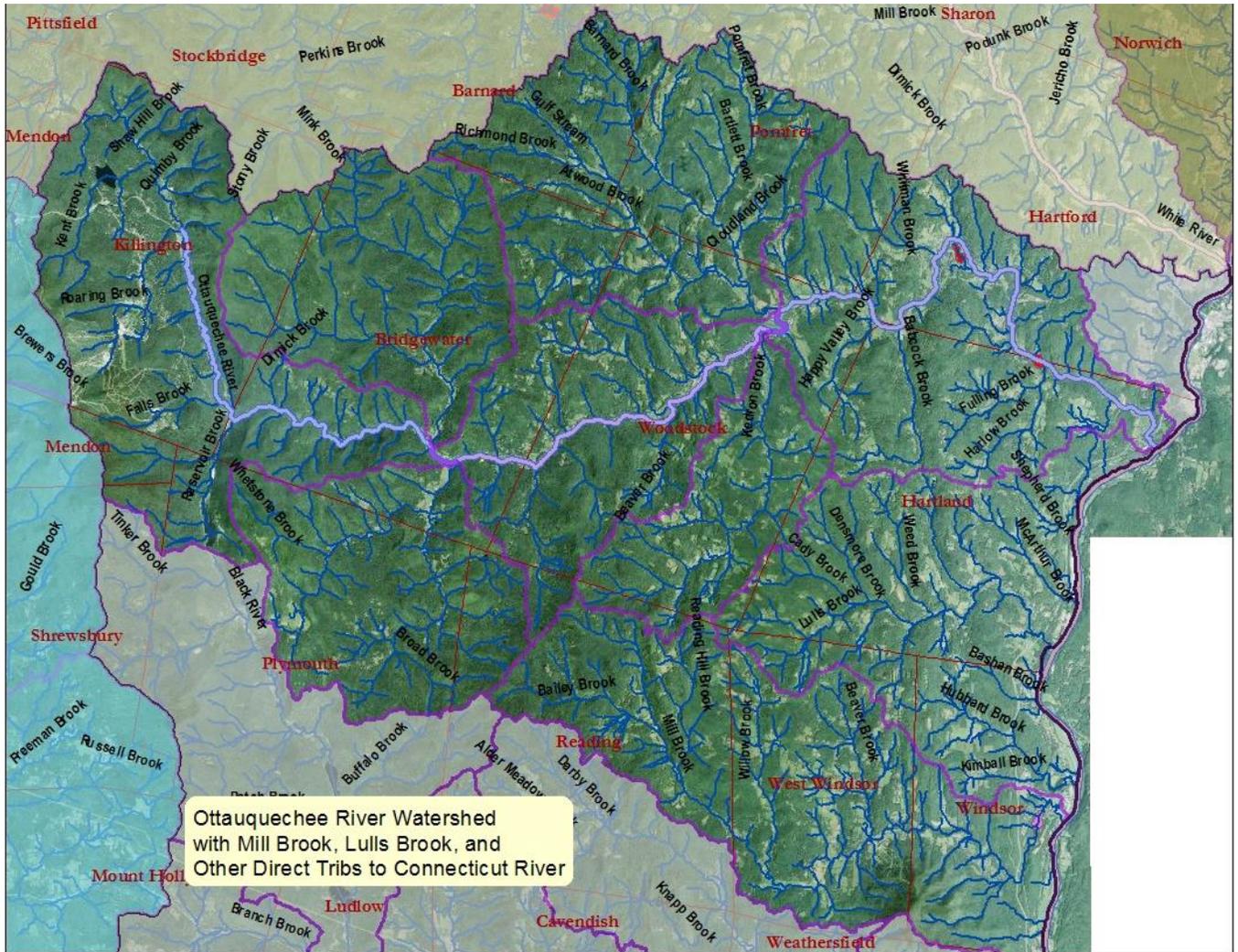


Ottauquechee River Watershed

Updated Water Quality/Aquatic Habitat Assessment Report

Including Mill Brook, Lulls Brook, & other Direct Tribs to the Connecticut River



Vermont Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
Monitoring, Assessment and Planning Program
June 2016

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Ottauquechee River Watershed

Earlier Information on the Ottauquechee River Watershed

The last time that a formal assessment report was done on the Ottauquechee River was in 2000 as the Basin 10 – Black & Ottauquechee Rivers Water Quality and Aquatic Habitat Assessment Report. A copy of that report can be found [here](#). In 2012, there was the Basin 10 Water Quality Management Plan: Ottauquechee River and Black River, which included updated data and information. In addition, there have several river corridor or geomorphic assessment reports done for stretches of these waters. This 2016 assessment is a further update in preparation for the 2017 Basin 10 plan.

General Description of the Ottauquechee Watershed

The Ottauquechee River has a mainstem length of 38 miles and drains an area of 223 square miles in east central Vermont. The Ottauquechee River valley is narrow with few large meadows, and the surrounding terrain is rugged and hilly with steep slopes. For most of its course, the mainstem is moderately swift with a total fall of 1,485 feet from its source to mouth. Most of its tributaries are flashy mountain streams. A more detailed description of the tributary streams to the Ottauquechee is given in the earlier assessment report at the link above.

The Ottauquechee River originates on the eastern slopes of the Green Mountains in the town of Killington. From its source, the river flows northeasterly down the mountainside to the valley floor where its course changes to a near southerly direction. Named brooks in this north-south valley include Shaw Hill Brook, Kent Brook, Quimby Brook, Taylor Brook, Brimstone Brook, Roaring Brook, and Falls Brook.

In West Bridgewater, the Ottauquechee is joined by Reservoir Brook coming from Woodward Reservoir, which enters from the south. From Reservoir Brook, the Ottauquechee winds in a generally eastward course to Bridgewater Corners where at river mile (rm) 22.3, it is joined by the North Branch from the north. The Ottauquechee continues easterly through Bridgewater Corners and immediately downstream at rm 21.8, Broad Brook enters from the south.

From Broad Brook, the Ottauquechee River continues its easterly course, passing through the village of Bridgewater and entering the town of Woodstock, where it alters direction to a northeasterly course. It then flows through the village of West Woodstock and enters Woodstock Village, where at rm 13.5 it is joined by Kedron Brook, which enters from the south.

From Kedron Brook, the Ottauquechee River continues northeasterly to rm 12.7, where it is joined by Barnard Brook entering from the northwest. The Ottauquechee then flows easterly through Taftsville, where the river changes to a northeasterly flow for about 3 miles, skimming the edge of Hartland and entering the town of Hartford. After returning to a southeasterly course, the Ottauquechee River flows through Quechee to the Deweys Mills dam at rm 5.4.

Passing over this dam, the river flows southeasterly into the North Hartland Flood Control Reservoir, formed by the North Hartland Dam at river mile 1.5. From this dam, the Ottauquechee River flows southeasterly to its confluence with the Connecticut River.

Ottauquechee River Watershed Summary of Segments with Impacts

Stream or Lake Segment	Mileage & Status	Pollutant	Source	Other information
Small stream to Ottauquechee River	Impaired Part A list	Metals (esp iron)	Bridgewater landfill (closed)	
Roaring Brook, rm 3.5 to rm 4.2	0.7 miles Impaired Part A list	Stormwater	Ski area development	
East Branch Roaring Brook, rm 0.1 to rm 0.6	0.5 miles Impaired Part A list	Stormwater, iron	Ski area development	
Lower Ottauquechee below North Hartland dam	0.9 miles Altered Part F list	Artificial flow regulation	Hydro facility	FERC license expires in 2021
Lower Ottauquechee below Woolen Mill dam	0.1 mile Altered Part F list	Artificial flow condition, de-watering of falls		
North Hartland Reservoir	215 acres Altered Part F list	Annual water level fluctuations	Hydro facility	FERC license expires in 2021
Ottauquechee River, metal bridge in Woodstock down to North Hartland Reservoir	9.5 miles Stressed	Nutrients, organic enrichment, sediments	Golf course, road, developed land runoff	Macroinvertebrates good-fair in 2012 & 2014 at rm 14.8
Ottauquechee River, Bridgewater Corners down to Woodstock	10.0 miles Stressed	Sediment, physical alteration, temperature	Channelization (pre and post Irene), road borders river	Hit hard in Irene & post storm dredging & rip-rap did more
Falls Brook Tributary #4	0.4 miles Stressed	Sediment	Development, streambank erosion	
Upper Roaring Brook and West Branch	1.2 miles Stressed	Sediment	Development, road runoff, erosion	
Kedron Brook	6.0 miles Stressed	Sediments, nutrients, E. coli	Horse recreation area & pastures, WWTF	
Broad Brook	1.5 miles Stressed	Sediment, physical alterations	Past channelization & gold dredging, streambank erosion	
Barnard Brook	2.0 miles Stressed	Sediment, temperature	Streambank erosion, loss of riparian veg	
Gulf Stream	4.2 miles Stressed	Sediment	Mix of nonpoint sources – roads, development, ag..	

Assessment Information

Following is a map showing biological monitoring sites; structures and land uses that could influence the rivers and streams such as dams, landfills, hazardous sites, and stormwater permits; and the condition of the stream following assessments using all available information.

Concentrations of monitoring occurs on the streams in the ski area development and a number of hazardous sites and stormwater permits occur in the Woodstock and Quechee Village areas. After the map are tables with some data from biomonitoring and water chemistry monitoring.

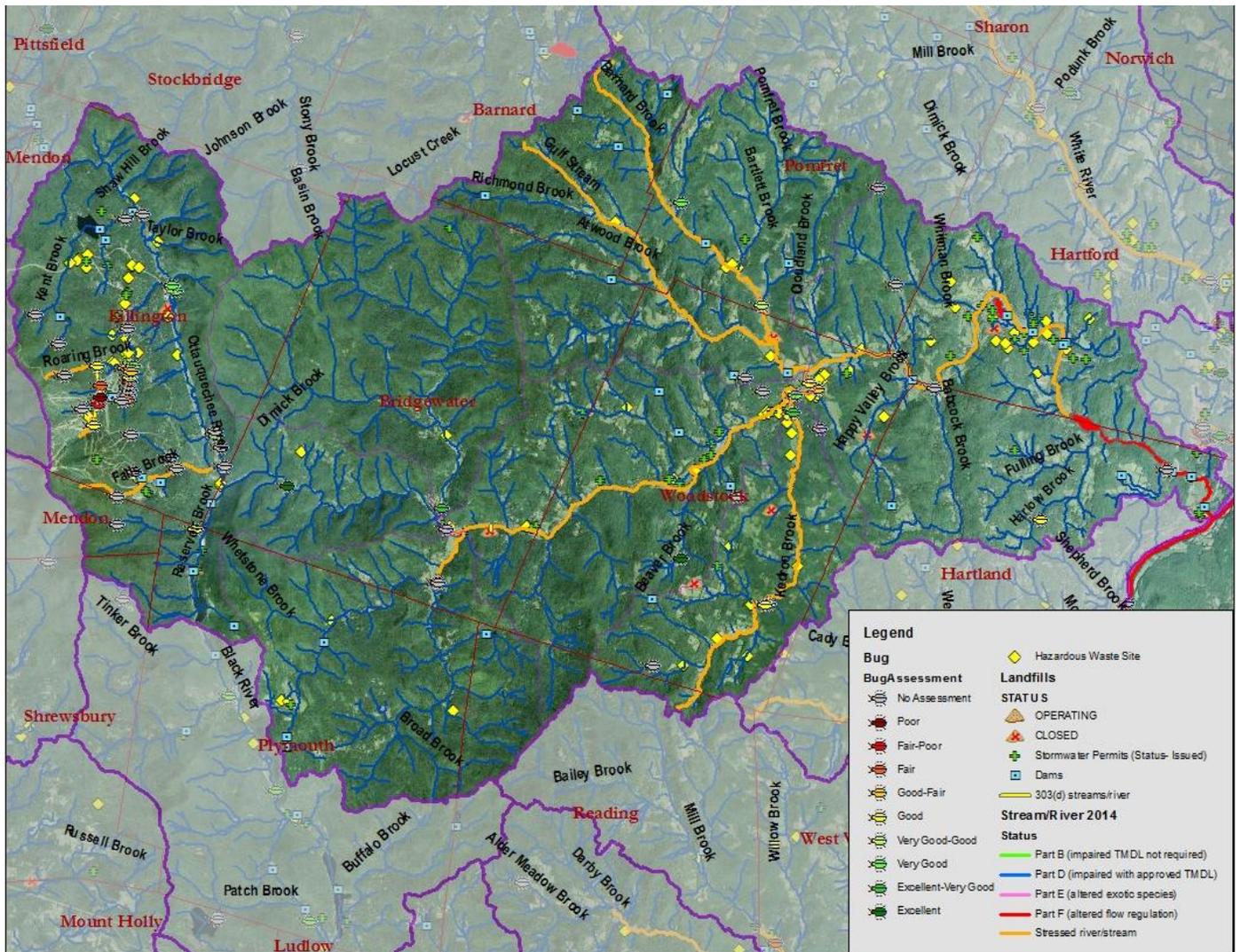


Figure 2. Ottauquechee River Watershed with Assessment Information

Biological Monitoring

There have been several sites on the Ottauquechee River mainstem or on its tributaries that have been sampled over a number of years where there is a better sense of the longer term condition, but a number of sites have only one biological sample result or none at all. Following is a table of the biological results from the last six years with a longer history described for three sites following. There is also a table with a list of streams where biological monitoring is needed.

Table 1. Biological community sampling results for Ottauquechee River & Tribs – 2009 to 2015

WBID	Stream Name	River -mile	Date	Assessment - macroinvertebrates	Assessment - fish
VT10-01	Ottauquechee River	14.8	9/15/2010	good	---
VT10-01	Ottauquechee River	14.8	9/20/2012	good-fair	---
VT10-01	Ottauquechee River	14.8	9/10/2014	good-fair	very good
VT10-01	Ottauquechee River	14.8	9/28/2015	good	----
VT10-01	Ottauquechee River	15.0	9/15/2010	very good	----
VT10-05	Ottauquechee River	34.3	9/13/2010	very good	----
VT10-05	Ottauquechee River	34.4	9/13/2010	very good	----
VT10-01	Harlow Brook	2.1	9/11/2014	good	excellent
VT10-04	Beaver Brook	1.7	9/12/2012	excellent	poor
VT10-06	Ottauquechee River Trib 57	1.0	10/7/2010	vgood-good	----
VT10-06	Ottauquechee River Trib 57	1.0	10/9/2015	very good	----
VT10-06	Roaring Brook	3.0	9/9/2014	good-fair	----
VT10-06	Roaring Brook	4.0	9/9/2014	fair	Unable to assess
VT10-06	West Trib Roaring Brk	0.2	9/9/2014	good	very good
VT10-06	East Trib Roaring Brk	0.3	9/9/2014	vgood-good	good
VT10-06	Madden Brook	0.3	10/1/2014	good	poor
VT10-07	Barnard Brook	2.6	9/10/2014	very good-good	----
VT10-07	Barnard Brook Trib 6	0.4	9/11/2014	very good	excellent
VT10-07	Kedron Brook	0.1	9/8/2014	very good	---
VT10-07	Kedron Brook	0.6	9/8/2014	exc-very good	---
VT10-07	Kedron Brook	5.2	9/15/2010	good	excellent
VT10-07	Kedron Brook	5.2	9/8/2014	fair	---
VT10-07	Kedron Brook	5.2	9/28/2015	good	excellent
VT10-07	Kedron Brook	5.3	9/15/2010	very good	---
VT10-07	Kedron Brook	5.3	9/28/2015	good	
VT10-08	North Branch Ottauquechee River	0.2	9/11/2014	exc-very good	---

Table 2. Biological sampling site locations

WBID	Stream or River	Station	Description
VT10-01	Ottauquechee River	14.8	Below WWTF 300 meters (below tractor crossing of the river)
VT10-01	Ottauquechee River	15.0	Immediately below the Woodstock WWTF outfall before mixing
VT10-05	Ottauquechee River	34.3	Located behind trailers, 100 meters below discharge pipe
VT10-05	Ottauquechee River	34.4	Above Sherburne FD#1 WWTF discharge
VT10-01	Harlow Brook	2.1	At edge of wetland complex
VT10-04	Beaver Brook	1.7	Adjacent to and upstream of Fletcher Hill Rd
VT10-06	Ottauquechee Trib 57	1.0	Below Sunrise Association spray disposal area about 50 meters
VT10-06	Roaring Brook	3.0	Above confluence with East Branch, above bridge into forested section
VT10-06	Roaring Brook	4.0	About 75 meters below the first Killington parking lot
VT10-06	West Trib Roaring Brk	0.2	Immediately above Killington Access Road about 20 meters
VT10-06	East Trib Roaring Brk	0.3	In lower area of Killington golf course just above first foot/cart bridge
VT10-06	Madden Brook	0.3	Park at log landing & bushwhack 200 meters upstream
VT10-07	Barnard Brook	2.6	Behind Pomfret Elementary Scholl
VT10-07	Barnard Brook Trib#6	0.4	Alongside Wild Apple Road
VT10-07	Kedron Brook	0.1	200 meters below last bridge crossing
VT10-07	Kedron Brook	0.6	Immediately below golf course in Woodstock, above small footbridge
VT10-07	Kedron Brook	5.2	Immediately downstream from the South Woodstock WWTF outfall
VT10-07	Kedron Brook	5.3	Above South Woodstock WWTF discharge at corner of fenced area.
VT10-08	North Branch Ottauquechee River	0.2	¼ mile upstream of Bridgewater Center Road immediately upstream of bridge

Roaring Brook was sampled in 2007 and 2014 at rm 3.0. Back in 2007, the density of macroinvertebrates was low but the richness was high. The Bio Index and the EPT/EPTc ratio were excellent indicating no enrichment stress on the community. The community composition also had a 61% similarity to SHG (small high gradient stream) reference. The amount of Oligochaetes indicated sediment stress. Sand filled the pools and the slow areas according to field notes. The silt rating was 3 out of a high of 5. Sediment was named as the predominant stressor.

In 2014, this was changed with density still low but richness also low. The community composition was very dissimilar to the SHG reference this year. Embeddedness was higher than in 2007. High frequency of scour was named as a stressor too this year.

Roaring Brook at rm 4.0 was sampled in 2004, 2005, and 2014. The macroinvertebrate assessment results were “poor”, “fair”, and “fair” again ten years after that first sample. Roaring Brook has been on the impaired waters list since at least 1998.

Kedron Brook was first sampled in 1994 at rivermile 5.2 just below the South Woodstock WWTF. It has been sampled four times at this site since then and most recently in 2015 as shown above in Table 1.

The aquatic community in 1994 was rated as “excellent”, however, the assessments of the macroinvertebrate community since 2000 have been “good” (in 2000, 2010, 2015) or “fair” (in 2014). Both enrichment and habitat degradation are discussed as the stressors resulting in the community being only “good” and in the one year, “fair”. The South Woodstock WWTF is above this site but there is also a large horse recreational area with little to no buffers on this stream and agricultural land use activities are above this sample site.

Ottawaquechee River mainstem at rm 14.8 has been sampled seven times since 2002. The macroinvertebrate assessment results have ranged from “good-fair” to “very good-good” with the latest assessment in 2015 as “good”. This site is located below the Woodstock WWTF.

Table 3. Biological monitoring needed in the Ottawaquechee River watershed

Water-body id	Stream or river name	Number of sites	Comments
VT10-02	Happy Valley Brook	1 site	Never been sampled
VT10-02	Babcock Brook	1 site	Never been sampled
VT10-02	Whitman Brook and Whitman Brook Trib 1	1 site	Whitman Brook needs to be sampled & it would be good to re-sample Trib 1 last sampled in 2002
VT10-05	Ottawaquechee River	1 or 2 sites	The upper Ottawaquechee sites were sampled pre-Irene. Need more recent samples.
VT10-07	Barnard Brook Trib 6	rm 0.4	Confirm the very high quality found in 2014 sampling
VT10-08	Broad Brook	1 site at least	This brook has not been sampled since 1987.
VT10-08	Pinney Hollow Brook	1 site	Never been sampled.
VT10-10	Gulf Stream	1 or, better yet, 2 sites	Gulf Stream is a large subwatershed to Barnard Brook (with named tributaries of its own) and has not been sampled.
VT10-10	North Bridgewater Brook	1 site	This tributary to Gulf Stream has never been sampled.
VT10-09	North Branch Ottawaquechee River	2 sites	Re-sample the site at rm 0.2 to confirm vhf and sample another site further upstream
VT10-09	North Branch Ottawaquechee tribs	1 or 2 sites	Sample the large tributary that comes in from the east

Water Chemistry Monitoring

Water chemistry sampling occurred on the Ottawaquechee River and some tributaries in summer of 2010, 2013, 2014, 2015. Some sampling also occurred in 2011 but the season was cut short due to Tropical Storm Irene. Phosphorus, nitrogen, turbidity, chloride, and *E. coli* were sampled. A five year summary report was completed in February 2016 (see the Information Sources section at the end of this report) with a presentation of the sampling results over those years.

Table 4. Summary results from four years of water quality sampling

Stream or River	River-mile	Description	A few key results*
Ottauquechee River	0.6	At Hartland covered bridge swim area	High <i>E. coli</i> in 2011.
Ottauquechee River	7.0	Below Quechee WWTF	Elevated P in 2013; high <i>E. coli</i> in 2013.
Ottauquechee River	13.2	Below Taftsville WWTF	Elevated P in 2013; high <i>E. coli</i> in 2011 and 2013.
Ottauquechee River	13.3	Above Taftsville dam	Elevated P in 2010 and 2013; high <i>E. coli</i> in 2011 and 2013.
Ottauquechee River	15.7	Below Woodstock WWTF	Elevated P in 2013; elevated <i>E. coli</i> in 2011 and 2013.
Ottauquechee River	16.3	Above Woodstock WWTF	High <i>E. coli</i> in 2011.
Ottauquechee River	18.5	Behind Woodstock Union High School	----
Ottauquechee River	24.5	Below Bridgewater WWTF	----
Ottauquechee River	25.4	At Route 100A bridge	----
Ottauquechee River	38.4	At Rabeck Road bridge	Elevated P in 2010, 2013, 2015; elevated <i>E. coli</i> in 2013.
Kent Pond Outlet Stream	1.5	At Kent Pond Outlet	Lowest <i>E. coli</i> numbers.
Roaring Brook	1.0	Mountain View Road crossing	Elevated chloride in 2010, 2011, 2013, 2014, 2015.
Falls Brook	0.2	Ottauquechee River confluence	----
North Branch Ottawaquechee River	0.1	Ottauquechee River confluence	Lowest chloride numbers.
Kedron Brook	4.5	Below WWTF	High P in 2010; high <i>E. coli</i> in 2011, 2013 & 2015.

* See report for color-coded figures per site per year

Physical Assessments

Geomorphic assessments

The Ottawaquechee River watershed was divided into nineteen reaches for the 2012 assessment done by Bear Creek Environmental for the Two Rivers-Ottauquechee Regional Commission. There were eighteen reaches on the main stem and one on Reservoir Brook, a tributary to the Ottawaquechee River. These nineteen reaches were then broken into 48 segments for the Phase 2 analysis. The study encompassed approximately nineteen miles of stream channel. A summary in the report stated:

“This assessment was helpful in identifying major stressors to geomorphic stability in the Ottawaquechee River watershed. The primary problem relating to geomorphic stability and habitat condition in the watershed is channel straightening and corridor encroachment associated with the existence of major roads and development. In some cases, this encroachment has limited floodplain access and has caused moderate to extreme channel degradation (lowering of the bed) resulting in sediment build up, channel widening, and planform adjustment (lateral movement). There are approximately 11.4 miles, or about 60%, of the Ottawaquechee River in the study area that run parallel to U.S. Route 4 where the high road embankment is completely restricting floodplain access. Channel straightening has resulted in a reduction in habitat quality and diversity. A lack of high quality streamside buffers along the Ottawaquechee River and parts of Reservoir Brook are exacerbating bank instability and erosion.”

Of the 48 segments that were analyzed, the habitat condition was found to be “good” on only three segments, “fair” on 39 segments, and “poor” on four segments. Two segments were not assessed. Data, analysis, photos, and maps are in the report cited below.

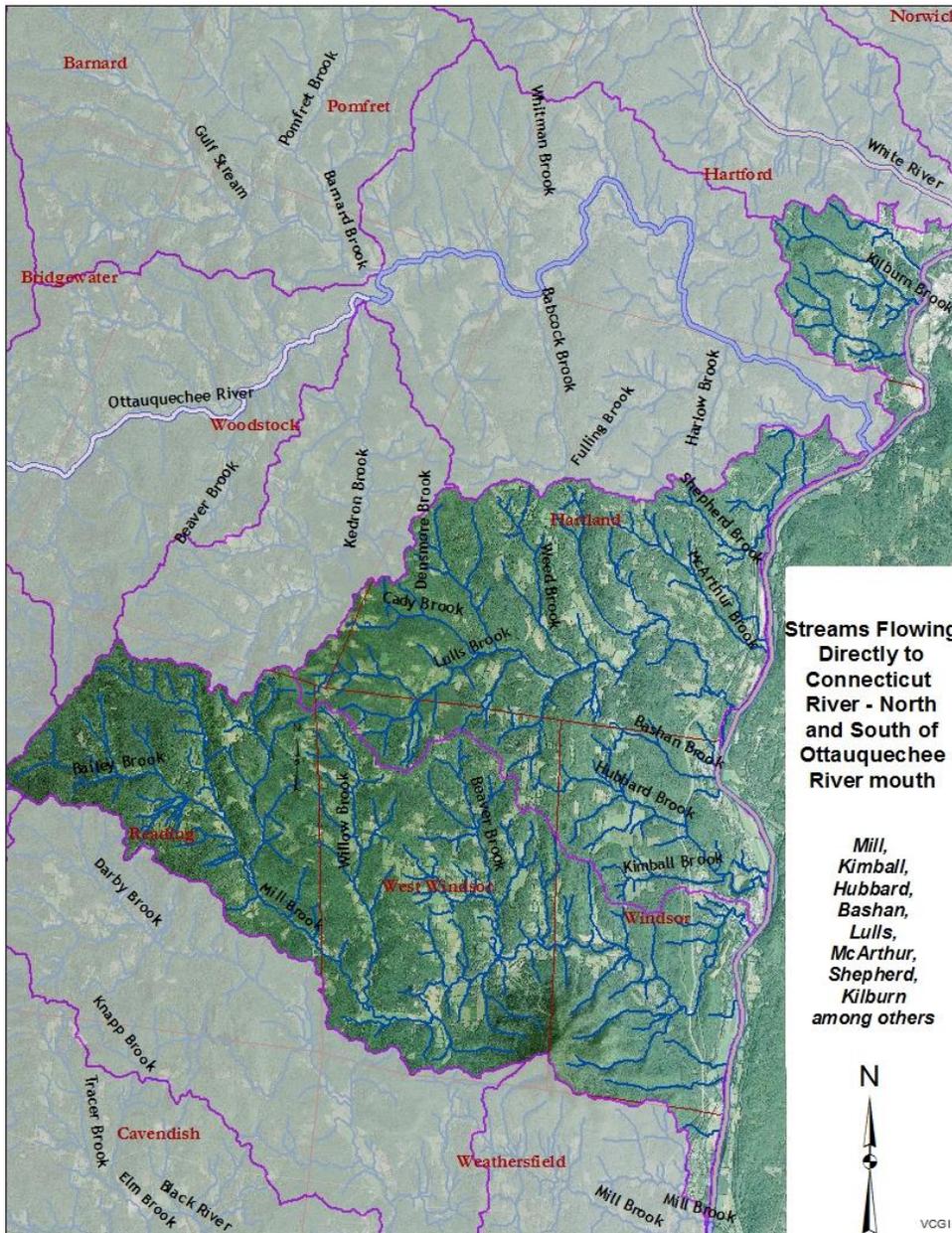
Dams

There are 40 dams identified in the attribute table of the ANR GIS dam layer in the Ottawaquechee River watershed. Of these forty, two are no longer there (“deleted”) and one was removed in 2007 (on Pinney Hollow Brook). See the table in Appendix 1 for the list of dams, the streams on which they are found, and their status.

Mill Brook, Lulls Brook, and Other Streams to the Connecticut River

Earlier Information on the Basin 13 tributaries to the Connecticut River

The last time that a formal assessment report was done for Basin 13, which once was a separate basin consisting of all of the smaller direct tributaries to the Connecticut River from Wilder down to the Massachusetts border, was in April 2002.



Now the Basin 13 streams are being assessed with, and are part of the plans of, Basin 10: Black and Ottauquechee Rivers; Basin 11: West, Williams and Saxtons Rivers; and Basin 12: the Deerfield River Watershed.

This Ottauquechee River watershed assessment report includes the basin 13 streams that drain to the Connecticut River from Hartford, Hartland, and Windsor, West Windsor, Reading. The named streams are Kimball Brook, Shepard Brook, McArthur Brook, Lulls Brook with a number of its named tributaries, Bashon Brook, Hubbard Brook, and Mill Brook.

These brooks are part of waterbodies VT13-06, VT13-07 and VT13-08. This 2016 assessment is in preparation for the 2017 Basin 10-13 plan.

Summary of Segments with Impacts

Stream or Lake Segment	Miles or Acres ¹ & Status	Pollutant	Source	Other information
Neal Brook	0.4 miles Impaired Part A list	metals	closed landfill drainage	
Mill Pond (Kennedys Pond) Windsor	14 acres Altered Part E list	Eurasian Water-milfoil		Pop confirmed 1987; limited non-chemical controls
Lulls Brook	8.0 miles Stressed list	sediment	gravel road runoff, other	needs additional assessment
Mill Brook, from Mill Pond dam to Conn River	1.0 miles Stressed list	sediment, stormwater	impoundment de-silting, developed land runoff	
Mill Brook, from Willow Brook mouth to Mill Pond	8.6 miles Stressed list	sediment, habitat alteration	Riparian encroachment, streambank erosion, road runoff	This brook was hit hard by TS Irene and sections of Brook Road are still closed.

1 - of impact, not total waterbody miles or acres

Assessment Information

Most sites sampled on the direct tributaries to the Connecticut River in this area have excellent to very good biological communities (macroinvertebrates and/or fish). The exception to this is Neal Brook at the sites that are below the Hartland Landfill.

Biological monitoring and assessment

Table 5. Biological sampling results for Neal, Lulls, and Mill Brooks – 2005 to 2015

WBID	Stream Name	River-mile	Date	Assessment - macroinvertebrates	Assessment - fish
VT13-06	Neal Brook	0.2	9/8/2015	fair	excellent
VT13-06	Neal Brook	0.4	9/23/2008	fair	fair
VT13-06	Neal Brook	0.4	9/30/2014	poor	-----
VT13-06	Neal Brook	0.4	9/8/2015	poor	excellent
VT13-06	Neal Brook	0.5	9/8/2015	exc-vgood	excellent
VT13-06	Kilburn Brook	0.2	9/23/2008	good	excellent (at rm 0.6)
VT13-06	Kilburn Brook	0.2	9/30/2014	excellent	-----
VT13-06	Kilburn Brook Trib 1	0.2	10/6/2011	excellent	excellent
VT13-07	Lulls Brook	5.9	9/8/2008	exc-very good	very good
VT13-07	Lulls Brook	6.6	9/19/2005	excellent	---
VT13-07	Lulls Brook	6.8	9/19/2005	exc-very good	----
VT13-08	Mill Brook	3.1	10/2/2008	excellent	---

WBID	Stream Name	River-mile	Date	Assessment - macroinvertebrates	Assessment - fish
VT13-08	Mill Brook	11.4	9/11/2014	fair	good

Table 6. Biological monitoring stations for Lulls and Mill Brooks

WBID	Stream or River	Station	Description
VT13-06	Neal Brook	0.2	At the end of Connecticut River road, just upstream of a cornfield
VT13-06	Neal Brook	0.4	About 25 meters below confluence with landfill tributary
VT13-06	Neal Brook	0.5	Located about 50 feet above the confluence with landfill tributary
VT13-06	Kilburn Brook	0.2	Located immediately below River Road
VT13-06	Kilburn Brook Trib 1	0.2	Upstream of I-91 and just south of I-89.
VT13-07	Lulls Brook	5.9	Upstream of Hartland Four Corners just past school.
VT13-07	Lulls Brook	6.6	Off Brownsville Road near address #868 below influence of new leachfield for G.M. Dharma Center
VT13-07	Lulls Brook	6.8	Below small private bridge crossing 50 meters. Near address #1092 off Brownsville Road
VT13-08	Mill Brook	3.1	Just below Route 44 bridge, above the interstate
VT13-08	Mill Brook	11.4	Located a ¼ mile below Luzenac discharge

Table 7. Biological monitoring needed in the VT13-07 & -08 Direct Tribs to Connecticut River

Water-body id	Stream or river name	Location and/or number of sites	Comments
VT13-07	McArthur Brook	1 site	This direct tributary to the Connecticut River in Hartland has never been sampled
VT13-07	Lulls Brook	Rm 3.4	Not sampled since 1998
VT13-07	Lulls Brook	Rm 6.6	Check on the “excellent” of 2005
VT13-07	Lulls Brook	1 site	Higher up on the brook than all past sites
VT13-07	Hubbard Brook	Rm 4.0	This site not sampled since 2003 (“good” then)
VT13-08	Beaver Brook	At least 1 site	This trib to Mill Brook has never been sampled
VT13-08	Willow Brook	At least 1 site	This trib to Mill Brook has never been sampled

Neal Brook

Neal Brook and the tributaries to it adjacent to the Hartford Landfill have been sampled for macroinvertebrate community health, metals, volatile organic compounds, and other chemical and physical parameters. There are some biological monitoring results from 2008, 2014, and 2015. There are the results of groundwater, surface water, and seep monitoring from 1986 to the present for some of the sites and from the 1990s or the early 2000s on for other monitoring locations.

The biological monitoring results (Table 5 above) show that Neal Brook is impaired from its mouth to rm 0.4 just below the point where Tributary 1 (which flows south of the landfill) enters and that the stressors are both toxics and organic enrichment. There have been exceedences

of metals standards in some of the surface water samples over the years and exceedences of standards for organic compounds in some of the seep samples. The results from the many samples taken are included in the biomonitoring summary report for Neal Brook, in the reports done by the consultants for the Town of Hartford, and in hydrogeologic report done to support the petition for a groundwater re-classification for the site (see references below). Neal Brook was added to the Vermont 303(d) impaired waters list in the 2016 assessment cycle.

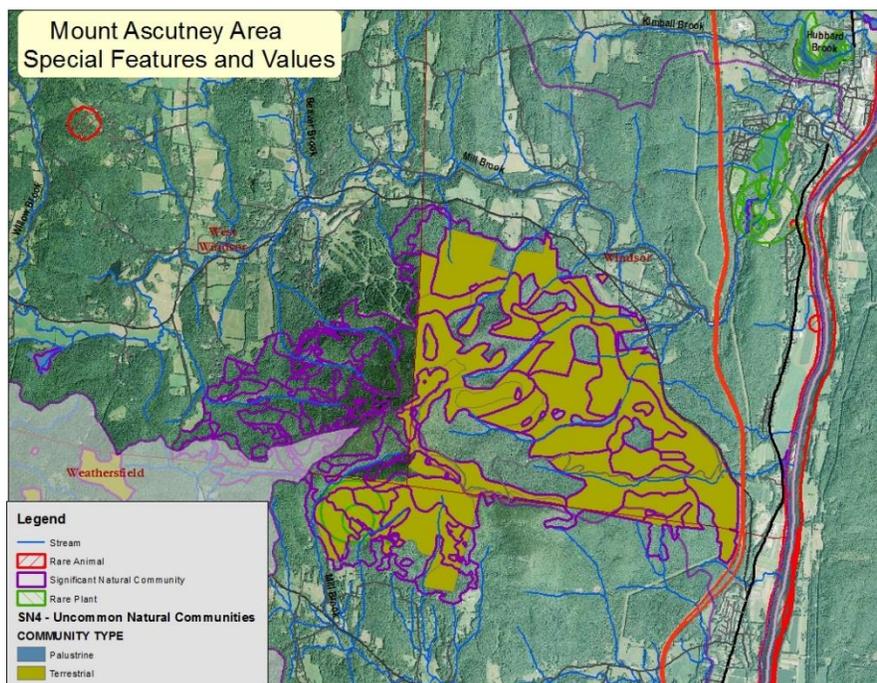
Special Values and Features

Mount Ascutney area

Mount Ascutney and an adjacent area shows as having a “very high” contribution to biological diversity as mapped on the ANR Biofinder. Below is a description of the area largely from the DFW Heritage Program data and information.

Mount Ascutney is a monadnock (isolated mountain) completely surrounded by lowlands. This mountain supports a wide range of natural communities ranging from Montane Spruce-Fir Forest and Montane Yellow Birch-Red Spruce Forest on its peak and upper slopes to Northern Hardwood Forest at mid elevations, conifer-dominated heath forests in mid elevations, and oak- and hemlock- dominated forests at lower elevations. The area is notable in that spruce trees extend to lower elevation than usually found in Vermont, while oak trees ascend to a relatively high elevation. This results in unusual natural communities that include mixes of oak and spruce, with hemlock also often present.

The slopes of the mountain also support cliffs, outcrops, and talus slopes. Numerous blue line streams flow down the slopes into the Mill Brook of Windsor and West Windsor to the north and Mill Brook of Weathersfield to the south. Few if any wetlands are present. Much of the mountain is protected in Ascutney State Park and the West Windsor Town Forest.



Information Sources

Aquatic Life Use Support Assessment of Neal Brook, Hartford, Vermont, December 2015. Prepared by Vermont ANR DEC WSMD Biomonitoring and Aquatic Studies Section, Montpelier, Vermont.

Biomonitoring data and analysis, Vermont ANR DEC Watershed Management Division, Biomonitoring and Aquatic Studies Section, Montpelier, Vermont, up through 2015.

Hydrogeologic Report to Support the Petition for Groundwater Reclassification: Hartford Landfill, U.S. Route 5, Hartford, Vermont. September 24, 2014. Prepared for the Town of Hartford by Ross Environmental Associates, Inc, Stowe, Vermont.

Ottawaquechee River Group Five Year Comprehensive Summary of Results, Chris Yurek, February 16, 2016. For the Ottawaquechee River Group and the LaRosa Environmental Laboratory Partnership.

Ottawaquechee River Watershed Stream Geomorphic Assessment Bridgewater and Woodstock, Vermont, January 29, 2013. Prepared by: Bear Creek Environmental, LLC, Middlesex, Vermont under contract to the Two Rivers-Ottawaquechee Regional Commission, Woodstock, Vermont.

Vermont Department of Fish and Wildlife Natural Heritage Program element occurrence data and information extracted August 2016.

Water Quality Results Spring 2016 for the Hartford Solid Waste Management Facility, Hartford, Vermont, July 13, 2016. Done for the Town of Hartford by Stantec Consulting Services, Inc., South Burlington, Vermont.

Appendix 1 – Dams

Table A-1. Dams of the Ottauquechee River watershed

Wbid	Dam name	Stream	Town	Dam Status	State id
VT10-01	White Current	Ottauquechee River	Hartland	In Service	95.05
VT10-01	Hartland-6	Ottauquechee River	Hartland	----	95.06
VT10-01	North Hartland	Ottauquechee River	Hartland	In Service	95.01
VT10-02	Sunny Acres	Ottauquechee River TR	Hartland	In Service	95.04
VT10-01	Deweys Mills	Ottauquechee River	Hartford	In Service	94.02
VT10-02	Deweys Pond	Ottauquechee River TR	Hartford	In Service	94.07
VT10-01	Quechee Mills	Ottauquechee River	Hartford	In Service	94.01
VT10-02	Lake Pinneo	Ottauquechee River TR	Hartford	In Service	94.08
VT10-01	Taftsville	Ottauquechee River	Woodstock	In Service	254.05
VT10-02	Crystal Pond	Happy Valley Brook TR	Hartland	In Service	95.06
VT10-10	Billings Pond	Barnard Brook	Woodstock	In Service	254.01
VT10-10	The Pogue	Barnard Brook TR	Woodstock	In Service	254.08
VT10-10	Lakota Lake	Richmond Brook	Barnard	In Service	11.05
VT10-10	Martin	Cloudland Brook TR	Pomfret	In Service	157.02
VT10-10	Breakneck Hill	----	Pomfret	----	157.06
VT10-10	Gray Camp Pond	Barnard Brook TR	Barnard	In Service	11.01
VT10-10	Line Pond	Barnard Brook TR	Barnard	Deleted ¹	11.06
VT10-10	Kellogg Pond	Barnard Brook TR	Barnard	In Service	11.03
VT10-10	Sonnenburg Ski Area	Barnard Brook TR	Barnard	In Service	11.04
VT10-10	Noble Pond	Gulf Stream TR	Bridgewater	In Service	28.03
VT10-07	Connors Pond	Kedron Brook TR	Woodstock	In Service	254.09
VT10-04	Cox Reservoir	Ottauquechee River TR	Woodstock	In Service	254.03
VT10-04	Vondell Reservoir	Vondell Brook	Woodstock	In Service	254.02
VT10-04	Carlton Reservoir	Ottauquechee River TR	Woodstock	In Service	254.04
VT10-08	Meccawe Pond	Broad Brook TR	Reading	In Service	163.01
VT10-8	Pinney Hollow	Pinney Hollow Brook	Plymouth	Removed	156.09
VT10-08	Lower Moore Pond	Pinney Hollow Brook	Plymouth	In Service	156.03

VT10-08	Upper Moore Pond	Pinney Hollow Brook	Plymouth	In Service	156.04
VT10-06	Sherburne 14	Reservoir Brook TR	Killington	In Service	188.14
VT10-06	Woodward Reservoir	Reservoir Brook	Plymouth	In Service	156.01
VT10-06	Rockefeller	Woodward Reservoir TR	Plymouth	In Service	156.07
VT10-06	Johnson	Ottauquechee River TR	Killington	In Service	188.08
VT10-06	Sunrise Village Lagoon	Falls Brook TR	Killington	In Service	188.15
VT10-06	Bear Pond	Falls Brook TR	Killington	In Service	188.16
VT10-06	Mirror Lake	Roaring Brook TR OS	Killington	In Service	188.06
VT10-06	Snowshed Pond	Roaring Brook TR OS	Killington	In Service	188.07
VT10-06	Thundering Falls	Kent Brook	Killington	In Service	188.20
VT10-06	Sherburne 5	Kent Pond TR	Killington	In Service	188.05
VT10-06	Kent Pond	Kent Brook	Killington	In Service	188.09
VT10-06	Pico Pond	Kent Pond TR	Killington	Deleted	188.17

1 – deleted means that the DEC FED dam safety staff have checked the location and the dam is gone but the record of its existence is being kept.

Table A-2. Dams on Basin 13 Streams

Wbid	Dam name	Stream	Town	Status	State id
VT13-06	Hurricane Lower Reservoir	Kilburn Brook	Hartford	Breached (Partial)	94.04
VT13-06	Wright Reservoir	Connecticut River-TR	Hartford	In Service	94.05
VT13-06	Hurricane Upper Reservoir	Kilburn Brook-TR	Hartford	Breached (Partial)	94.03
VT13-06	Simonds Reservoir	Kilburn Brook-TR	Hartford	In Service	94.06
VT13-07	Stokien	Weed Brook	Hartland	In Service	95.02
VT13-07	Martinsville	Lulls Brook	Hartland	In Service	95.03
VT13-07	Bronson	Lulls Brook-TR	West Windsor	In Service	239.04
VT13-07	Rawson	Lulls Brook-TR	West Windsor	In Service	239.02
VT13-07	Prison Pond	Hubbard Brook-TR	Windsor	In Service	248.07
VT13-07	Lake Runnemedede Dike	Connecticut River-TR	Windsor	In Service	248.08
VT13-07	Lake Runnemedede	Connecticut River-TR	Windsor	In Service	248.01

Wbid	Dam name	Stream	Town	Status	State id
VT13-08	Windsor (Lower)	Mill Brook	Windsor	Breached	248.03
VT13-08	Windsor Upper	Mill Brook	Windsor	In Service	248.02
VT13-08	Mount Ascutney Effluent Pond	Mill Brook-OS	West Windsor	In Service	239.07
VT13-08	Mount Ascutney Snow Pond	Mill Brook-OS	West Windsor	In Service	239.08
VT13-08	Howland	Mill Brook-TR	West Windsor	In Service	239.01
VT13-08	Hammondsville Mine	Reading Hill Brook - OS	Reading	In Service	163.08
VT13-08	Windsor Minerals Pond #9	Mill Brook-TR	West Windsor	In Service	239.05
VT13-08	Windsor Minerals Pond #10	Mill Brook-TR	West Windsor	In Service	239.06