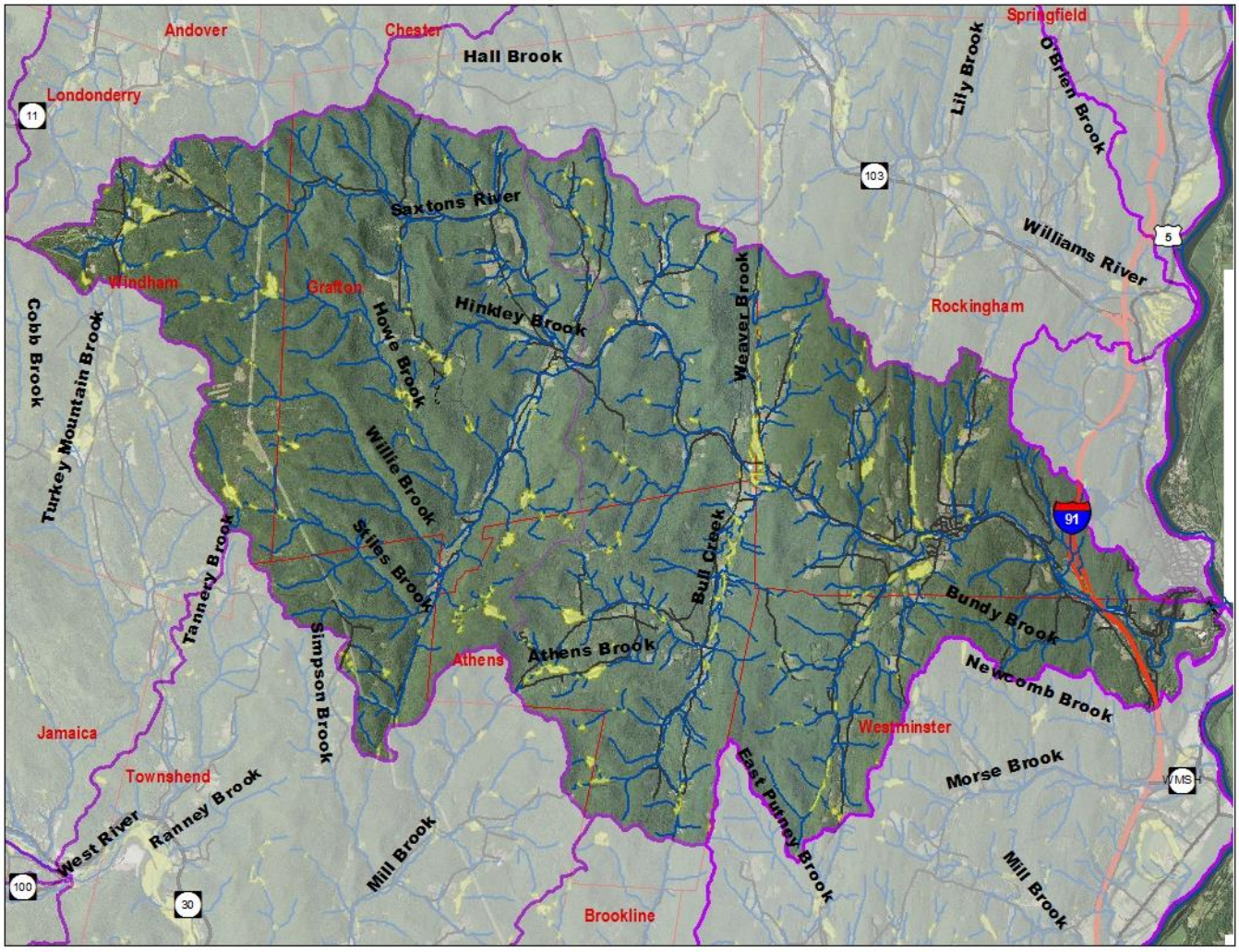
The Saxtons River and its Watershed

Updated Water Quality/Aquatic Habitat Assessment Report

October 2014



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Earlier Information on the Saxtons River Watershed

The last time that a formal assessment report was done on the Saxtons River was in 2001 as the Basin 11 – West, Williams & Saxtons Rivers Water Quality and Aquatic Habitat Assessment Report. Following that there was the 2008 Basin 11 West River, Williams River, Saxtons River Management Plan. In addition, there was geomorphic assessments done on the Saxtons River between 2008 and 2010 culminating in a river corridor plan dated September 2010. This 2014 assessment is a further update in preparation for the 2015 Basin 11-13 plan.

General Description of the Watershed

The Saxtons River rises on the eastern slopes of the southern Green Mountains in the town of Windham and flows southeasterly across the Vermont Piedmont to the Connecticut River. Its length is 20 miles draining an area of 78 square miles with a total drop of approximately 1800 feet. The basin is characterized by narrow steep gorges cut through rugged hilly uplands with outcropping bedrock and poor drainage.

The Saxtons River originates in an extensive wetland complex in the Lawrence Four Corners area in Windham from which it begins its easterly flow. Many headwater tributaries from the hills and mountains of the east part of Windham and the western part of Grafton flow northerly and southerly through narrow, forested valleys to join the Saxtons River. The Saxtons continues an easterly flow through Houghtonville where 1.5 miles downstream, the river turns south and flows in a somewhat wider valley to Grafton village.

In Grafton, the South Branch joins the Saxtons River from the south. The South Branch is six miles long and drains a watershed that is 20.3 square miles.

From Grafton village and the South Branch confluence, the river flows northeasterly then southeasterly around the base of Kidder Hill then continues southeasterly to the village of Saxtons River. Weaver Brook, Bull Creek, and Leach Brook all contribute to the river's flow in this stretch. From Saxtons River village, the river continues its southeasterly journey until North Westminster where it bends back, flows over Twin Falls then continues in a northeast direction for just over a mile before emptying into the Connecticut River.

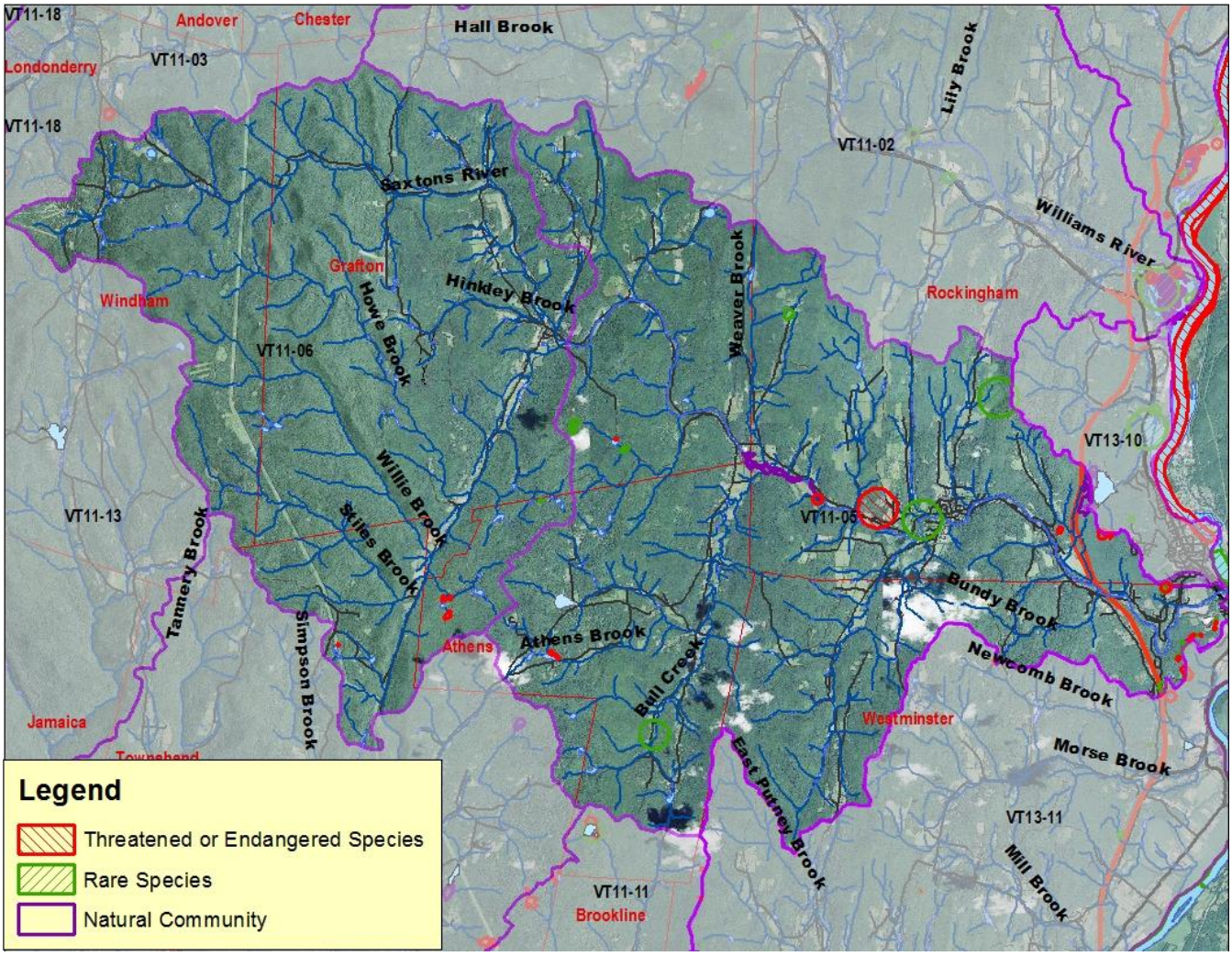
Special Features and Values of the Saxtons River Watershed

Waterfalls and Swimming Holes

On the lower Saxtons River just above the Route 5 bridge in Bellows Falls is the area called Saxtons River Falls. There are rocks and a sandy beach for sitting and sunbathing and ledges for jumping. It gets good local use. At the mouth of the river is a sandy area that appears to be used as a picnic or gathering spot. The vacant land at the mouth which is a dirt turn-around has good potential for a park. Another popular local gathering site is Twin Falls upstream in Westminster that has a nice pool, the falls, and ledges.

Rare, threatened, and endangered species and significant natural communities

The Saxtons River watershed is host to at least the following RT&E species and significant natural communities: state-endangered barbed-bristle bulrush, state-endangered scrub oak, state-threatened flowering dogwood, state-threatened slender mountain rice, very rare tapering rush, rare spotted wintergreen, rare American hazelnut, rare Canada frostweed, state-endangered sedge wren, state-threatened whip-poor-will, very rare Fowler's toad, Eastern ribbonsnake of special concern, sugar maple-ostrich fern floodplain forest, and river cobble shore natural community.



Saxtons River and Tributaries Summary of Segments with Impacts

Stream or Lake Segment	Mileage & Status	Pollutant	Source	Uses affected
Saxtons River, from mouth upstream to South Branch	12.8 miles – ***Stressed*** Stressed waters list	temperature, sediment, channel alterations	channel modification, encroachment, erosion	aquatic habitat, fishing
Saxtons River, from mouth up to SaxtonsR WWTF	5.0 miles – ***Stressed*** Stressed waters list	nutrients	both biomonitoring & phosphorus sampling indicate enrichment below WWTF	aquatic life

Assessment Information

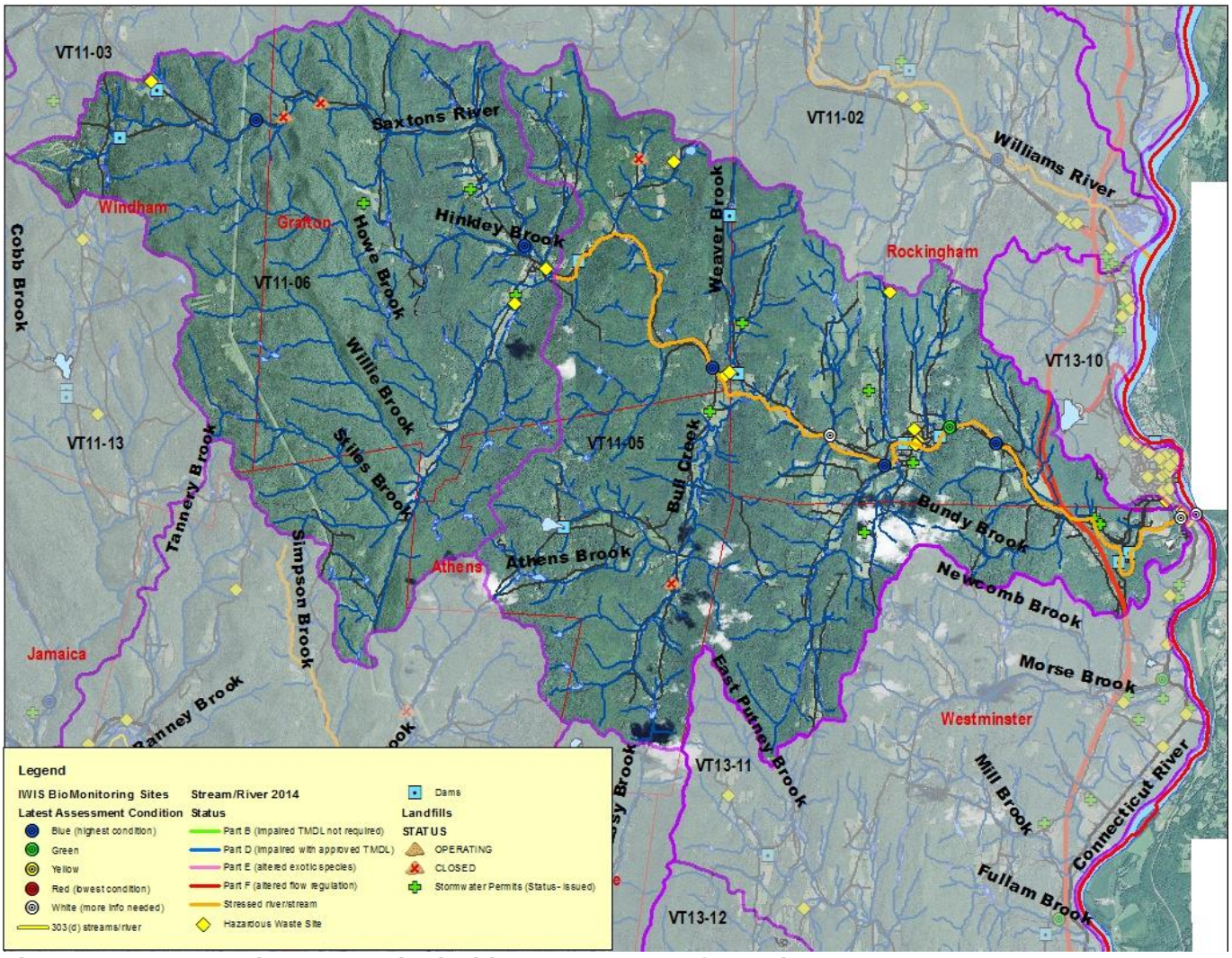


Figure 2. Saxtons River Watershed with Assessment Information

Biological Monitoring

Table 1. Biological community sampling results from 2006 to 2013.

Waterbody id	River/Stream	Town	Station	Date	Assessment	Com-munity
VT11-05	Saxtons R	Rockingham	4.5	9/25/2008	Good	bugs
VT11-05	Saxtons R	Rockingham	4.5	9/25/2008	Fair	fish
VT11-05	Saxtons R	Rockingham	4.5	9/21/2012	Good	bugs
VT11-05	Saxtons R	Rockingham	4.5	9/21/2012	Fair	fish
VT11-05	Saxtons R	Grafton	9.4	9/20/2006	Excellent	bugs
VT11-05	Saxtons R	Grafton	9.4	9/20/2006	Good	fish
VT11-05	Saxtons R	Grafton	14.4	9/20/2006	Exc-vgood	bugs
VT11-05	Saxtons R	Grafton	14.4	9/20/2006	Very good	fish
VT11-06	Saxtons R	Windham	20.3	9/22/2008	Excellent	bugs
VT11-06	Saxtons R	Windham	20.3	9/25/2008	Very good	fish
VT11-05	Leach Brook	Rockingham	0.1	9/20/2006	Poor	fish

Table 2. Biological community sampling sites

Waterbody id	Stream	Station	Description
VT11-05	Saxtons River	4.5	Below town & WWTF, ¼ mile below bridge
VT11-05	Saxtons River	9.4	On Rte 121, 200 meters up of Cambridgeport bridge
VT11-05	Saxtons River	14.4	Rte 121, across from 191 Houghton Village Road
VT11-06	Saxtons River	20.3	Below Rte 121 new bridge about 50 meters
VT11-05	Leach Brook	0.1	Below first bridge up Leach Road

Saxtons River biological monitoring assessment notes

Rivermile 4.5 in Rockingham was sampled in 2008 and the macroinvertebrate community at this site was assessed as "good". In 2008, the combination of metrics indicated a moderate shift in the community composition toward enrichment-tolerant EPT taxa. The community had not, however, lost its water quality sensitive species - they had become less dominant in the community. The percent Oligochaeta was low indicating little sediment stress.

In 2012, there was macroinvertebrate and fish community sampling at rm 4.5. The macroinvertebrate community was "good" and the fish community was "fair". Notes from the macroinvertebrate assessment state that the "Bio Index is moderately elevated indicating significant enrichment and instream primary productivity. TP increased from 6 ug/liter to 11ug/liter from above to below the WWTF, with a low percent canopy most of these nutrients would be available to algae growth." The notes went on to say that since the site assessment in 2008, the number of species and EPT both decreased and the BI increased "indicating a more degraded community" even though both final assessments was good. Notes associated with the fish community results noted that there were too few fish generally and too few brook trout.

Table 3. Biological monitoring needed in the Saxtons River watershed

Waterbody id	Stream or river name	Location/number of sites	Comments
VT11-05	Saxtons River	rm 9.4 or rm 14.4	Latest bio data at these sites are from 2006 and so updates would be valuable.
VT11-05	Bull Creek	1 or 2 sites	No data.
VT11-05	Unnamed Stream up along Westminster West Road	1 or 2 sites	No data.
VT11-06	South Branch Saxtons River	2 sites	No data and this is a signi-ficant size stream in the watershed.
VT11-06	Howe Brook or Willie Brook	1 site on either	No data on these tributaries to South Branch. Perhaps very high quality?

Water Quality Sampling

As shown below, three sites have been sampled yearly by the Southeastern Vermont Watershed Alliance for several water quality paramters including *E. coli*, phosphorus, conductivity, and others. The sites are at rm 5.6 (in Rockingham, just above Saxtons R village at Stickney's Field); rm 5.0 (in Rockingham, below Saxtons River village WWTF); and rm 0.19 (in Westminster, at "Sandy Beach" just south of the Bellows Falls town line).

Table 4. E. coli sampling results (geometric mean of season mpn/100 ml)

	Saxtons .19 "Sandy beach"	Saxtons 5.0 - below Saxtons R WWTF	Saxtons 5.6 Stickneys Field
2004	108	---	50
2005	281	---	113
2006	117	---	70
2007	98	---	73
2008	173	266	113
2010	68	51	46
2011	142	94	81
2012	275	192	150
2013	355	209	129

The *E. coli* sampling results show a general trend of lower levels at Saxtons 5.6 to higher levels downstream at Saxtons .19 although one year (2008) had the highest geometric mean of *E. coli* at Saxtons 5.0 below the WWTF. The *E. coli* geometric means are often above the 77 standard (8 of the 9 years at rm .19; 4 of 5 years at rm 5.0; and 5 of 9 years at rm 5.6), but less often above the geomean of 126 (5 of 9 years at rm .19; 3 of 5 years at rm 5.0; and 2 of 9 years at rm 5.6).

Table 5. Phosphorus sampling results (geometric mean of season in ug/Liter)

	Saxtons .19 "Sandy beach"	Saxtons 5.0 - below Saxtons R WWTF	Saxtons 5.6 Stickneys Field
2004	11.23	----	7.22
2005	12.01	----	12.39
2006	10.01	----	8.12
2007	17.04	----	8.62
2008	18.13	10.90	11.24
2010	10.45	40.82	8.12
2011	11.27	34.42	10.72
2012	11.93	161.00	11.65
2013	17.74	46.65	10.17

Phosphorus sampling shows that the phosphorus levels are high at the Saxtons 5.0 site over the last four sampling seasons. Phosphorus ranges from 34.42 to 161.00 in the 2010 through 2013 sampling period and these values are from three to 13 times the values at the sampling site that is above (rm 5.6). The proposed phosphorus standard for a Class B medium high gradient stream is 15 ug/liter. The high phosphorus does coincide with signs of enrichment in the macroinvertebrate community (see table and discussion above).

Table 6. Maximum temperature (degrees Celsius) for each season

	Saxtons .19 "Sandy beach"	Saxtons 5.0 Below Saxtons R WWTF	Saxtons 5.6 Stickneys Field
2004	19.0	----	18.0
2005	22.0	----	20.5
2006	22.0	----	20.0
2007	21.0	----	----
2008	20.0	19.5	20.0
2010	20.0	19.0	20.0
2011	20.0	19.0	18.0
2012			
2013			

Conductivity, turbidity, nitrogen, and pH were also sampled and the results did not indicate water quality problems for these parameters.

Physical Assessment

In 2008, the Windham County NRCD retained an environmental consulting firm who conducted Phase 1 geomorphic assessments on 77 miles in the Saxtons River watershed and Phase 2 assessments on 32 miles in the watershed. The results of the Phase 2 assessments are given in the table below.

The consultants identified "abundant reach scale stressors such as corridor encroachments and channel straightening.. and noted that "the mainstem of the Saxtons River from Grafton to Bellows Falls has lost significant floodplain function and aquatic

habitat due to encroachment from Route 121" with the exception of two areas at tributary junctions. Woody debris densities were often low as were pool densities.

Bull Creek has been straightened in the past but is in a wide alluvial valley and habitat improvement is thought to be "very promising" on this stream.

Table 7. RHA and RGA conditions for Phase 2 segments in Saxtons River watershed

Stream Name	Reach/ Segment ID	RHA Condition	RGA Condition
Saxtons River mainstem	M01-A	fair	fair
	M01-B	na	good
	M02	fair	fair
	M03-A	fair	fair
	M03-B	fair	fair
	M04	poor	poor
	M05	fair	fair
	M06	fair	fair
	M07	fair	good
	M08	fair	fair
	M09	fair	fair
	M10	fair	fair
	M11	fair	fair
	M12	fair	fair
	M13	fair	fair
	M14	poor	fair
	M15	fair	fair
	M16	fair	fair
	M17	poor	poor
	M18	fair	good
	M19	good	fair
	M20-A	good	fair
	M20-B	fair	fair
Bull Creek	T4.01-A	fair	fair
	T4.01-B	good	fair
	T4.02	fair	fair
	T4.03-A	fair	fair
	T4.03-B	fair	fair
	T4.03-C	fair	fair
South Branch Saxtons River	T6.01-A	fair	fair
	T6.01-B	fair	fair
	T6.02	fair	fair
	T6.03	fair	fair
	T6.04-A	fair	fair
Stiles Brook	T6.04-B	poor	poor
Howe Brook	T6.S1.01-A	fair	fair
Willie Brook	T6.S2.01-A	fair	poor

References

1) ***Southeastern Vermont Watershed Alliance Water Quality Monitoring Program 2010 & 2011 Report***, January 2012. Prepared by: Laurie Callahan, Water Quality Monitoring Program Coordinator.

2) ***River Corridor Plan for the Saxtons River Watershed Windham County, Vermont*** September 30, 2010. Prepared by Fitzgerald Environmental under contract to the Windham County Natural Resources Conservation District and the Windham Regional Commission Brattleboro, Vermont.

3) Vermont DEC WSMD Biomonitoring Database, 2014.