Basin 5
Malletts Bay Streams
Update as of July 2013

There are four named streams to Malletts Bay - Indian Brook, Pond Brook, Malletts Creek, and Allen Brook - and updated water quality and aquatic life information on these streams and others is given below. The last time a comprehensive assessment in this watershed was done was in 2003. However, assessment information was compiled and reviewed during the basin planning process – the Basin 5 Plan was completed in February 2009.

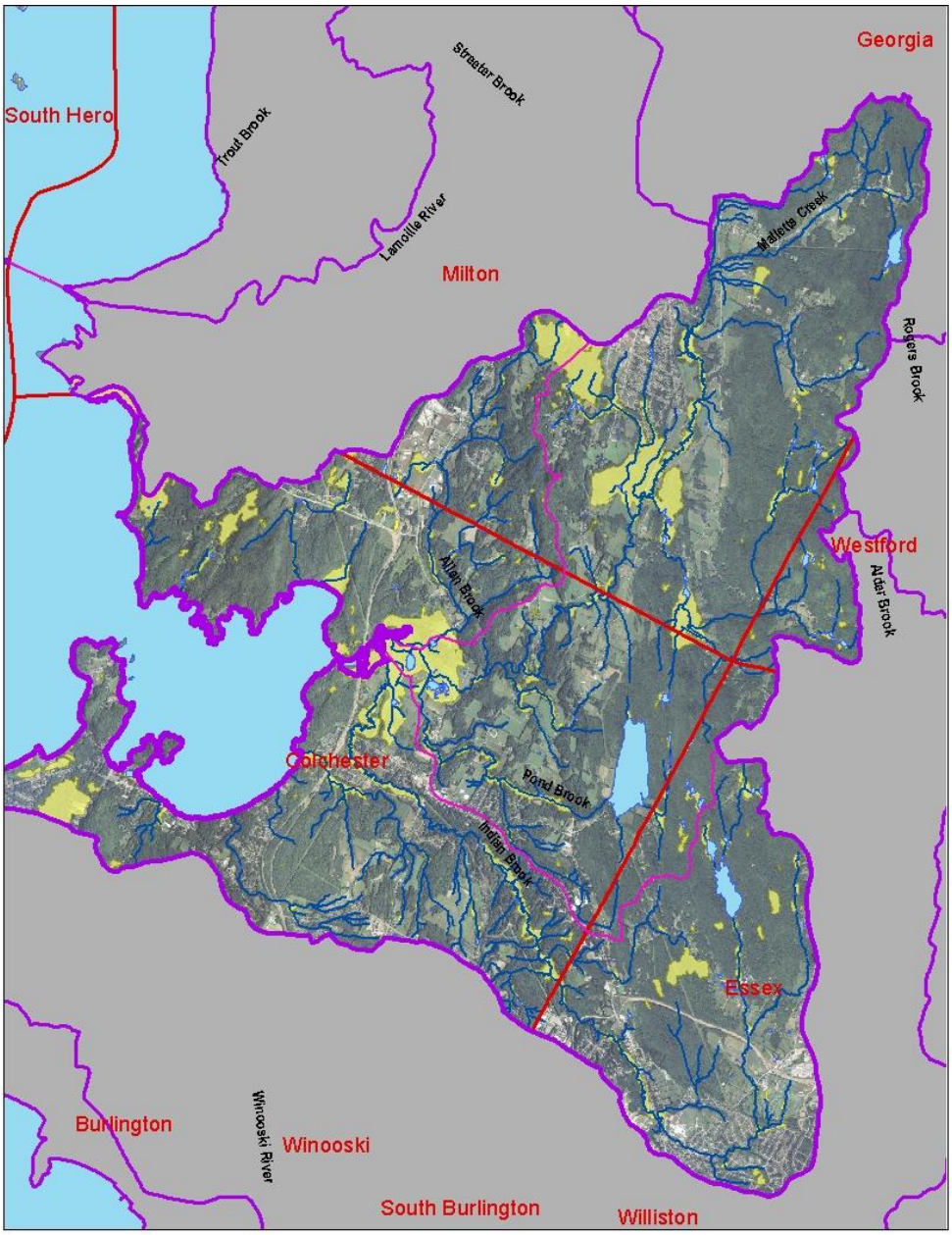

Figure 1. Malletts Bay Streams (wetlands shown as yellow)

Malletts Bay Stream Segments with Impacts

Table 1. Malletts Bay Stream Segments with Impacts and Assessment Status

Stream segment	Milage & Status	Pollutant	Source	Other Info.
Indian Brook – from rm 5.8 to rm 9.8	4 miles **Impaired**- Part D list	Stormwater	Urban Runoff	EPA approved TMDL August 21, 2008.
Indian Brook - mouth to rm 5.4	5.4 miles **Stressed**- Part C list	Toxics	Haz Waste Site, old Landfill	Assessment of stream sediments and biota needed. Follow-up needed by WMD.
Crooked Creek	3 miles **Impaired**- Part D list	E. coli		EPA approved TMDL September 30, 2011
Smith Hollow Stream	2.7 miles **Impaired** – Part D list	E. coli		EPA approved TMDL September 30, 2011

Indian Brook

General Description

Indian Brook rises in the hills around Colchester Pond and Indian Brook Reservoir. The brook was dammed to create the reservoir for a public water supply in the late 1800s. From the reservoir, the brook flows south to Essex Junction and then makes a wide sweep in the village and heads northwesterly to Colchester. It continues northwesterly in Colchester to Mill Pond dammed for a sawmill that once operated there and then on to Malletts Creek Marsh adjacent to Malletts Bay.

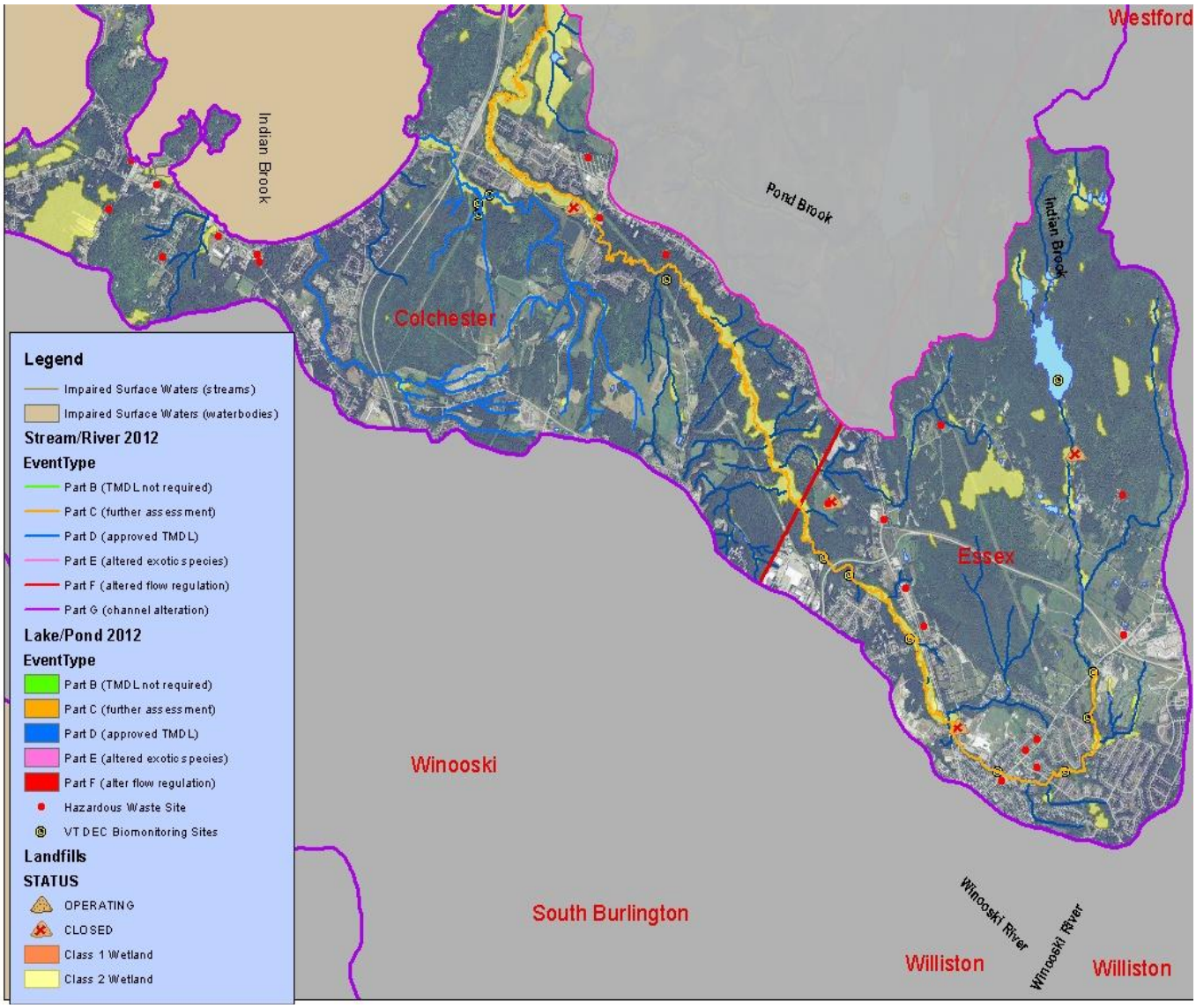

Figure 2. Indian Brook and conditions

Assessment Information for Rivers and Streams

Biological Monitoring Results for Indian Brook

Table 1. Macroinvertebrate community assessment from sites on Indian Brook

	rm 3.1	rm 5.8	rm 7.0	rm 8.5	rm 9.0	rm 9.5	rm 9.8
1993	-----	poor	----	poor	-----	-----	poor
1995	-----	-----	----	-----	-----	good	-----
1996	-----	-----	----	-----	-----	fair	-----
1999	-----	fair	----	-----			
2002	-----	-----	----	fair-poor	good-fair	fair	-----
2003	fair	poor	----	---	fair	-----	-----
2004	good-fair	fair-poor	----	-----	good-fair	-----	-----
2008	-----	fair	----	-----	-----	-----	-----
2009	-----	-----	----	poor	-----	-----	-----
2011	----	fair	fair	fair-poor	----	fair	----

Table 2. Fish community assessment from sites on Indian Brook

	Rm 3.1	Rm 5.8	Rm 8.5	Rm 9.5
1992	---	fair	fair	---
1993	---	good	---	---
1994	---	fair	---	---
1995	---	---	---	fair
1996	---	---	---	---
2002	---	---	---	good
2003	fair	fair	---	---
2004	good	---	---	---
2008	---	fair	---	---
2009	---	---	good	---
2011	---	fair	---	---

Table 3. Biological monitoring site locations on Indian Brook

Rm	
3.1	Located approximately 75 meters below Mill Pond Rd and Mill Pond
5.8	Located below the Suzie Wilson Road bridge
7.0	Downstream of Pine Crest Drive
8.5	Located above the bridge near the high school
9.0	located below the falls where a local recreation trail crosses the brook
9.5	located above Hubble Falls road crossing about one-quarter mile
9.8	located below the first Route 15 crossing near Lang Farm

Stormwater Permits in Indian Brook Watershed

A portion of Indian Brook is stormwater impaired and a TMDL has been written and approved for this stream. Details of the TMDL are found here: http://www.epa.gov/waters/tmdldocs/35083_Indian%20Brook%20VT%20TMDL.pdf

Table 4. Number of stormwater permits for Indian Brook as March 26, 2013

operational (individual)	construction	MSGP
23 (4)	7	----

Physical Assessment Results for Indian Brook

Table 5. Stream Segment Habitat and Geomorphic Assessment Indian Brook

P2EXPORT				
ProjectName	Phase2SegmentID	Length (ft)	HabAssessCondition	GeoAssessCondition
Indian Brook	M01-	3904	Good	Good
Indian Brook	M02-	5529	Fair	Good
Indian Brook	M03-	10168	Good	Good
Indian Brook	M04-	8041	Good	Fair
Indian Brook	M05-	2581	Good	Fair
Indian Brook	M06-	7404	Good	Good
Indian Brook	M07-	1905		Good
Indian Brook	M08-	2885	Good	Good
Indian Brook	M09A	2441	Fair	Fair
Indian Brook	M09B	1700	Fair	Fair
Indian Brook	M10A	6689	Fair	Fair
Indian Brook	M10B	3000	Fair	Fair
Indian Brook	M11A	2700	Poor	Fair
Indian Brook	M11B	2783	Fair	Fair
Indian Brook	M11C	1000	Good	Good
Indian Brook	M12-	2106	Good	Good
Indian Brook	M13A	1200	Good	Good
Indian Brook	M13B	1000	Reference	Good
Indian Brook	M13C	1500	Good	Fair
Indian Brook	M13D	3500	Fair	Fair
Indian Brook	M14-			
Indian Brook	M15-	5300	Fair	Fair
Indian Brook	M16A	2131	Fair	Fair
Indian Brook	M16B	1500	Fair	Fair
Indian Brook	M18-	6200	Good	Fair

Hazardous Waste Sites in Indian Brook Watershed

Former Village Beverage Site

The SB Collins site (Colchester Variety formerly Village Beverage – site 87-0068) is the source of petroleum contaminated groundwater into Indian Brook. The site is located below the lowest biological sampling site on the brook. A remediation system that targeted clean-up of the source of the polluted groundwater (versus treating the sump and storm sewer discharges) had been in place from early 2000 until spring 2003 but was removed because it was not effective.

A number of groundwater monitoring wells, surface samples, sump effluent, and culvert effluent among others have been sampled over the years since at least 2001. There were quarterly samples taken from 2001 through 2006; three samples taken in 2007 and 2008; two samples taken in 2009 and one sample in 2010 and 2011. These samples were taken from 27 to 30 different locations each sampling round.

High levels of a number of contaminants remain on the site twenty years after monitoring began. Benzene, 1,3, 5- trimethylbenzene, 1,2,4-trimethylbenzene, napthalene, and MTBE have all been at levels many times the Groundwater Enforcement Standards at monitoring well 9, which is the closest well to Indian Brook. These contaminants as well as toluene, ethylbenzene, and xylenes are very high in a number of other sampling locations as well. The November 2010 summary report from the consulting firm monitoring the site concluded that: groundwater flows generally in a westerly direction towards Indian Brook; VOC concentrations increased at this most recent sampling in five of the locations sampled; the flow enhancement trench has not been effective at intercepting off-site contamination migration as they observed “substantial contamination directly adjacent to Indian Brook.”

The latest report (2013) from Lincoln Applied Geology contains the following information:

“Total VOC concentrations in this area (MW-17) are near free product levels, resulting in an ongoing source of contamination which feeds the downgradient portion of the plume. The plume extends to the west across U.S. Route 7 in the direction of Indian Brook due to the moderate to steep hydraulic gradient. Dissolved contamination has been identified as far down-gradient as MW-9 which is very close to the bank of Indian Brook. It is likely that, if a more representative sampling program of the creek water and sediments is conducted, the results would indicate that the petroleum contamination is currently impacting the brook and will continue to do so unless an aggressive corrective action is undertaken at the Site. Further evidence of downgradient contamination can be seen in between the flow enhancement trench and the sump as persistent ground water seepage with a very distinct visual sheen and petroleum odor….. In upholding with our previous recommendation made in our August 2007 Summary Report, LAG suggests that a Corrective Action Feasibility Investigation (CAFI) be developed in an effort to evaluate the future installation of an active remedial system to reduce concentrations at the Site and capture the off-site migration. It is LAG’s opinion that, due to the remaining high concentration upgradient source of contamination, the plume will continue migrating and will impact the creek in an even more severe way.”

Table x. Samples from monitoring well 9 near Indian Brook – selection of results*

	EPA acute	EPA chronic	Highest -2001	Highest -2002	Highest -2004	Highest -2006	Highest -2008	2010	2012
Benzene	5,300	---	1,380	1,150	806	874	300	198	114
Ethylbenzene	32,000	---	295	481	362	252	260	71	58
Naphthalene	2,300	620	294	238	273	184	153	38	63
1,2,4-trimethylbenzene	---	---	2,150	1,050	1,310	1,330	425	196	201
1,3,5-trimethylbenzene	---	---	537	268	235	393	77	46	14

* Samples were collected from this well and others each year from 2001 to the present and several times per year until 2010.

Essex Landfill

The Essex landfill (site 77-0010 and around rm 5.4), which was capped in October 1993, is near Indian Brook. Groundwater and surface water monitoring have occurred twice annually at this site since May 1993. Four surface water sites are sampled - two on a tributary to Indian Brook and two on Indian Brook.

The results have found arsenic above standards at surface water site WQ-2 on the tributary from October 1999 to Fall 2011. Nickel was elevated or above standards during the same time period. Benzene was above the standard for consumption of water and organisms from May 1999 to October 2007. The volatile organic compound (VOC), diethyl ether, was detected from May 2001 until Fall 2011; MTBE was detected from May 2000 to October 2003; and tetrahydrofuran was detected from May 2000 to May 2007.

In May 2010, the four surface water sampling sites were WQ-1 that is upgradient of the landfill and the WQ-2 seep area; WQ-2 that is the seep with “iron bacteria in abundance”; WQ-3 that is an upstream of WQ-4 and in the main watercourse – beaver dams once here are “nearly eliminated”; and WQ-4 that is now farther downstream than originally due to beaver dams. As mentioned in the paragraph above, arsenic was above water quality standards at WQ-2 and the only VOC detected at this site was at WQ-2.

References

Indian Brook Watershed Departure Analysis and Project Identification Summary, April 14, 2008. Prepared by: Fitzgerald Environmental Associates, LLC for the Vermont River Management Program.

Essex Landfill Water Quality Results, Fall 2011, January 30, 2012. Stantec Consulting Service Inc., South Burlington, Vermont for Department of Public Works Essex Junction, Vermont and Vermont DEC Waste Management Division, Montpelier, Vermont.

November 2010 Annual Summary Report Former Village Beverage, Colchester, Vermont. Vermont DEC SMS Site #87-0068, April 20, 2011. Prepared for S.B. Collins Inc, St. Albans, Vermont by Lincoln applied Geology Inc, Lincoln, Vermont.

Malletts Creek

General Description

Malletts Creek originates in the northeastern portion of Milton at Milton Pond. It flows southwesterly towards the town core of Milton. A small stream joins Malletts Creek from the north as the creek turns and flows in a southerly direction parallelling East Road in Milton. It continues winding generally south to the Milton-Colchester town line. In the southeastern portion of Milton, the creek flows through a large wetland complex, which has been recognized as an important wetland. In Colchester, the creek meanders in an overall southwesterly direction and near the mouth, it is part of another large wetland complex.

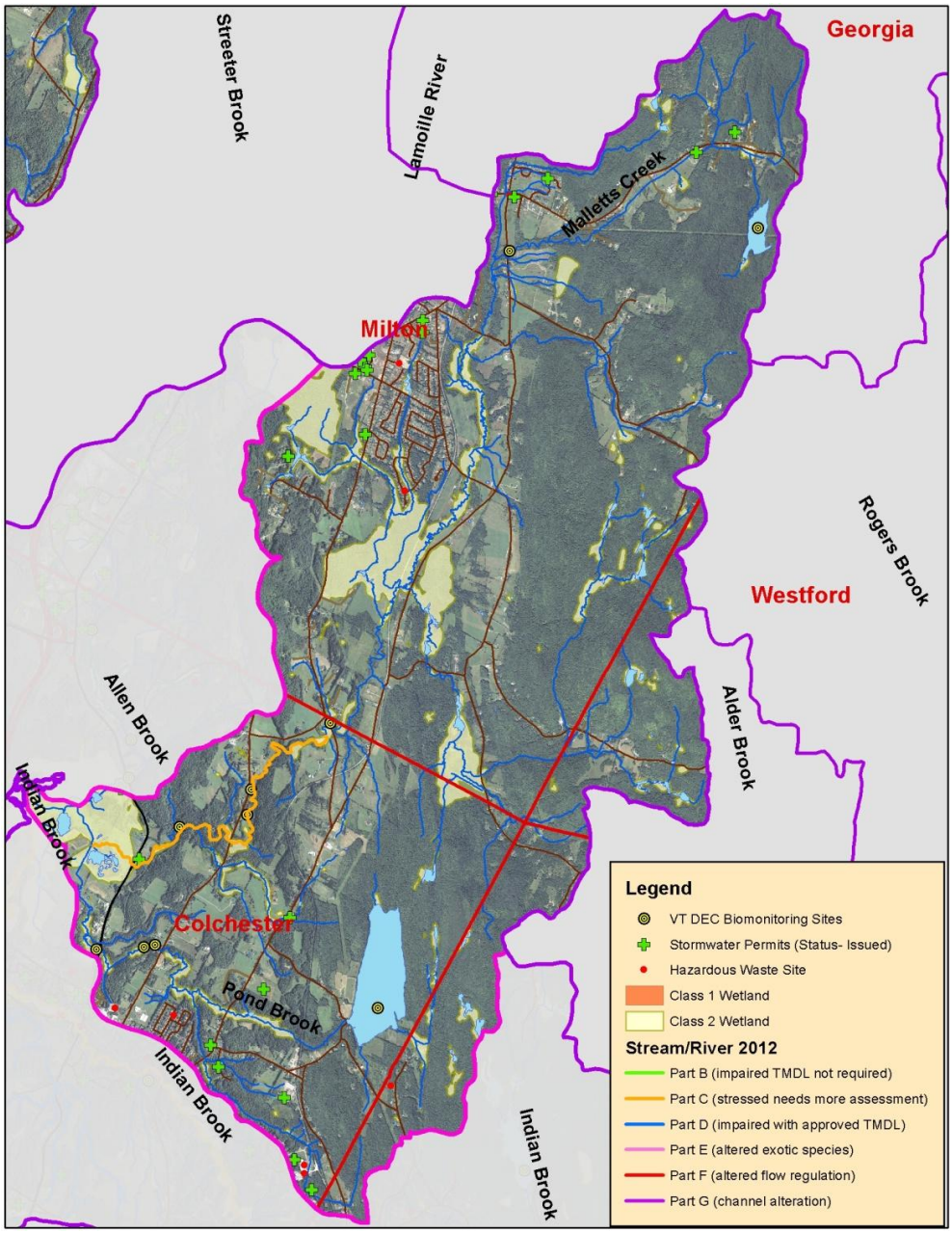

Figure 3. Malletts Creek and Assessment Information

Pond Brook
Pond Brook originates at Colchester Pond and has a generally westerly flow through Colchester until it passes under Route 7. At that point, it begins a generally northerly flow into the large Malletts Creek Marsh and then Malletts Bay.

Assessment Information for Rivers and Streams

Biological Monitoring Results for Malletts Creek

Table 5. Macroinvertebrate community assessment from sites on Malletts Creek:

	Malletts Creek Rm 2.4	Malletts Creek Trib 8 rm 0.2
2003	---	vgood-good
2004	----	exc-very good
2009	excellent	exc-very good

Malletts Creek at rm 2.4 is located below the falls about 50 meters. The site is behind a house on Middle Road. Malletts Creek Trib 8 rm 0.2 is located above the East Road bridge crossing.

Allen Brook

The headwaters of Allen Brook are in Milton west of Cobble Hill. The brook flows westerly and then southerly through the subdivisions of Milton along Route 7. After the brook crosses into the town of Colchester, it flows southeasterly for about a mile before curving sharply and going under Route 7 and into Malletts Creek Marsh.

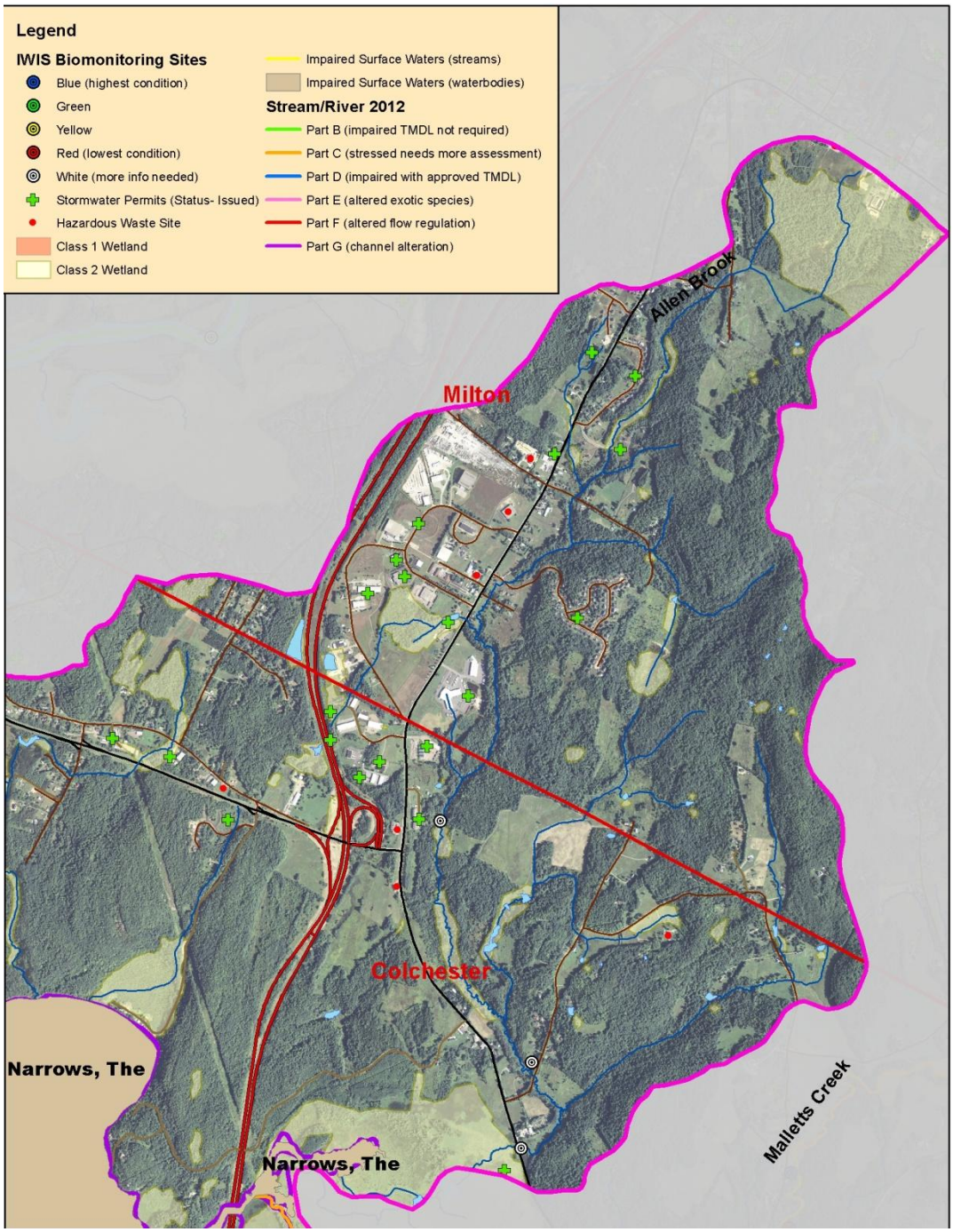

Figure 4. Allen Brook subwatershed