Stevens River Watershed

Including information on Sutton Brook and Manchester Brook watersheds

June 2014

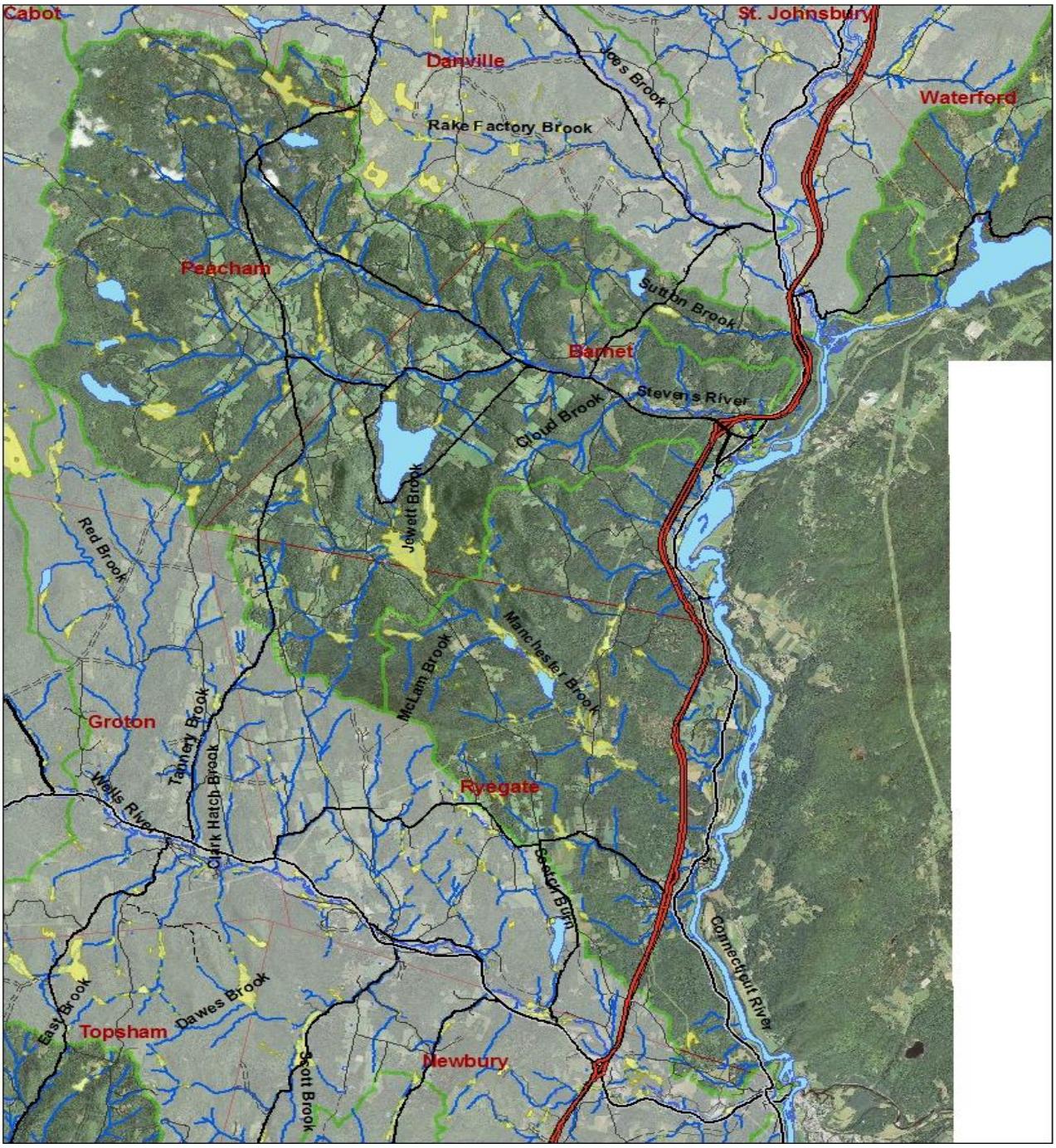

Figure 1. Stevens River Watershed with Sutton and Manchester Brooks watersheds

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Earlier Information on the Watersheds

The last time that a formal assessment report was done on the Stevens River was in 1999 as the *Basin 14 – Stevens, Wells, Waits, Ompompanoosuc Water Quality and Aquatic Habitat Assessment Report*. Following that there was the Basin 14 "Little Rivers" Water Quality Management Plan dated June 2008. Updated information was used in the formation of that plan. This 2014 assessment is a further update in preparation for the 2015 Basin 14 plan preparation.

Sutton Brook and Manchester Brook were assessed as part of the *Northern Connecticut River and Direct Tributaries Water Resources, Water Quality, and Aquatic Habitat Assessment Report* completed in March 2011. They will now be evaluated along with the Stevens River and its tributaries.

General Descriptions

The Stevens River watershed is located adjacent to and just south of, the Passumpsic River basin and is about 49 square miles or 31,360 acres in area. The origin of the river's waters are the tributaries that flow from the eastern sides of Lookout Mountain and Macks Mountain into Willow Brook; from the wetlands and ponds in the northern part of Peacham into East Peacham Brook and from the tributaries and ponds on the eastern side of Morse Mountain, Devil's Hill, and Jennison Mountain into South Peacham Brook.

East Peacham Brook, South Peacham Brook and the drainage from Harvey's Lake, which enters South Peacham Brook in West Barnet, all converge to form the Stevens River. East Peacham Brook is about 7 miles long and its watershed is 17.2 square miles. South Peacham Brook is 4.5 miles long and has a 12.5 square mile watershed.

There are a number of large lakes and ponds in the Stevens River watershed including Harveys Lake (351 acres), Martins Pond (82 acres), Fosters Pond (61 acres), Ewell Pond (51 acres) and Mud Pond (34 acres).

Sutton Brook begins on the western side of Barnet and flows east/southeast into Warden Pond. After Warden Pond, it flows a short stretch into the small Sarah Moores and then on easterly to the Connecticut River entering the river near Nine Islands. Its length is 2.5 miles and its watershed is 3.5 square miles.

Manchester Brook originates from the outlet of Lower Symes Pond with unnamed tributaries and wetlands contributing flow. It winds southeasterly for 5.5 miles down to the Connecticut river entering just north of East Ryegate village. Unfortunately, this small watershed is crossed by high tension electric transmission lines (and all the cutting and disturbance beneath them) as well as the interstate in addition to the usual town roads and rural development.

Special Uses, Values, and Features

Biological Diversity

Lower Symes Pond, the origin of Manchester Brook, is a hotspot for biological diversity with a Sweet Gale Shoreline Swamp, a rare pondweed that is considered “extant”, and three state-threatened plants.

On the map to the right, yellow shading indicates wetland; the purple outlines significant natural communities; the red hatching indicates the state-threatened plant species; and the green hatching is a rare plant species’ potential location.

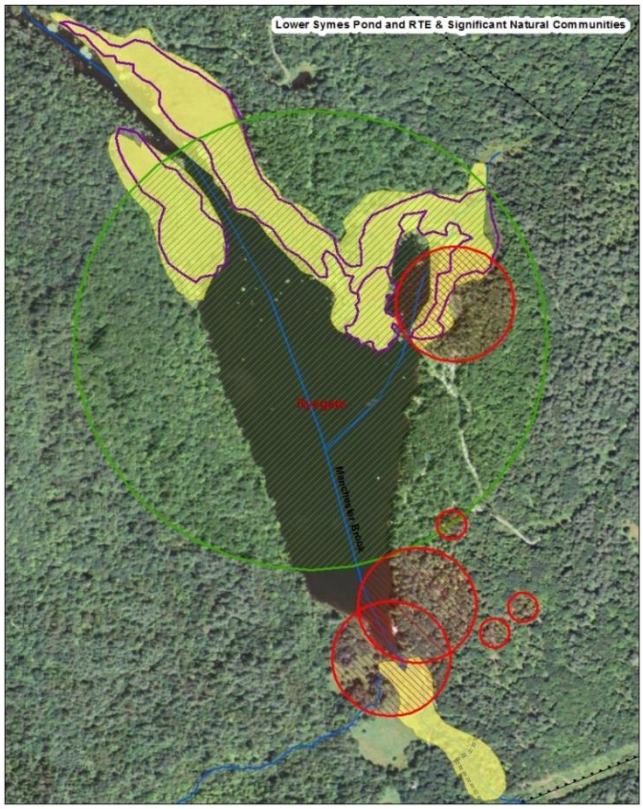

Figure 2. Biodiversity of Lower Symes Pond Area

Jewett Brook Wetland Complex with a Tier 1 – greatest – contributions to biological diversity. There is significant northern cedar swamp, a rare sedge, a vernal pool, and it is part of a landscape connecting block.

On the map to the right, yellow shading is the wetland layer; the purple outlines significant natural communities and in this case, the cedar swamp; the red hatching is a rare species general location.

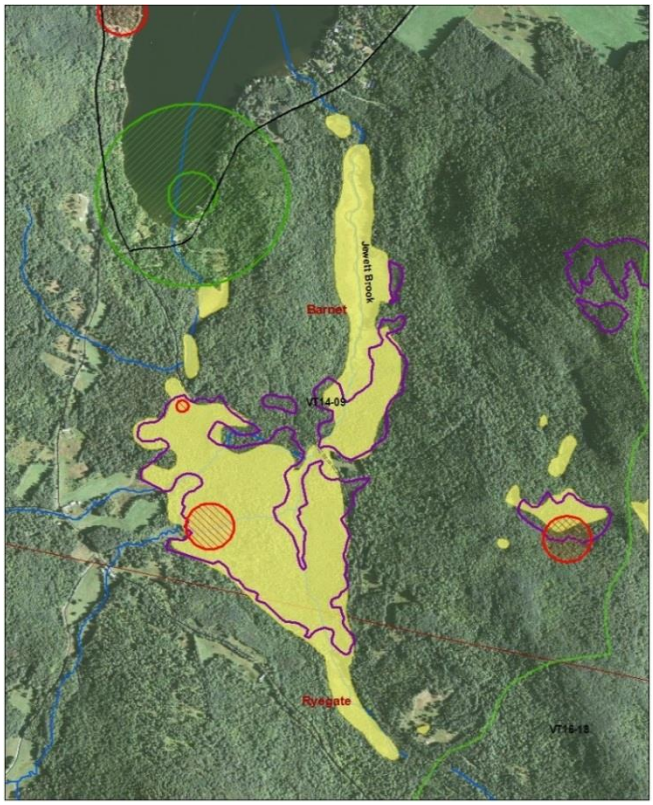

Figure 3. Biodiversity of Jewett Brook Wetland Complex.

Stevens River Watershed Summary of Segments with Impacts

Table 1. Waterbodies with Impacts in Stevens River Watershed

Stream or Lake Segment	Milage & Status	Pollutant	Source	Other information
Harveys Lake	***Altered***	Water level	Dam on Harveys Lake	
Stevens River below Harveys Lake	***Altered***	Flow alterations	macroinvertebrates	

Assessment Information

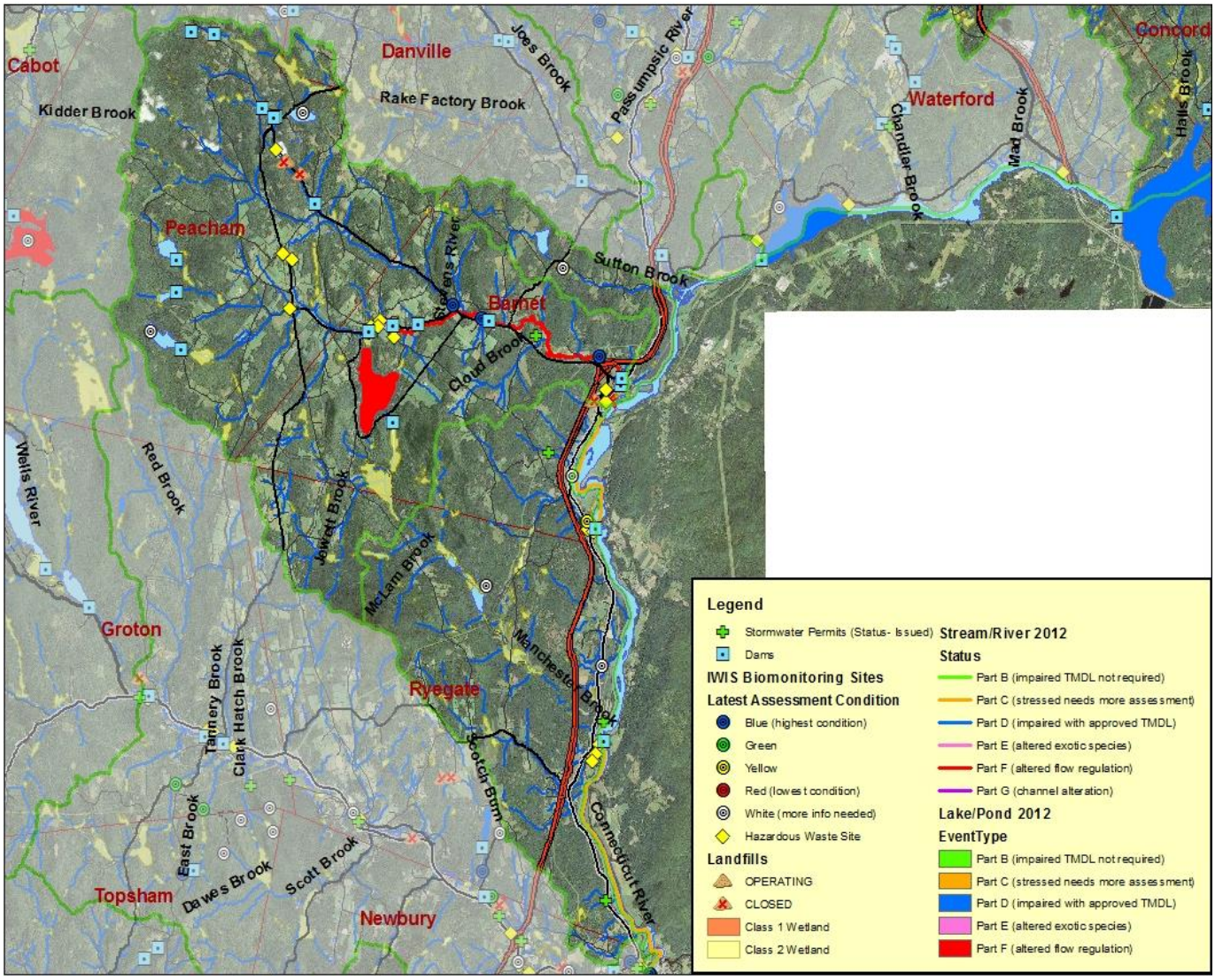

Figure 4. Stevens River, Sutton Brook, Manchester Brook Assessment Conditions

Biological Monitoring in the Stevens River watershed

Those streams that have been sampled in the Stevens River watershed indicate very high quality conditions (see Table 2 bleow).

Table 2. Biological Monitoring Results for Sites in the Stevens River Watershed

Stream	Rivermile	Community	Result	Year
Stevens River	1.4	macroinvertebrates	exc-vgood	2007
Stevens River	4.0	macroinvertebrates	excellent	2010
Stevens River	4.0	fish	very good	2010
Stevens River	4.0	macroinvertebrates	exc-vgood	2012
Stevens River	4.0	fish	good	2012
East Peacham Brook	0.4	macroinvertebrates	exc-vgood	2007
East Peacham Brook	0.4	fish	excellent	2007

Table 3. Sampling site locations in the Stevens River watershed

River or stream	River-mile	Description
Stevens River	1.4	Located 50m below Anderson Street
Stevens River	4.0	Adjacent to West Barnet Road just above old mill called "BENSMILL", west of intersection with Barnet Center Road. Drains Harveys Lake.
East Peacham Brook	0.4	Above Ferguson Rd 0.2 miles, and just above private recreation area, unposted.

However, there are a number of streams that have had no biological sampling and that information would be important to have. Some streams for which there is no biological data that should be sampled include:

Table 4. Biological sampling needed in the Stevens River watershed (VT14-09)

Stream	Location	Comments
South Peacham Brook	several spots along its length	a biologically underserved area-no bio sites on this major trib to the Stevens River at all
Tribs to South Peacham Brook	a trib or two	there are a number of tributaries to South Peacham Brook – a sample on a tributary or two above the sites chosen on the S.P. Brook itself would be good
East Peacham Brook	in Peacham	two sites at least are needed upstream of where the one sample has been taken in the past
Tribs to East Peacham Brook	anywhere	none of the tributaries are sampled
Cloud Brook	anywhere	a sample

Biological Monitoring in the Direct to the Connecticut River drainages

Manchester Brook has no biological monitoring sites. There was one biological monitoring sample taken from Lower Symes Pond in 2006 but there are no sites on Manchester Brook itself or the tributaries.

In the Sutton Brook watershed, the only biological monitoring site is one that was sampled 15 years ago in Sarah Moores pond. There needs to be at least one sample site established for Sutton Brook, preferably more.

There are a number of unnamed tributaries to the Connecticut River in the stretch from the mouth of Sutton Brook down to the mouth of the Wells River and only one stream has been sampled. The stream, called McIndoes Falls tributary, was sampled in 2007 and the macroinvertebrate community was assessed as "good-fair".

Table 5. Biological sampling needed in the VT16-18 watersheds

Stream	Location	Comments
Sutton Brook	At least one site upstream of the interstate but downstream of Sarah Moore Pond	Only one old bio site sampled (qualitative) in Sarah Moore Pond back in 2006.
Unnamed tributaries north of Manchester Brook	A site on one or two of the unnamed tributaries that go to the Conn R north of where Manchester Brook enters	It would be good to update the sample from McIndoes Falls tributary and get a sample from another of the unnamed tribs.
Manchester Brook	Upstream of the interstate	We have no samples from this brook.

Fish Habitat and Fisheries in the Stevens River watershed

The Stevens River had been stocked with Atlantic salmon fry as part of an effort to restore salmon to the Connecticut River basin. The Stevens was last stocked with salmon fry in the spring of 2012. The Stevens mainstem contains an estimated 829 100-meter^2 units of salmon rearing habitat. Over the last several years of the salmon program, an average of 25,000 fry were stocked annually, at an average density of 31/unit. Typically it takes salmon fry two years to attain smolt (migratory) size. Growth rates of salmon were consistently higher in the Stevens River than in any other Northeast Kingdom salmon nursery stream, to the extent that in some years young salmon reached smolt size and left after only a single year. Over the last several years of the program, the Stevens River contributed an average of 3,000 smolts annually to the Connecticut River basin outmigration. Adult Atlantic salmon, returning from the ocean, are not able to access the Stevens River due to the Dodge Falls Dam on the Connecticut River in East Ryegate

The Vermont Department of Fish and Wildlife (DFW) stocks brook trout into the Stevens River from West Barnet Village downstream to I-91. Rainbow trout are stocked below the falls in Barnet Village. Very few wild trout are found in the river downstream of West Barnet Village, and this is presumably due to excessively high water temperatures. Both Peacham Hollow Brook and South Peacham Brook are managed as wild brook trout fisheries (Kratzer 2007).

Fish species collected in the Stevens River during the most recent sampling (2008 to 2012) by DFW at the former salmon monitoring station include: Atlantic salmon, brook trout, longnose dace, longnose sucker, pumpkinseed, blacknose dace, white sucker, common shiner, slimy sculpin, creek chub, lake chub, common shiner, rainbow trout, and brown trout. There should not be any juvenile Atlantic salmon remaining in the Stevens River after the spring of 2015.

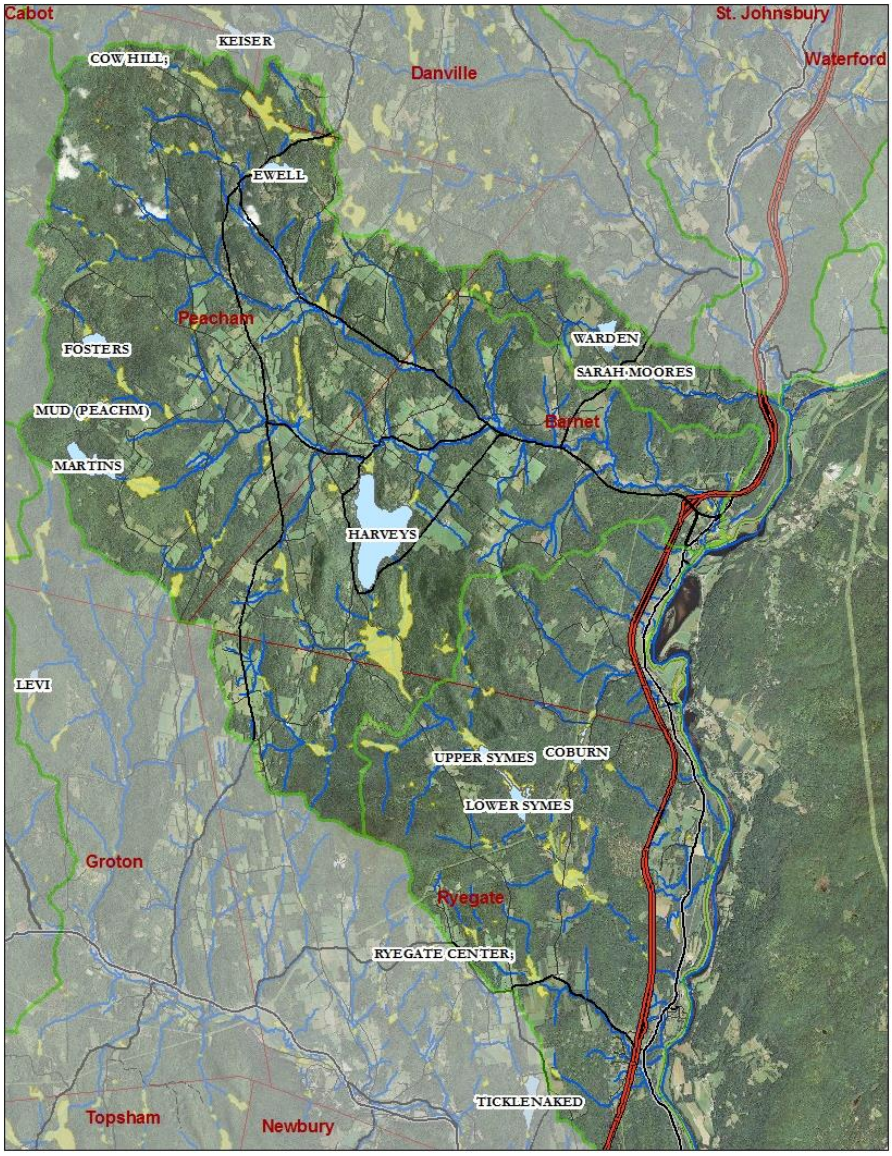

Figure 5. Ponds and Lakes in Stevens Watershed

There is a diversity of fish habitat in the lakes and streams in the Stevens River watershed. Harveys Lake covers just 351 acres but is a very deep lake that is stocked with lake and rainbow trout.

Temperature/dissolved oxygen profiles of Harvey's Lake suggest that the lake is becoming increasingly marginal as trout habitat. Catch rates of lake and rainbow trout were very low when compared with other Northeast Kingdom lakes during electro-fishing surveys in 2009, 2010, and 2011. Nevertheless, anglers still fish Harveys Lake in search of lake and rainbow trout, rainbow smelt, yellow perch, and chain pickerel.

The smaller Ewell Pond and Martins Pond are stocked with rainbow trout and brook trout, respectively. Martins Pond is one of only five ponds in Vermont known to support fishable populations of wild brook trout. Special regulations at Martins Pond are intended to protect the wild brook trout population while allowing anglers to harvest the stocked trout.

Physical Assessment

A Phase 2 geomorphic assessment was done on the Stevens River, East Peacham Brook (called Peacham Hollow Brook in the report by Redstart Consulting), and South Peacham Brook. Nineteen reaches broken into 38 segments were assessed and of these 38, 26 of them had greater than 50% straightening as a "primary stressor". The historic straightening has been a result of mill use of the streams and also the road system.

There were at least thirteen mills in the watershed historically and this resulted in stream straightening as well as flow regulation due to storage and release for the mills' operations. Currently, however, there is only flow regulation below Harvey's Lake.

There is also a "relatively high density of roads" in this watershed and main roads run along the Stevens River, East Peacham Brook, and South Peacham Brook.

Phase2 SegmentID	Segment Length	StreamName	GeoAssess Condition	% Straightened
M101-	2708.6	Stevens River	Fair	> 50%
M102-	659.4	Stevens River	Fair	> 50%
M103A	1414.2	Stevens River	Fair	> 20%, < 50%
M103B	2258.6	Stevens River	Fair	> 50%
M104-	3395.9	Stevens River	Good	5 – 20%
M105-	4187.1	Stevens River	Fair	> 50%
M106A	2153.8	Stevens River	Fair	> 20%, < 50%
M106B	2443.3	Stevens River	Fair	Ben's Mill
M107A	761.6	Stevens River	Good	> 50%
M107B	3116.9	Stevens River	Fair	> 50%
M107C	2626.7	Stevens River	Poor	> 50%
T1.01A	1571.6	Peacham Hollow Brook	Fair	> 50%
T1.01B	1953.6	Peacham Hollow Brook	Fair	> 50%
T1.02A	2962.6	Peacham Hollow Brook	Fair	> 20%, < 50%
T1.02B	1794.1	Peacham Hollow Brook	Fair	> 50%
T1.02C	3029.5	Peacham Hollow Brook		beaver
T1.02D	4783.5	Peacham Hollow Brook	Fair	---
T1.03A	1728.6	Peacham Hollow Brook	Good	> 50%
T1.03B	860	Peacham Hollow Brook	Fair	> 50%
T1.03C	2003.8	Peacham Hollow Brook	Good	---
T1.04-	1492.5	Peacham Hollow Brook	Fair	> 50%
T1.05-	9377.5	Peacham Hollow Brook	Fair	> 20%, < 50%
T1.06A	631.9	Peacham Hollow Brook	Good	> 50%
T1.06B	692.3	Peacham Hollow Brook	Fair	> 50%
T1.06C	1956.4	Peacham Hollow Brook		beaver

Phase2 SegmentID	Segment Length	StreamName	GeoAssess Condition	% Straightened
T1.07A	3087.2	Peacham Hollow Brook	Fair	> 50%
T1.07B	1295.5	Peacham Hollow Brook	Poor	> 50%
T1.07C	2047.3	Peacham Hollow Brook	Fair	---
T2.01-	5816.4	South Peacham Brook	Fair	> 20%, < 50%
T2.02A	3899.6	South Peacham Brook	Fair	> 50%
T2.02B	2570.3	South Peacham Brook	Fair	most
T2.02C	1616	South Peacham Brook		impoundment
T2.02D	1136.8	South Peacham Brook	Fair	> 50%
T2.03A	2055.4	South Peacham Brook	Fair	> 50%
T2.03B	815.3	South Peacham Brook	Fair	> 50%
T2.04A	1712.5	South Peacham Brook	Fair	almost all
T2.04B	997.8	South Peacham Brook	Fair	most
T2.04C	2769.7	South Peacham Brook	Fair	virtually all
T2.05-	3522.7	South Peacham Brook	Good	> 50%

Sources of Information

1. ANR Department of Environmental Conservation, Biomonitoring Section, Steve Fiske and Rich Langdon – data and assessment on aquatic communities in Stevens, Wells, Waits, and Ompompanoosuc watersheds.

2. ANR Department of Fish and Wildlife, Jud Kratzner, Fishery Biology, St. Johnsbury – descriptions of the fishery resource in the Stevens and Wells watersheds.

3. ANR Department of Fish and Wildlife, Rich Kirn, Fishery Biologist, Roxbury – descriptions of the fishery resource in the Waits and Ompompanoosuc watersheds.

4. ANR Department of Fish and Wildlife, Natural Heritage Program – data and information on rare, threatened, and endangered species, significant natural communities, areas of high biological diversity.

5. Stevens River Watershed: Stream Geomorphic Assessment and River Corridor Plan 2010-011, August 12, 2011. Prepared by Redstart Consulting (Ruddell, Haynes, McLane, and Machin) for the Caledonia County NRCD and Vermont ANR DEC River Management Program.