

# The Williams River and its Watershed

## Water Quality and Aquatic Habitat Assessment Update

October 2014

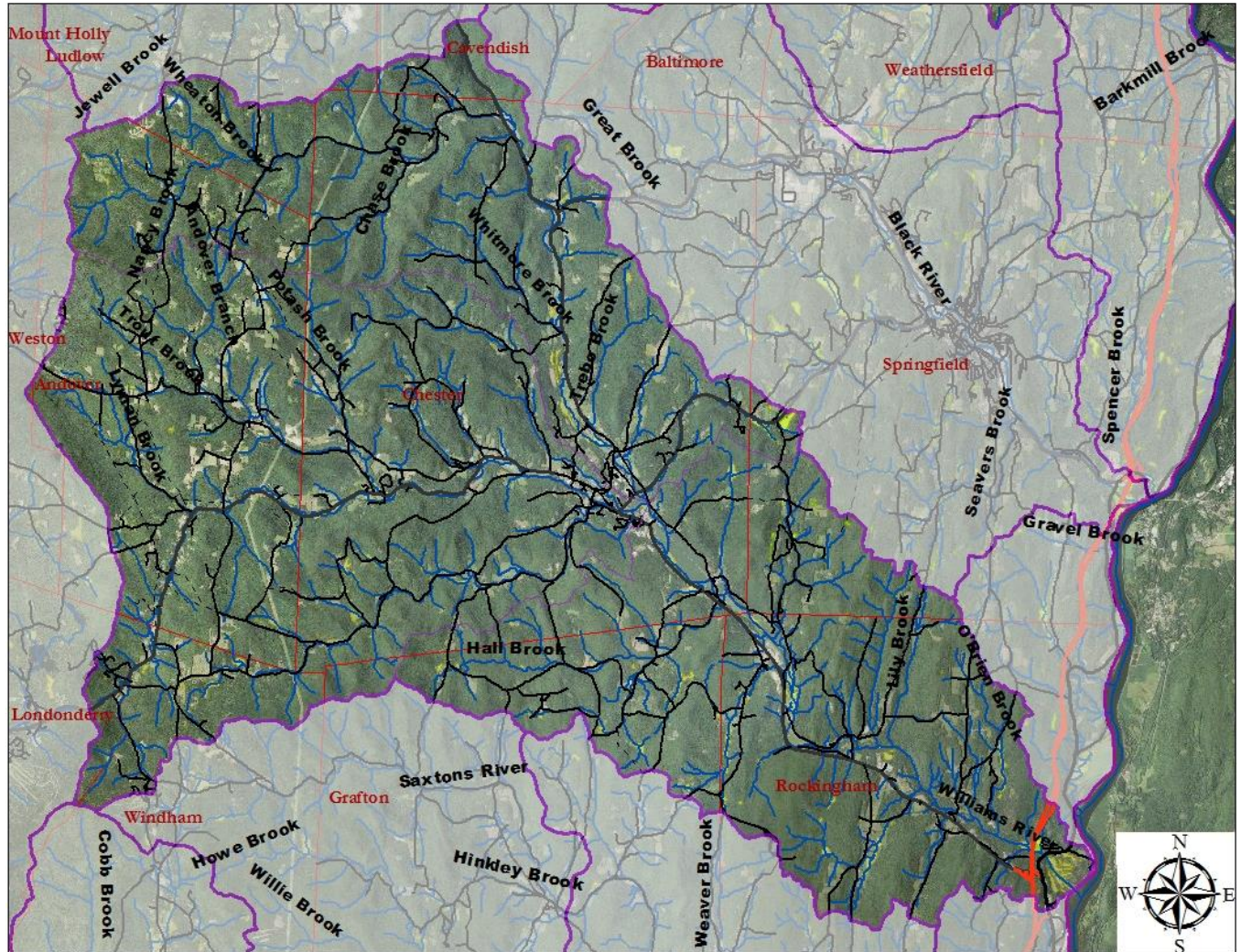


Figure 1. Williams River watershed.

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## **Earlier Information on the Williams River Watershed**

The last time that a formal assessment report was done on the Williams 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. This 2014 assessment is a further update in preparation for the 2015 Basin 11-13 Plan.

## **General Description of the Watershed**

The Williams River originates on the eastern edge of the southern Green Mountains and flows easterly then southeasterly through the Southern Vermont Piedmont before joining the Connecticut River at Herricks Cove. The Williams River has a stream length of 25 miles and drains an area of 117 square miles. Much of the basin is rugged, hilly land with steep slopes and poor drainage.

The Williams River headwater streams come off the slopes of Terrible Mountain and other nearby mountains to form the Williams River mainstem. The river flows easterly through Andover and into the southern portion of Ludlow where Wheaton Brook, Lovejoy Brook, and Bear Brook join in. It continues its easterly flow into Chester and is confined to a relatively narrow valley until it turns south-southeast. At that point it flows in a broader valley down the length of the town of Chester. In the village of Chester, the Middle Branch of the Williams River joins the Williams River mainstem.



**Figure 2. Williams River looking downstream of Missing Link road (Irene streambank damage bank right). Photo taken June 2014.**

The Middle Branch originates in Windham and flows north for a ways before flowing east through Andover and Chester into the Williams River. Lymans Brook, Andover Branch, and South Branch are all tributaries to the Middle Branch. The Middle Branch is 13 miles in length and drains a watershed of 47 square miles.

From Chester village, the Williams River continues its southeasterly flow into the town of Rockingham where it flows through Bartonville, over the Brockway Mills dam, and through a narrow valley before flowing out into Herricks Cove at the Connecticut River.

## **Special Uses, Features, and Values in the Williams River Watershed**

### **Boating**

There are three whitewater boating stretches in the Williams River watershed described in the 1992 Whitewater Rivers of Vermont report and very briefly described in the [2001 Basin 11 Assessment Report](#) on page 14.

### **Swimming**

The Williams River is relatively shallow in the summer and there are few known swimming holes. The river was not explored during the 1991 Vermont Swimming Hole Study although two sites are listed but not described in the study's report. One of the sites is Rainbow Rocks in Chester and the other is Brockway Mills in Rockingham. Rainbow Rocks are ledges with a deep hole below. The Brockway Mills site is an 80-foot gorge with pools, potholes, and small cascades. It is below the hydro-electric development at Brockway Mills and is a well-known site locally as confirmed during a watershed visit in the summer of 2014. It is also a popular fishing stretch.

### **Biological Diversity**

High to very high contributions to biological diversity potential occur in an area in the upper Williams watershed northwest of Chester village, in the subwatershed of Chase Brook, and adjacent mountains (see the light purple to dark purple color in the map below). There are some known rare species (see two patches of deepest purple); there are some potential vernal pools (see small purple circles); the area is a habitat block that is larger than 10,000 acres and thus an "anchor block" of land considered "core habitat". This area is also "representative physical landscape" of mountain slopes. As can be seen below, protection of this area of identified area of higher biological diversity potential would include and protect numerous, likely pristine headwater streams.

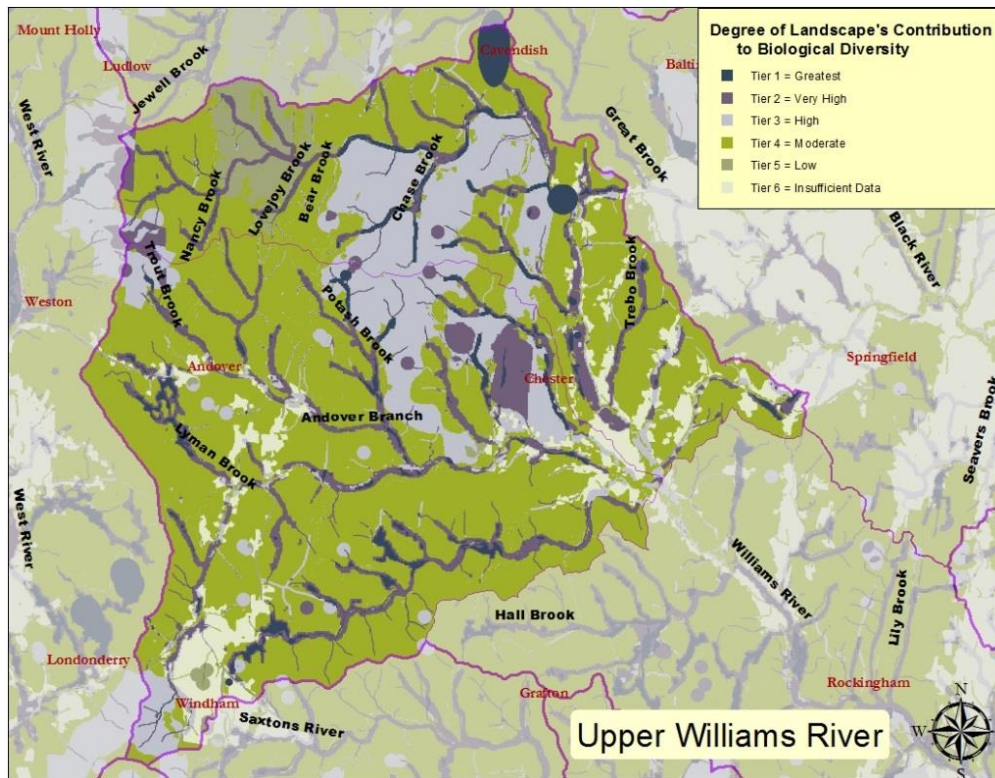


Figure 3. High to very high contributions to biological diversity in Upper Williams

## Summary of Impacts to Waters in William River Watershed

Table 1. Stream segments with known impacts in Williams River Watershed

Stream or lake segment	Mileage & Status	Pollutant	Source	Further information
Lower Williams River from mouth to confluence of Middle Branch	11.8 miles <b>Stressed</b>	sediment, nutrients, temperature	encroachments from developed land (roads/RRs esp), ag land, small or lacking riparian buffers	this river system was hit hard by TS Irene, also an impoundment above hydro dam that warms water
Middle Branch Williams River	10.5 miles <b>Stressed</b>	physical alterations, temperature	dredging, berming, channelization, also diminished riparian veg	hit hard by TS Irene
Williams River, above Chester Village to Route 103 Junction/Smokeshire Road junction	10.5 miles <b>Stressed</b>	temperature, sediment	loss of riparian vegetation, road encroachment	hit hard by TS Irene

# Assessment Information for River & Stream Segments

## Biological Monitoring

Table 2. Biological community sampling results from 2004 - 2013

Waterbody id	River/Stream	Town	Station	Date	Assessment	Community
VT11-01	Williams R	Chester	11.8	10/9/2008	Very good	bugs
VT11-01	Williams R	Chester	11.8	10/14/2008	Good	fish
VT11-01	Williams R	Chester	11.8	9/21/2012	Good	bugs
VT11-01	Williams R	Chester	11.8	9/21/2012	Poor	fish
VT11-01	Williams R	Chester	12.1	10/9/2008	Very good	bugs
VT11-01	Williams R	Chester	12.2	10/9/2008	Exc-vgood	bugs
VT11-04	Chase Brook Trib 2	Chester	0.1	10/9/2008	Excellent	bugs

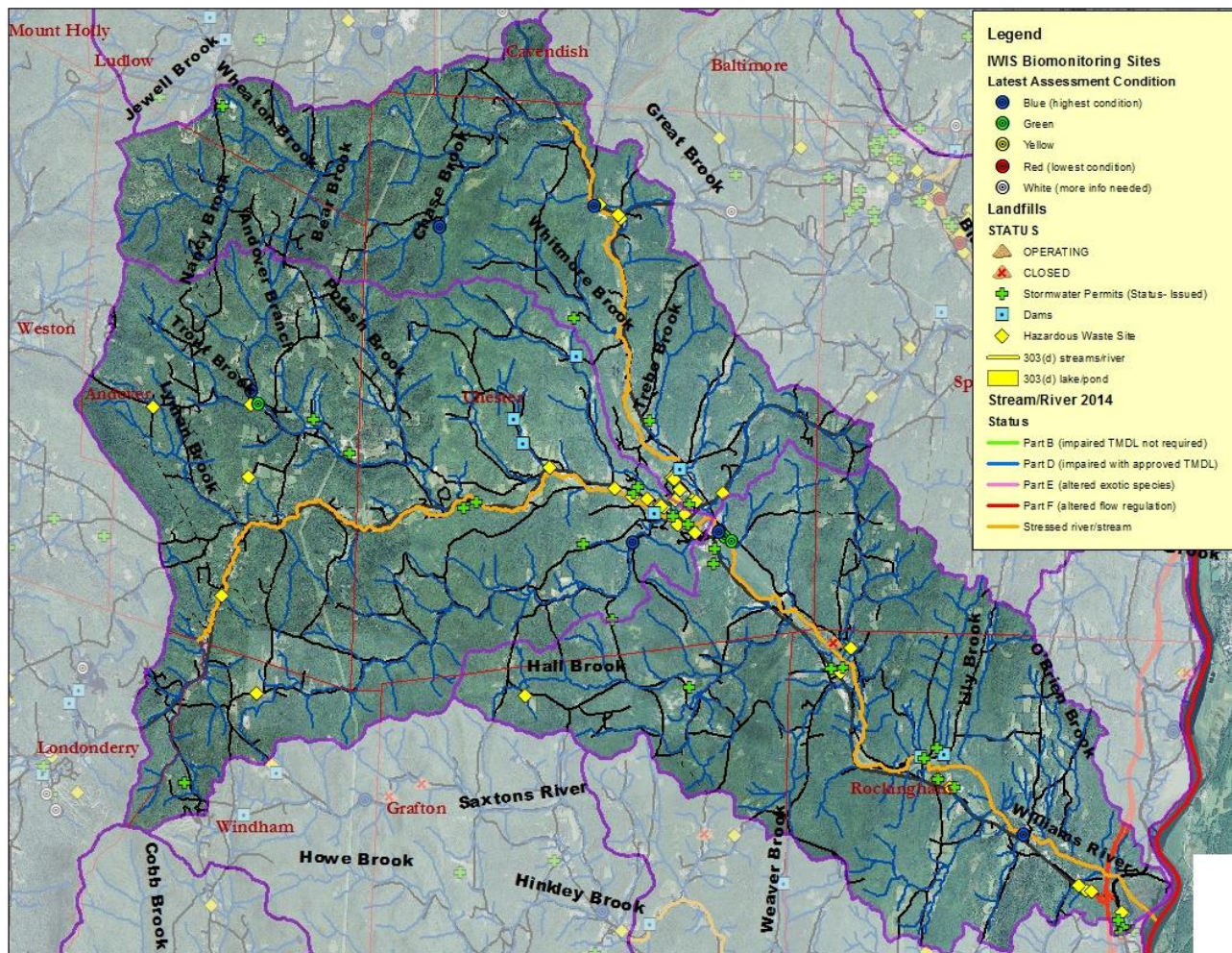


Figure 4. Williams River watershed with dams, stormwater permits, biomonitoring sites, hazardous waste sites, and old landfills shown

**Table 3. Biological sampling sites on the Williams River or its tributaries:**

Waterbody id	Stream or river	Station	Description
VT11-01	Williams River	11.8	Located about 300 meters below Chester WWTF in 2 <sup>nd</sup> riffle below discharge point.
VT11-01	Williams River	12.1	Located in south side channel above Chester WWTF
VT11-01	Williams River	12.2	Located in north (now main) channel above the Chester WWTF
VT11-04	Chase Brook Trib 2	0.1	Located 150 meters up a private drive off of Chase Brook Road, off Williams River

***Biomonitoring assessment notes***

The macroinvertebrate sampling in 2012 found that the abundance high as was richness and EPT. The bio index, however, was elevated indicating that moderately tolerant taxa dominated the community. Compared to the last assessment in 2008, the BI increased significantly. Only one of the dominant taxa is water quality sensitive.

Nutrients were low and did not increase from above to below the WWTF indicating that any nutrients were possibly coming from fines in the substrate. The silt rating was 3/5, and while overall embeddedness was 40% in riffles, in runs it was over 70%. There was a lot of filamentous algae growth in stream. This stream reach was hard hit by TS Irene which maybe in part the reason for substrate conditions.

The 2012 fish comments noted that much sediment, possibly deposited by TS Irene, was noted in the substrate. Too many black nosed dace and no brook trout or sculpin caused the fish assessment failure.

**Table 4. Biological monitoring needed in the Williams River watershed**

Waterbody id	Stream or river name	Location/number of sites	Comments
VT11-02	Halls Brook or any of the streams in 11-02	1 site on Halls or O'Brien or unnamed streams	The tribs to the Williams River in this waterbody, VT11-02, have not been sampled at all.
VT11-03	Middle Branch Williams River	2 sites	This is a significant size stream and we have no bio sites on it.
VT11-03	South Branch Williams River	rm 1.3	Sampled in 1993 and not since.
VT11-03	Andover Branch	rm 4.4 or 4.8	Not sampled since 2003.
VT11-03	Potash, Lyman, Trout Brooks	a site on each or some of these	Never been sampled.
VT11-04	Nancy, Wheaton, Lovejoy, Whitmore, Trebo Brooks	a site on one or more of these	Never been sampled.

## **E. coli Sampling**

**Table 5. E. coli sampling results (geometric means) from Williams River sites**

	Williams 7.0 Bartonsville Bridge	Williams 8.7 Above Missing Link Rd bridge	Williams 10.3 Below Chester WWTF	Williams 10.7 Rainbow Rock SH Chester	Williams 10.8 Above confluence of Middle Branch
2004	86	---	---	---	---
2005	150	---	---	---	---
2006	105	---	---	---	---
2007	121	---	---	---	---
2008	338	---	410	246	---
2010	174	---	57	159	---
2011	95	92	85	95	143
2012	428	341	285	267	379
2013	178	178	126*	193	155*

\* Samples were not taken on July 3 at these two sites. The samples collected at other sites were very high due to heavy rains in the previous 24-48 hours. It would have been useful to know the numbers.

## **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) Vermont Agency of Natural Resources Department of Environmental Conservation Watershed Management Division Biomonitoring and Aquatic Studies Section database - biomonitoring results through 2013.

3) Vermont Agency of Natural Resources Department of Fish and Wildlife Natural Resources Mapping Project data and information