EAST BRANCH
2001 WATER QUALITY RESULTS

2001 Water Quality Results
East Branch of the Housatonic River

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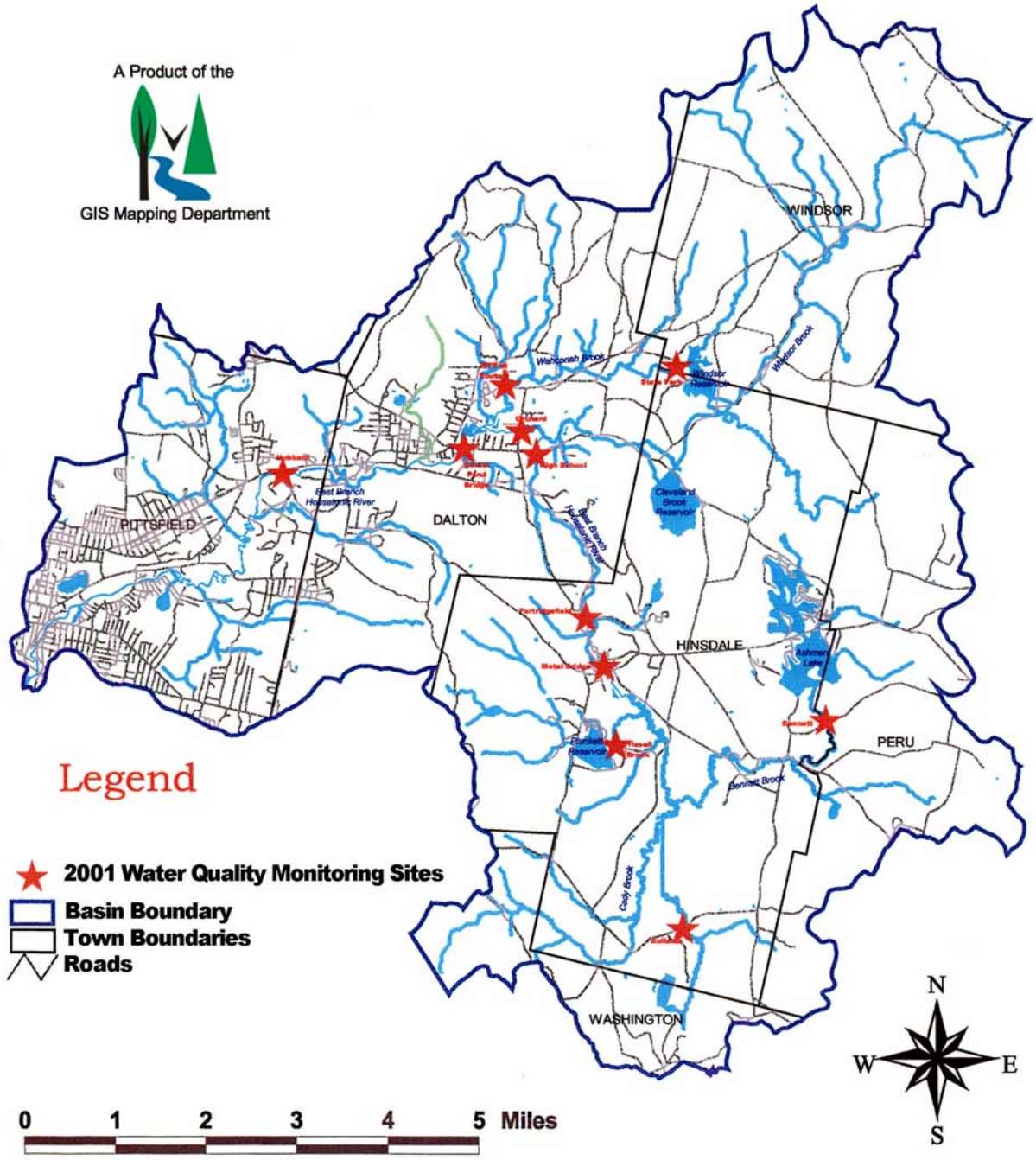
Water Quality Monitoring Sites
East Branch Housatonic River



HVA'S EAST BRANCH SAMPLING SITES

SITE #	LOCATION	GPS	TOWN
EB 22.8	Bullards Crossing	N42.399693 W 073.10801	Hinsdale
EBBB04.6	Bennett Brook at Smith Rd	N 42.43045 W 073.07786	Hinsdale
EBFB01.4	Frisell Brook at Michaels Road	N 42.42661 W 073.12314	Hinsdale
EB18.6	Metal Bridge, Main St.	N 42.43910 W 073.12576	Hinsdale
EB17.4	"Partridgefield", on Old Dalton Road, near intersection of Rt. 8	N 42.44692 W 073.12908	Hinsdale
EBWF05.0	Wahconah Falls State Park	N 42.48687 W 073.11279	Dalton
EBWF01.0	Wahconah Falls Brook at Route 9	N 42.48442 W 073.14833	Dalton
EB14.4	Old Windsor Road, next to the High School	N 42.47361 W 073.14128	Dalton
EB13.4	Orchard Road	N 42.47719 W 073.14489	Dalton
EB 12.0	Center Pond Bridge	N 42.47429 W 073.15665	Dalton
EB08.2	Hubbard Ave.	N 42.46945 W 073.19734	Pittsfield

I. EXECUTIVE SUMMARY

The shoreline survey information collected by the East Branch Stream Team in 1999 provided preliminary information about this section of river and its watershed. These surveys described the general characteristics of the river and surrounding land use, identified potential areas of negative impacts, and provided a basic overview of the health of the watershed.

We used this information to develop our water quality monitoring program, which we started in 2001. Although one years' worth of sampling does not provide sufficient data to fully determine patterns or causes of water quality impacts, it is relevant data that will allow us to begin to assess the conditions on the East Branch.

Our initial concerns or "Why we sampled where we did."

Our Benchmark or "Pristine" Site:
We intended to use Bullards Crossing located in the Hinsdale Flats as our pristine benchmark site due to its relatively undeveloped location near the headwaters of the East Branch. However, the coliform counts exceeded the state standards for safe swimming of 200 colonies per 100 ml, and for one month even exceeded the safe recreational contact limit of 1,000 colonies. We are assuming that this is due to the intense presence of beavers. Instead, we will use Wahconah Falls Brook at the state park as our site against which we will compare our other sites' water quality. Wahconah Falls Brook is a tributary to the East Branch and it is also in a relatively undeveloped area. In 2001 its water quality was very good, except for a few low alkalinity levels in the spring months.

Impacts of major lakes − recreational and residential use.
Bennett (outflow of Ashmere Lake) and Frisell Brook (outflow of Plunkett Lake) appear to have minor negative impacts by their respective lakes, though we do not yet have enough information to be conclusive. Frisell Brook did have problems with the water temperature being too high in the summer, as well as flow that was low enough to potentially compromise the natural wildlife habitat. We will continue to monitor this site to help determine whether its warm temperatures and low flow are due to the lake.

For one month, Bennett Brook had a high coliform reading, but this may have been from the rainstorm the day before, or perhaps from beaver activity. Bennett also had higher phosphorus and nitrogen levels during that rain event.

Assess impact from the town of Hinsdale.
Due to bridge reconstruction on Rt. 8 upstream of Hinsdale, we were unable to establish a testing site upstream of town. Therefore we are unable to compare our town sites to upstream conditions. We did find elevated bacteria and nutrients levels starting in the Hinsdale area. Since the sites in Hinsdale, our "Metal Bridge" and "Partridgefield" sites, had high readings in coliform bacteria, nitrate-nitrogen and phosphorus, in 2002 we will be adding a site upstream as well as an additional site in downtown Hinsdale to help us identify the source(s) of these nutrients.

Concerns about farming operations on Wahconah Falls Brook.
Our upstream site at the state park was relatively pristine, while the site at Rt. 9 in Dalton had high levels of bacteria and nutrients. We will add an additional site midway between these two sites to help begin the process of identifying the source of these contaminants.

Wahconah Country Club.
Two sites bracketed this golf course. The downstream site was fairly consistent with the readings of the upstream site, which indicates that the golf course had a minimal impact to the water quality. Nitrate-nitrogen levels did consistently increase, however, between the site above and the site below the golf course. The total values, however, are low enough that they are probably not creating any problems. Without a state standard it is hard to determine how high is too high.

Assess impact from the town of Dalton on the East Branch.
Fecal coliform, nitrate levels and pH were higher than most of the other sites. Even through this site is classified as a warm water fishery, preliminary results for water temperature and dissolved oxygen show that this site is similar to a cold water fishery.

Additional findings, by parameter and state standards

Cause and effect of chemical parameters to a water body

Dissolved Oxygen: *Waters that are consistently high in dissolved oxygen are considered to be healthier since they can support many different kinds of aquatic organisms.*

Three sites, Bullards Crossing, Bennett Brook, and the Hinsdale Metal Bridge, had readings during the warmer months that were below the standard set for their classifications.

pH: *Measurement of hydrogen ions. Aquatic organisms prefer pHs between 6.5 and 8.0. pH levels can be affected by rain/snow deposition from burning fossil fuels, surrounding bedrock, or wastewater discharges.*

All sites were within the state standards of between 6.5 and 8.3

Alkalinity or Acid Neutralizing Capacity: *High alkalinity levels help a stream buffer the acids that enter the stream. Alkalinity levels can be affected surrounding bedrock.*

Although most of the river had adequate acid neutralizing capacities, two tributaries, Bennett Brook and Wahconah Falls Brook, had readings that were "Sensitive, or Highly Sensitive" in the spring months. That means they are somewhat susceptible to negative impacts from acid rain.

Fecal Coliform Bacteria: *Can increase oxygen demand, plus increase nitrogen and phosphorous which leads to increased plant growth. Potential sources are wastewater treatment plants, failing septic systems, runoff, or animal manure.*

Five sites (Metal Bridge, Partridgefield, Wahconah Fall Brook at Rt. 9, Center Pond Bridge and Hubbard) exceeded the state standard for safe swimming for the majority of testing days. All sites but two (Wahconah Falls State Park and Frisell Brook) exceeded this limit after a heavy rainstorm event in September. Five of those sites were so high that they were either close to or even exceeded state standards for boating. We believe the high bacteria levels were due to the storm water runoff from the heavy rain the day before our testing date.

Nitrate-Nitrogen: *Is a plant nutrient found in the environment. High levels can lead to excessive plant growth which causes an imbalance in the ecosystem. Potential sources are fertilizers and/or animal wastes.*

Since there are no state standards for this parameter, it's difficult to assess what is an acceptable level. However, nitrate-nitrogen levels jumped up at Partridgefield and stayed high at all the rest of the sites downstream. There was a consistent increase in nitrates below the golf course, and also a considerably higher reading downstream from some farms and homes on Wahconah Falls Brook.

Phosphorus: *Is a plant nutrient found in the environment. High levels can lead to excessive plant growth which causes an imbalance in the ecosystem. High levels can be caused by fertilizers and wastewater from detergents.*

There are no state standards for this parameter either. These levels were relatively low until September when all sites were recorded at a much higher level. We do not think these levels are high enough to pose a problem to the river.

Water Temperature: *Temperature affects the rates of many biological and chemical processes. Every species has an optimum temperature at which its growth and reproduction occurs most efficiently.*

As expected, the highest readings were in July and August. The majority of sites fell within the state standard for cold water fisheries by staying below 20 degrees Celsius. (Hubbard Ave. is the only site in this study that is designated as a warm water fishery.) Three cold water sites did exceed standards in July and August − the Center Pond and Metal Bridge sites which are located behind dams where the water is very slow moving, and Frisell Brook which is the outflow of Plunkett Lake, and is relatively shallow.

II. INTRODUCTION

Starting in April and continuing through October 2001, HVA sampled between 7 and 11 sites on the East Branch of the Housatonic River. Samples were collected for Fecal Coliform Bacteria, Total Phosphorus, and Nitrate-Nitrogen and taken to Berkshire Enviro-Labs (BEL) for analysis. Other samples were collected for Dissolved Oxygen, pH and Alkalinity and were analyzed at HVA's lab. Water and air temperatures were measured in the field by the monitors. Although one years' worth of sampling does not provide sufficient data to fully determine patterns or causes of water quality impacts, it is relevant data that will allow us to begin to assess the conditions on the East Branch.

III. PROJECT DESCRIPTION

In 1999 volunteers carried out shoreline surveys of the East Branch of the Housatonic River, starting at Muddy Pond in Washington and continuing through Hinsdale and Dalton to the town line with Pittsfield. Some of the questions and concerns that arose from the surveys revolved around the impacts on the river from the land use activities in the watershed, such as golf courses, farms, and other such human activities. Also in question is whether the water in the lakes and reservoirs has any impact on the river due to decreased oxygen or elevated temperatures and/or nutrients in the impounded water.

Therefore, sites were chosen above and below a major golf course, above and below some farmland, and below the major lakes/reservoirs. Sites were also chosen that we thought would represent fairly pristine areas, since they are in the headwaters of the watershed. These sites would act as reference sites for other, more developed areas of the watershed. One site, at the Route 8 Bridge just above the Center Pond dam, was chosen because it has been used by DEP in the past for some of their sampling. The last site is across from the USGS gauging station just below Hubbard Ave. in Pittsfield. This site represents the water quality in the river after it leaves the town of Dalton and enters Pittsfield.

What We Tested:

We tested the water for seven basic parameters that measure the health of a river: dissolved oxygen, temperature, pH, alkalinity, nutrients (total phosphorus and nitrate-nitrogen), and fecal coliform bacteria.

1) Dissolved oxygen was sampled by taking a sample in a glass bottle, adding three chemicals (manganous sulfate, alkaline iodide-azide, and sulfamic acid) to "fix" the amount of oxygen, and then later in the lab titrating with sodium thiosulfate to measure the amount of oxygen that was present in the sample when it was taken out of the river. This technique is a modification of the Winkler titration method. The samples were transported in coolers, on ice, and analyzed that same day.

2) Water Temperature, as well as air temperature, was measured while the other samples were being taken. Both were measured in the shade with alcohol thermometers that were calibrated in the spring with a NIST thermometer.

3) pH was measured by taking the samples, in a cooler on ice, to the HVA lab for analysis, at room temperature, with a Fisher Scientific Accumet AP62 pH meter.

4) Alkalinity, or Acid Neutralizing Capacity (ANC), was measured by transporting the samples in a cooler on ice to the HVA lab where we analyzed it by adding sulfuric acid to the samples until they reached a pH of 4.5, and then 4.2. The amount of chemicals required to lower the pH to each of those levels is then used in an equation that shows how much acid neutralizing capacity the samples had.

5) Total Phosphorus and Nitrate-Nitrogen samples were collected in acid-washed plastic jugs and taken, in coolers on ice, to a state certified lab (Berkshire Enviro-Labs) in Lee. There they were analyzed using Standard Methods 4500.

6) Fecal Coliform Bacteria was also collected and transported in coolers with ice to Berkshire Enviro-Labs (BEL) where they were analyzed using Standard Methods 9222D. The samples were collected in sterile bottles provided by BEL. Appropriate caution was taken not to touch the insides of the bottles or caps, and the samples were analyzed that day.

Where and When We Tested:

Page 2 shows a map of the East Branch where we tested and Page 3 has a list of the specific sites with their GPS locations. Here are brief site descriptions:

Bullard's Crossing is a road crossing the river up near the headwaters of the East Branch in the Hinsdale Flats, where the water is fairly deep and slow moving.
Bennett Brook drains out of Ashmere Lake. We take our samples where it first crosses Smith Road in Hinsdale.
Frisell Brook flows out of Plunkett Reservoir. We sample it where it crosses Michael's Road in Hinsdale.
"Metal Bridge" refers to the green metal bridge behind the Mobil gas station in Hinsdale.

"Partridgefield" is a store on the downstream edge of Hinsdale. We take our samples from the upstream corner of their property.
"High School" refers to the bridge near Wahconah Regional High School in Dalton. This site is just upstream from the golf course.
Orchard Road in Dalton is just downstream from the golf course.
"State Park" refers to Wahconah Falls State Park. We take our samples just downstream from Windsor Reservoir but upstream from the falls.
"WFB at Route 9" is where Wahconah Falls Brook crosses Route 9 in Dalton, just upstream from Center Pond, and downstream from the State Park and some farms and houses.
Center Pond Bridge is the Route 8 Bridge in Dalton next to the Center Pond dam. We believe this site has been previously used as a DEP testing site.
Hubbard Avenue is in Pittsfield, just downstream from the Dalton town line. We take our samples between Hubbard Avenue and the USGS Coltsville gauging station.

Starting in May, the sites were monitored on the second Tuesday of each month. In April, the sites were monitored on two different days, the 25th and 26th. During some months, if a site was not monitored on the second Tuesday, a makeup sample was taken on another day of the month, (all were made-up except for the State Park sample in October).

Quality Assurance Procedures:

In order to be sure that our results were reliable, at least 10 percent of the samples we took were quality control samples. Duplicate samples, and/or blank samples and/or split samples were taken every month to be sure our results were falling within an acceptable range of accuracy.

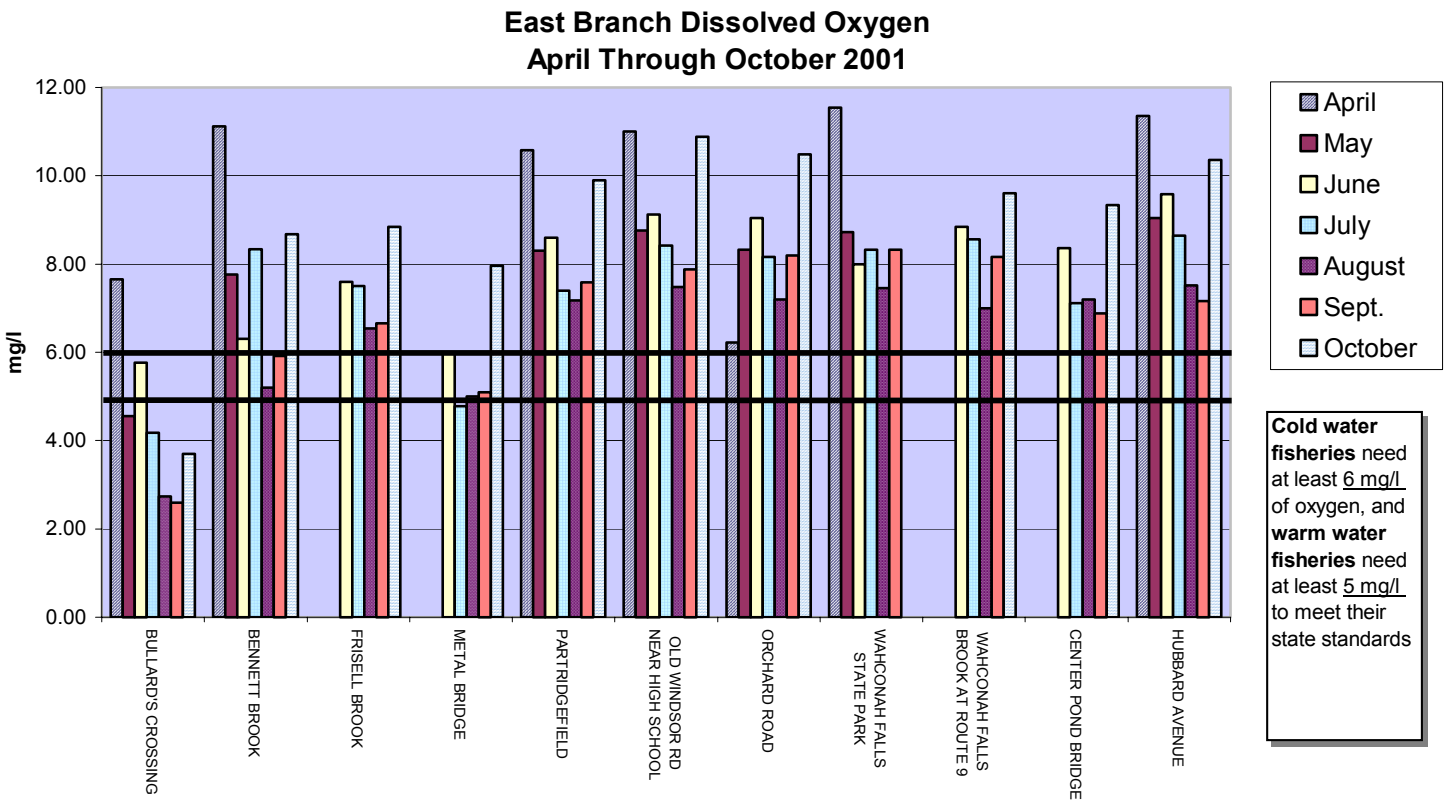
We also participated in the quality control program at the lab at the University of Massachusetts Amherst. Each month (except for April and May) they sent us samples that had fixed levels of pH, alkalinity, and dissolved oxygen. We then analyzed those samples in our lab at HVA to see whether our results fell within an acceptable range, which they did (if a meter or titrator did not produce acceptable results, it was not used for analyzing samples that day).

IV. RESULTS BY PARAMETER

Findings and Violations by Parameter:

Dissolved Oxygen: All the sites, except Hubbard Avenue in Pittsfield, are classified as Class B Cold Water Fisheries, which state standards require have at least 6 mg/l of oxygen. Twelve violations of this standard occurred in 2001 at the following sites:

Bullard's Crossing did not have enough dissolved oxygen to support its classification in May, June, July, August, September or October.
Bennett Brook failed its classification in August and September.
Metal Bridge failed in June, July, August and September.



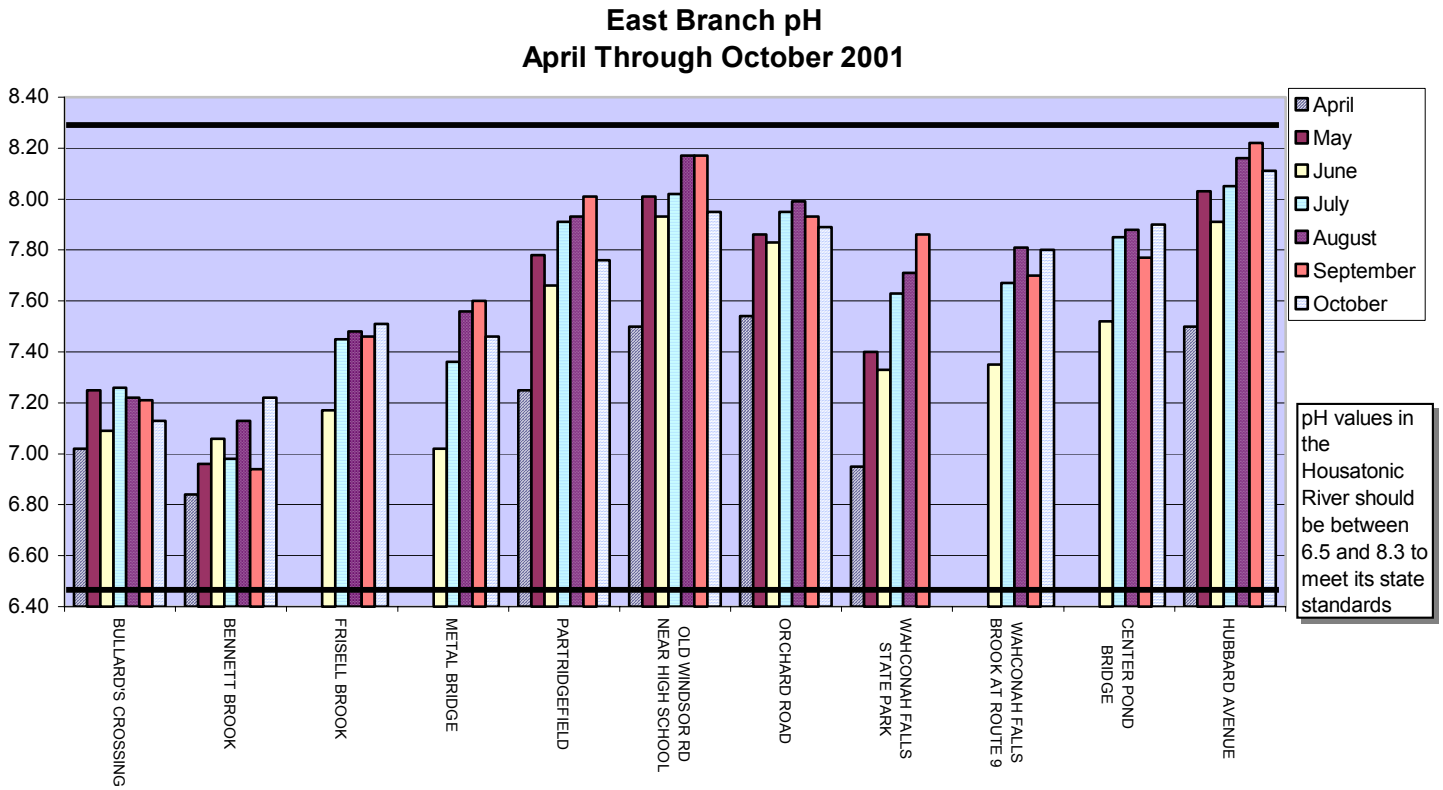
Note: The sites proceed downstream as you read from left to right.

East Branch Dissolved Oxygen – 2001

(in mg/l)

SITE	April	May	June	July	Aug	Sept	Oct
BULLARD'S CROSSING	7.66	4.56	5.76	4.18	2.74	2.60	3.70
BENNETT BROOK	11.12	7.76	6.30	8.34	5.20	5.92	8.68
FRISELL BROOK			7.60	7.50	6.54	6.66	8.84
METAL BRIDGE			5.98	4.78	5.00	5.10	7.96
PARTRIDGEFIELD	10.58	8.30	8.60	7.40	7.18	7.58	9.90
OLD WINDSOR RD NEAR HIGH SCHOOL	11.00	8.76	9.12	8.42	7.48	7.88	10.88
ORCHARD ROAD	6.22	8.32	9.04	8.16	7.20	8.20	10.48
WAHCONAH FALLS STATE PARK	11.54	8.72	8.00	8.32	7.46	8.32	
WAHCONAH FALLS BROOK AT ROUTE 9			8.84	8.56	7.00	8.16	9.60
CENTER POND BRIDGE			8.36	7.12	7.20	6.88	9.34
HUBBARD AVENUE	11.36	9.04	9.58	8.64	7.52	7.16	10.36

pH: 68 samples were tested for pH levels, and all were within the state requirements of 6.5 to 8.3.



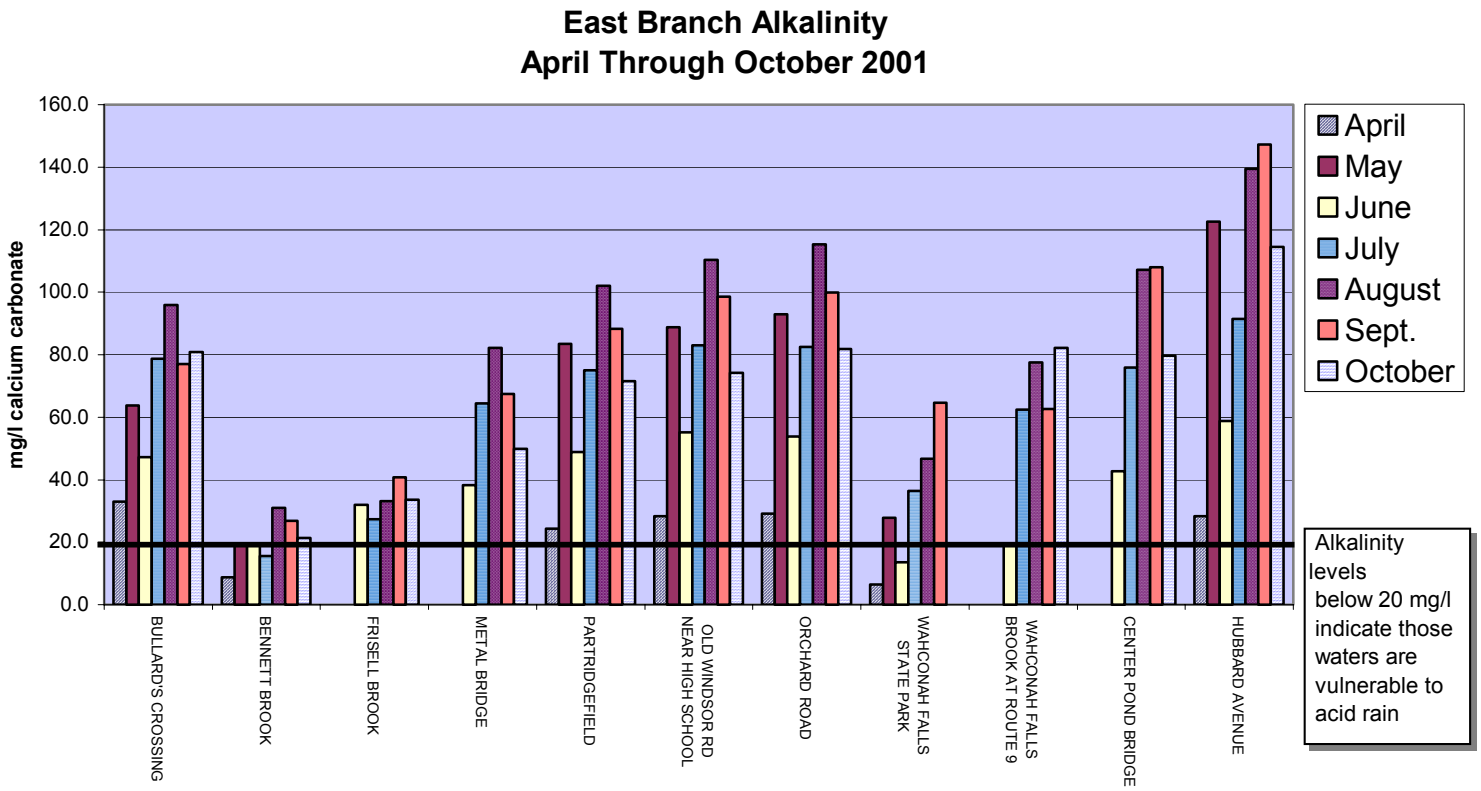
Note: The sites proceed downstream as you read from left to right.

East Branch pH – 2001

SITE	April	May	June	July	Aug	Sept	Oct
BULLARD'S CROSSING	7.02	7.25	7.09	7.26	7.22	7.21	7.13
BENNETT BROOK	6.84	6.96	7.06	6.98	7.13	6.94	7.22
FRISELL BROOK			7.17	7.45	7.48	7.46	7.51
METAL BRIDGE			7.02	7.36	7.56	7.60	7.46
PARTRIDGEFIELD	7.25	7.78	7.66	7.91	7.93	8.01	7.76
OLD WINDSOR RD NEAR HIGH SCHOOL	7.50	8.01	7.93	8.02	8.17	8.17	7.95
ORCHARD ROAD	7.54	7.86	7.83	7.95	7.99	7.93	7.89
WAHCONAH FALLS STATE PARK	6.95	7.40	7.33	7.63	7.71	7.86	
WAHCONAH FALLS BROOK AT ROUTE 9			7.35	7.67	7.81	7.70	7.80
CENTER POND BRIDGE			7.52	7.85	7.88	7.77	7.90
HUBBARD AVENUE	7.50	8.03	7.91	8.05	8.16	8.22	8.11

Alkalinity (or "Acid Neutralizing Capacity"): The Massachusetts Acid Rain Monitoring Project lists waters between 5-10 mg/l of calcium carbonate as being "Highly Sensitive" to acid rain. Alkalinity levels between 10-20 mg/l are considered "Sensitive." Levels above 20/mg/l are considered "Not Sensitive." Although most of the river in the East Branch has adequate acid neutralizing capacities, there are a few concerns:

Bennett Brook was measured "Highly Sensitive" in April, and "Sensitive" in May, June and July.
Wahconah Falls State Park was "Highly Sensitive" in April, and "Sensitive" in June.
Wahconah Falls Brook at Route 9 was not tested in April or May but fell in the "Sensitive" category in June.



Note: The sites proceed downstream as you read from left to right.

East Branch Alkalinity – 2001

SITE	April * **	May * **	June	July	Aug	Sept	Oct
BULLARD'S CROSSING	33.0	63.8	47.2	78.6	95.9	77.0	80.9
BENNETT BROOK	8.8	19.0	19.3	15.6	31.0	26.9	21.4
FRISELL BROOK			31.9	27.4	33.2	40.7	33.6
METAL BRIDGE			38.3	64.4	82.1	67.4	49.8
PARTRIDGEFIELD	24.4	83.4	48.9	75.0	102.0	88.2	71.6
OLD WINDSOR RD NEAR HIGH SCHOOL	28.3	88.8	55.2	83.0	110.3	98.6	74.2
ORCHARD ROAD	29.2	93.0	53.8	82.5	115.3	99.8	81.8
WAHCONAH FALLS STATE PARK	6.4	27.9	13.6	36.4	46.7	64.6	
WAHCONAH FALLS BROOK AT ROUTE 9			19.1	62.4	77.5	62.6	82.2
CENTER POND BRIDGE			42.8	75.9	107.2	108.0	79.6
HUBBARD AVENUE	28.4	122.6	58.8	91.4	139.5	147.2	114.4

*In May I discovered that I had not fully re-standardized our pH meter in April. Therefore, April's pH and alkalinity numbers may be off a bit. May's pH and alkalinity levels are all higher, but that may be due to the meter. The patterns are the same, however, in that Bullard's Crossing, Bennett Brook, and WF State Park had the lowest pH and alkalinity levels during both months.

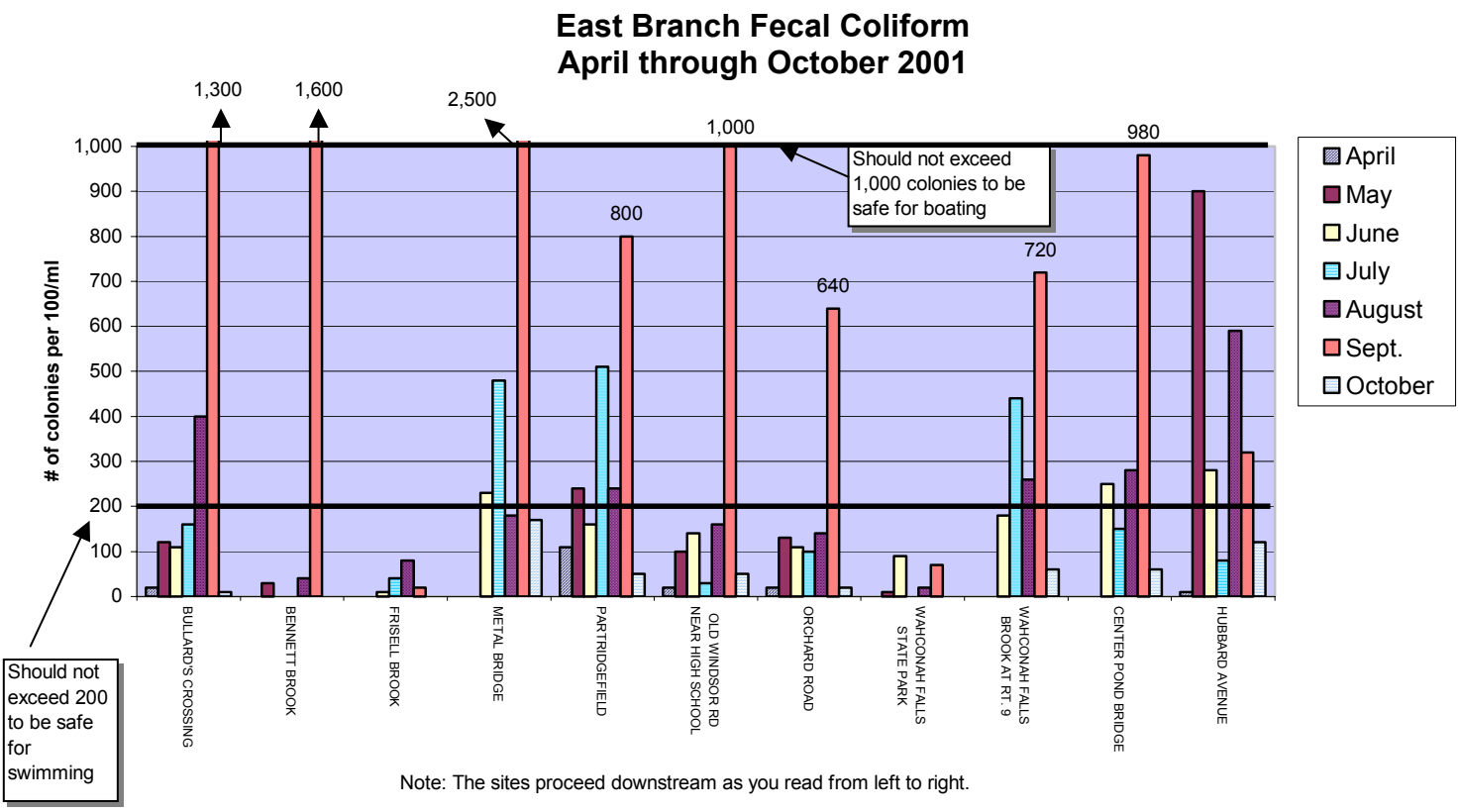
** The sulfuric acid cartridges that were used in April and May for the alkalinity test were found to have expired in December '00. However, after using the cartridges with June's QC samples, the results were still well within the acceptable range, so we are confident that our previous results are also acceptable.

Fecal Coliform Bacteria: 68 samples were tested for fecal coliform in 2001. Levels above 200 colonies per 100 ml are not considered safe for swimming, because water could be accidentally ingested while swimming. Levels below 1,000 are considered safe for secondary contact, i.e. boating and fishing. Five of the sites (Metal Bridge and Partridgefield in Hinsdale, and Wahconah Falls Brook at Route 9, Center Pond Bridge, and Hubbard Ave.) exceeded the state standard for safe swimming (200 colonies per 100 ml) more times than not. All sites but two exceeded the 200 colony level on September 11th, which was one day after a heavy rainstorm. Frisell Brook and Wahconah Falls State Park, however, never exceeded the safe swimming level, even after rain events. Bennett Brook only had high bacteria levels once, in September, though they were quite high, having 1,600 colonies per 100 ml.

The pattern of high bacteria levels in Hinsdale seems to indicate that either there is a problem with septic/sewage systems in town, or possibly the high levels are coming upstream from town in the Hinsdale Flats, where there is a high population of beavers. Next year we'll test other sites upstream from town, and in town as well, to see if we can pinpoint the source of these high bacteria levels.

The high bacteria levels at the Wahconah Falls Brook at Route 9 site would seem to indicate a source that lies upstream from there, but below the State Park, where there was never a problem. There are some farms, and houses, in that area, and next year we will do more sampling to see if we can find the source(s) of bacteria in that area as well.

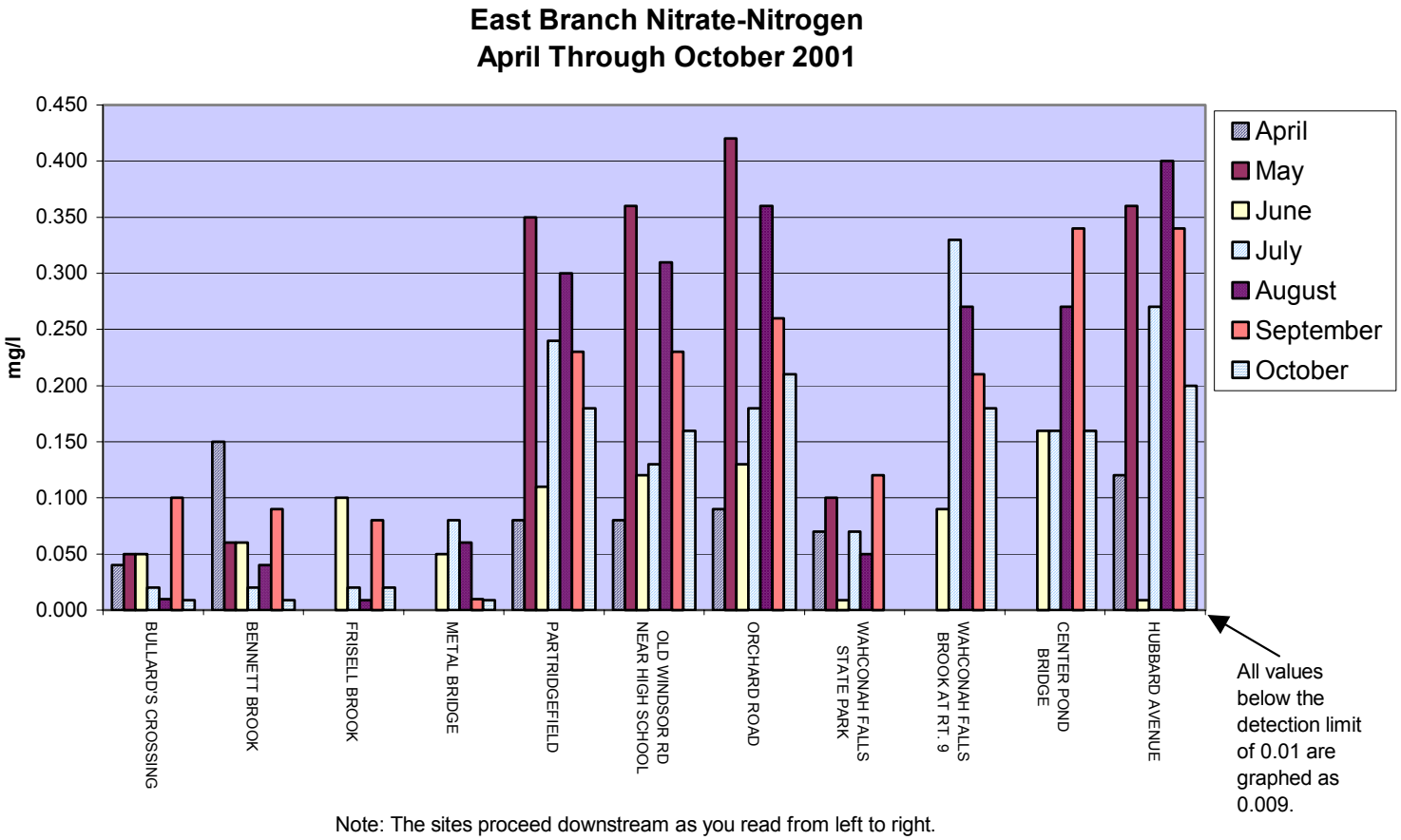
Why there were so many high spikes at almost all the sites in September is not clear. May was also a wet weather sampling day. However, in May only two sites (Partridgefield and Hubbard) saw levels higher than the state standard of 200 colonies per 100 ml, whereas in September only two sites (Frisell Brook and State Park, both on tributaries) were below the state standard.



East Branch Fecal Coliform – 2001

SITE	April	May	June	July	Aug	Sept	Oct
BULLARD'S CROSSING	20	120	110	160	400	1,300	10
BENNETT BROOK	<10	30	<10	<10	40	1,600	<10
FRISELL BROOK			10	40	80	20	<10
METAL BRIDGE			230	480	180	2,500	170
PARTRIDGEFIELD	110	240	160	510	240	800	50
OLD WINDSOR RD NEAR HIGH SCHOOL	20	100	140	30	160	1,000	50
ORCHARD ROAD	20	130	110	100	140	640	20
WAHCONAH FALLS STATE PARK	<10	10	90	<10	20	70	
WAHCONAH FALLS BROOK AT ROUTE 9			180	440	260	720	60
CENTER POND BRIDGE			250	150	280	980	60
HUBBARD AVENUE	10	900	280	80	590	320	120

Nitrate-Nitrogen: There is no state standard for nitrate-nitrogen, so it makes it a harder to determine what levels are acceptable for the health of a river and what levels indicate problems. The levels shown here are probably not high enough to create problems, though the levels in the main stem clearly jumped at the Partridgefield site and stayed higher from there on. Whether this jump indicates a source in Hinsdale that causes all the downstream sites to be high, or if there are additional sources downstream that contribute to the overall level to keep it high is hard to determine. In 2002 we will see whether this pattern continues or not. There is also a jump in nitrates in Wahconah Falls Brook from the State Park site to the Wahconah Falls Brook at Route 9 site, indicating a source in-between these two sites.



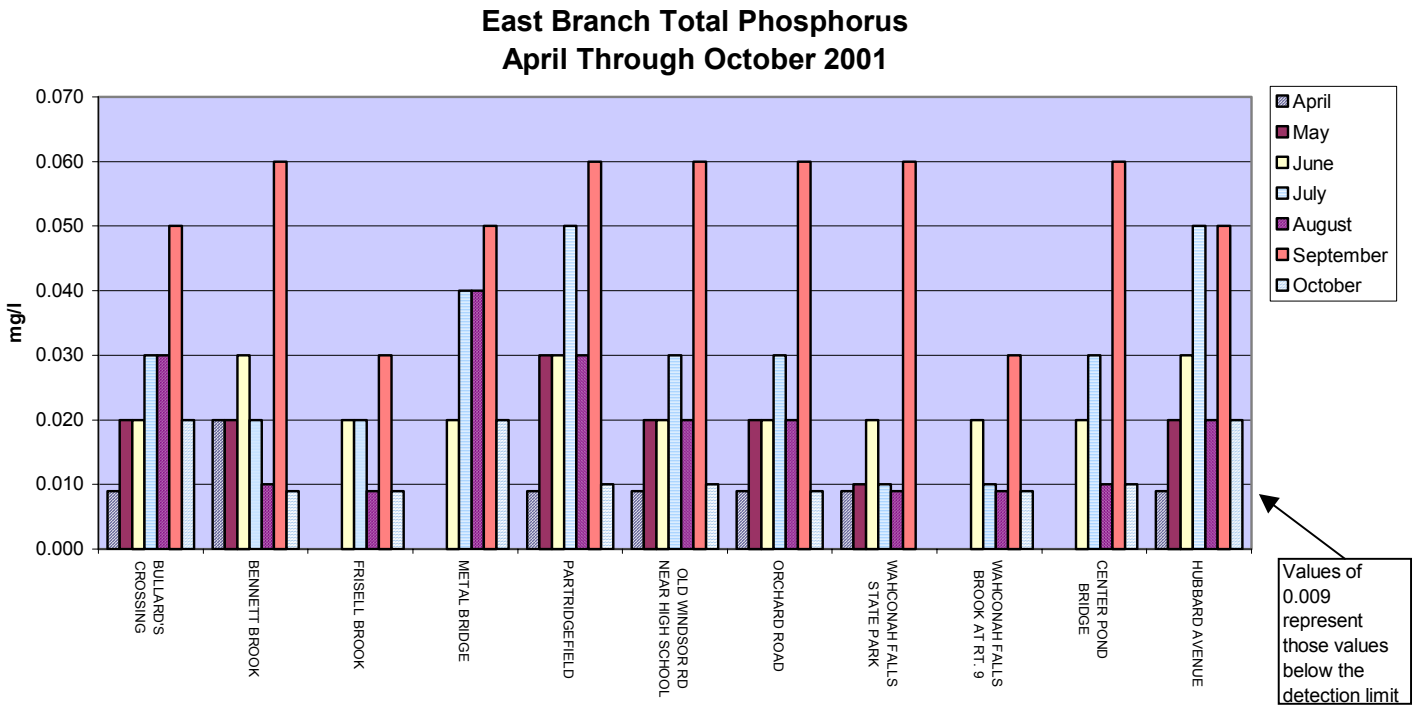
Note: The sites proceed downstream as you read from left to right.

East Branch Nitrate-Nitrogen – 2001

SITE	April	May	June *	July	Aug *	Sept	Oct *
BULLARD'S CROSSING	0.040	0.050	0.050	0.020	0.010	0.100	0.009
BENNETT BROOK	0.150	0.060	0.060	0.020	0.040	0.090	0.009
FRISELL BROOK			0.100	0.020	0.009	0.080	0.020
METAL BRIDGE			0.050	0.080	0.060	0.010	0.009
PARTRIDGEFIELD	0.080	0.350	0.110	0.240	0.300	0.230	0.180
OLD WINDSOR RD NEAR HIGH SCHOOL	0.080	0.360	0.120	0.130	0.310	0.230	0.160
ORCHARD ROAD	0.090	0.420	0.130	0.180	0.360	0.260	0.210
WAHCONAH FALLS STATE PARK	0.070	0.100	0.009	0.070	0.050	0.120	
WAHCONAH FALLS BROOK AT RT. 9			0.090	0.330	0.270	0.210	0.180
CENTER POND BRIDGE			0.160	0.160	0.270	0.340	0.160
HUBBARD AVENUE	0.120	0.360	0.009	0.270	0.400	0.340	0.200

* All values below the detection limit of 0.01 are entered as 0.009 so they can be graphed.
Days when no sample(s) was taken are left as blanks.

Total Phosphorus: There is no state standard for phosphorus, so it makes it a little harder to determine what levels are acceptable for the health of a river. The levels shown here are probably not high enough to create problems for the river. In September, however, the phosphorus levels jumped significantly, indicating a relationship between phosphorus levels and rain events, since there was some rain on the day before the samples were taken. May's sampling day, however, was also after a rain event, and though the levels were higher than in April, they were not as high as they were after September's rain.



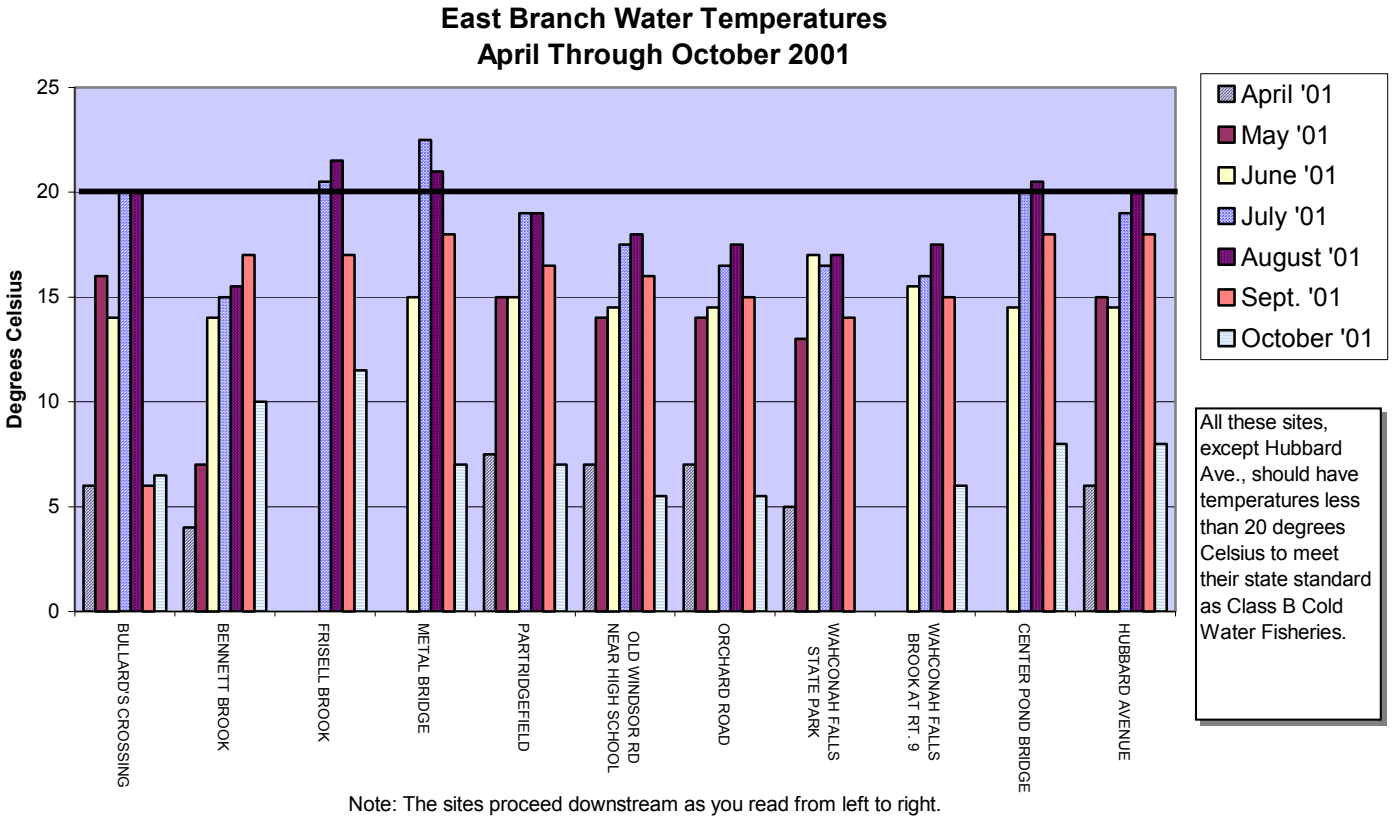
Note: The sites proceed downstream as you read from left to right.

East Branch Total Phosphorus – 2001

SITE	April *	May	June	July	Aug *	Sept	Oct *
BULLARD'S CROSSING	0.009	0.02	0.02	0.03	0.03	0.05	0.02
BENNETT BROOK	0.02	0.02	0.03	0.02	0.01	0.06	0.009
FRISELL BROOK			0.02	0.02	0.009	0.03	0.009
METAL BRIDGE			0.02	0.04	0.04	0.05	0.02
PARTRIDGEFIELD	0.009	0.03	0.03	0.05	0.03	0.06	0.01
OLD WINDSOR RD NEAR HIGH SCHOOL	0.009	0.02	0.02	0.03	0.02	0.06	0.01
ORCHARD ROAD	0.009	0.02	0.02	0.03	0.02	0.06	0.009
WAHCONAH FALLS STATE PARK	0.009	0.01	0.02	0.01	0.009	0.06	
WAHCONAH FALLS BROOK AT ROUTE 9			0.02	0.01	0.009	0.03	0.009
CENTER POND BRIDGE			0.02	0.03	0.01	0.06	0.01
HUBBARD AVENUE	0.009	0.02	0.03	0.05	0.02	0.05	0.02

* All values below the detection limit of 0.01 are entered as 0.009 so they can be graphed. Days when no sample(s) was taken are left as blanks.

Water Temperature: Not surprisingly, July and August were when the water temperatures were the highest. Most of the sites had temperatures below the required state standard of 20 degrees Celsius, at least most of the time. Bullard's Crossing, where the river is fairly deep and flows slowly as it meanders through the Hinsdale Flats, never exceeded the state standards but did reach the threshold in July and August. The Metal Bridge and Center Pond Bridge sites are both behind dams, so the water is fairly deep and slow moving at these sites also. They also met or exceeded the standards in July and August. The more surprising results were at Frisell Brook and Hubbard Avenue, where the water is fairly quick moving though shallow at both sites. Frisell drains from Plunkett Reservoir and is perhaps reflecting the warmer temperatures found in the lake in the summer, though it also is a very small brook and had very low flows at times. At the Hubbard Avenue location the river is wide and shallow, there are numerous dams upstream from it, and perhaps there is less shading of the stream as it flows through urban areas in Dalton.



Note: The sites proceed downstream as you read from left to right.

East Branch Water Temperatures – 2001

SITE	April	May	June	July	Aug	Sept	Oct
BULLARD'S CROSSING	6	16	14	20	20	6	6.5
BENNETT BROOK	4.0	7.0	14.0	15.0	15.5	17.0	10.0
FRISELL BROOK				20.5	21.5	17.0	11.5
METAL BRIDGE			15.0	22.5	21.0	18.0	7.0
PARTRIDGEFIELD	7.5	15.0	15.0	19.0	19.0	16.5	7.0
OLD WINDSOR RD NEAR HIGH SCHOOL	7.0	14.0	14.5	17.5	18.0	16.0	5.5
ORCHARD ROAD	7.0	14.0	14.5	16.5	17.5	15.0	5.5
WAHCONAH FALLS STATE PARK	5.0	13.0	17.0	16.5	17.0	14.0	
WAHCONAH FALLS BROOK AT ROUTE 9			15.5	16.0	17.5	15.0	6.0
CENTER POND BRIDGE			14.5	20.0	20.5	18.0	8.0
HUBBARD AVENUE	6.0	15.0	14.5	19.0	20.0	18.0	8.0

IV. RESULTS BY SITE

Bullard's Crossing:
This site was monitored by Dennis Regan. It was monitored all seven months, from April through October. Results for this site are as follows:

Dissolved Oxygen ranged from a high in April of 7.66 mg/l to a low of 2.6 mg/l in September. Only in the first month, April, did it meet its state standard as a Class B Cold Water Fishery. All the rest of the sampling season the DO levels were too low to meet state standards.

Water Temperatures were highest in July and August with 20 degrees Celsius, which is the state standard for Cold Water Fisheries.

Fecal Coliform increased throughout the summer, jumping to a high in September of 1,300, but then dropping off in October to a negligible amount.

Nitrate-Nitrogen remained low all year, ranging from a high in September of 0.10 to a low in October that was below the detection limit. .

Total Phosphorus climbed throughout the summer from below the detection limit of 0.01 mg/l in April, to a high of 0.05 in September, and then dropping off again to 0.02 in October.

pH ranged from a low in April of 7.02 to a high in July of 7.26, with all levels well within the state standard range of 6.5 to 8.3.

Alkalinity, or Acid Neutralizing Capacity, ranged from a low in April of 33.0 mg/l calcium carbonate to a high of 95.9 in August. All readings indicate the river here is not sensitive to acid rain.

Conclusions: Bullard's Crossing is up in the Hinsdale Flats, where the flow is slow and the water fairly deep. During the course of the summer, beavers steadily built up a dam in the culvert right next to where our sampling was being done. This probably explains the steadily rising fecal coliform levels throughout the summer. In the fall the fecal bacteria level dropped off to almost nothing, presumably due to the water temperature being so very low. The temperature readings in September were suspiciously low, so the thermometer was replaced for the October readings. Dissolved oxygen levels are a problem for this site, apparently due to the lack of mixing that occurs in that section of the river, and fecal coliform levels can be a problem depending on the local beaver population and temperatures.

Bullard's Crossing 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l	7.66	4.56	5.76	4.18	2.74	2.60	3.70
pH	7.02	7.25	7.09	7.26	7.22	7.21	7.13
ALKALINITY in mg/l calcium carbonate	33.0	63.8	47.2	78.6	95.9	77.0	80.9
FECAL COLIFORM in colonies/ 100 ml	20	120	110	160	400	1,300	10
NITRATE-NITROGEN in mg/l	0.04	0.05	0.05	0.02	0.01	0.10	<0.01
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.02	0.03	0.03	0.05	0.02
WATER TEMPERATURE in degrees Celsius	6	16	14	20	20	6	6.5
AIR TEMPERATURE in degrees Celsius	9.0	12.0	15.5	16.5	15.0	1.0	-3.0

In September the thermometer seemed to be reading exceedingly low and so was replaced in October. Two different thermometers were used in October and the more likely set of numbers was chosen for October's readings.

Bennett Brook:

Ed and Mary Jo Barrett monitored this site, from the first chilly morning in April, until the last sampling day in October. Results for this site are:

Dissolved Oxygen ranged from a low of 5.20 mg/l in August, to 11.12 mg/l in April. August and September are the only months when this site did not meet its state standard of 6 mg/l of dissolved oxygen, even though the water flow at this site is fairly slow and deep.

Water Temperatures ranged from a low of 4.0 degrees Celsius in April, to a high of 17.0 degrees in September, with all values well below the 20 degrees Celsius state standard.

Fecal Coliform Bacteria ranged from non-detectable on four different days, to a high of 1,600 colonies in September. All levels, except September's, were well below the level required for safe swimming.

Nitrate-Nitrogen levels were all low, ranging from a high in April of 0.15 mg/l to a low of 0.01 in August. These levels are all relatively low and should create no problems.

Total Phosphorus levels at Bennett Brook remained low all year except for a spike in September of 0.06 mg/l, which followed a rainy day when nutrients and bacteria all were exceptionally high. Surprisingly, though this site seems to be fairly healthy, especially in comparison to downstream sites, its phosphorus level in September was as high as the highest of the downstream sites.

pH levels ranged from a low of 6.84 in April to a high of 7.22 in October, generally increasing throughout the season except for a dip in July and again in September. All levels were within the state standard.

Alkalinity, or Acid Neutralizing Capacity, ranged from a low in April of 8.8 mg/l to a high in August of 31.00 mg/l. More than half of the readings were below 20 mg/l of calcium carbonate, which indicates that this brook is somewhat sensitive to the negative impacts of acid rain. Levels of 5-10 mg/l are considered "Highly Sensitive," according to the Acid Rain Monitoring Project at UMassAmherst, and levels of 10-20 mg/l are "Sensitive." Levels above 20 mg/l are rated as "Not Sensitive."

Conclusions: Bennett Brook is a small tributary that flows out of Ashmere Lake. The low levels of Acid Neutralizing Capacity is probably due to the type of bedrock found in this tributary, and we will continue to monitor this parameter on a yearly basis, although there is probably little we can do to protect it from acid rain. In general, this site seems to be meeting its state classification as a Class B Cold Water Fishery, though its summer oxygen levels were a bit too low, and its coliform levels shot way up after September's rainstorm.

Bennett Brook 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l	11.12	7.76	6.30	8.34	5.20	5.92	8.68
pH	6.84	6.96	7.06	6.98	7.13	6.94	7.22
ALKALINITY in mg/l calcium carbonate	8.8	19.0	19.3	15.6	31.0	26.9	21.4
FECAL COLIFORM in colonies/ 100 ml	<10	30	<10	<10	40	1,600	<10
NITRATE-NITROGEN in mg/l	0.15	0.06	0.06	0.02	0.04	0.09	<0.01
TOTAL PHOSPHORUS in mg/l	0.02	0.02	0.03	0.02	0.01	0.06	<0.01
WATER TEMPERATURE in degrees Celsius	4.0	7.0	14.0	15.0	15.5	17.0	10.0
AIR TEMPERATURE in degrees Celsius	7.0	11.0	18.0	12.0	17.0	12	-2.0

Frisell Brook:

Frisell Brook was monitored by Mike Frederick, starting in July, 2001. Dennis Regan monitored it in June. The results from this site were as follows:

Dissolved Oxygen levels started at 7.6 mg/l in June, dipped down to 6.54 mg/l in August, and then rose to a high of 8.84 mg/l in October, following the typical reverse relationship to water temperature that you would expect. DO levels were always above the state standard of 6 mg/l. Samples were not taken in April or May.

Water Temperatures at Frisell were too high in the months of July and August at 20.5 and 21.5 degrees Celsius, respectively.

Fecal Coliform levels stayed nice and low all season, even after rain events, though they were a lot higher in August (80 colonies) than any of the other months.

Nitrate-Nitrogen levels at Frisell were highest in June, at 0.10 mg/l, then dropped to below the detection limit in August, then jumped up in September (after a rainy day) to 0.08 mg/l, and then dropped down again to 0.02 in October. Though the zigzag pattern of these levels is interesting, the levels are probably low enough that they do not represent a problem.

Total Phosphorus levels ranged from below the detection limit in August and October to a high of 0.03 mg/l in September. None of these levels indicate a problem.

pH levels rose throughout the summer and fall, starting at a low of 7.17 in June and rising to a high of 7.51 in October. All these levels fall well within the acceptable range.

Alkalinity, or Acid Neutralizing Capacity, ranged from a low of 27.4 mg/l in July to a high of 40.7 mg/l in September. These numbers mean this brook is "Not Sensitive" to acid rain.

Conclusions: Frisell Brook is a small brook that flows out of Plunkett Reservoir. Summer water temperatures appear to be the only problem for this stream, though we did not measure flow this year, and low flow levels may also create problems for the creatures in this stream. We hope to start measuring flow in the 2002 sampling season.

Frisell Brook - 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l			7.60	7.50	6.54	6.66	8.84
pH			7.17	7.45	7.48	7.46	7.51
ALKALINITY in mg/l calcium carbonate			31.9	27.4	33.2	40.7	33.6
FECAL COLIFORM in colonies/ 100 ml			10	40	80	20	<10
NITRATE-NITROGEN in mg/l			0.10	0.02	<.01	0.08	0.02
TOTAL PHOSPHORUS in mg/l			0.02	0.02	<.01	0.03	<0.01
WATER TEMPERATURE in degrees Celsius				20.5	21.5	17.0	11.5
AIR TEMPERATURE in degrees Celsius				16.0	17.0	13.0	3.0

Metal Bridge:

Holly Adams monitored this site in 2001, though we did not start testing there until June. The results from this site are as follows:

Dissolved Oxygen ranged from a low of 4.78 mg/l in July, to 7.96 mg/l in October. Only in October did it exceed its state standard as a Class B Cold Water Fishery. In June it almost met the standard of 6 mg/l, having 5.98 mg/l. In July, August and September the DO levels were too low to meet state standards.

Water Temperatures were lowest in October, at 7.0 degrees Celsius, and highest at 22.5 degrees in July. In July and August the water temperatures were too high for state standards.

Fecal Coliform ranged from a high in September of 2,500 colonies per 100 ml to a low of 170 colonies in September! FC levels at Metal Bridge were either close to exceeding state standards, or did exceed them, for most of the year. Only in August and October were the levels low enough to be considered safe for primary contact, i.e. swimming.

Nitrate-Nitrogen levels at the Metal Bridge site consistently remained below 0.10 mg/l, even following rain events, and do not appear to be a problem.

Total Phosphorus levels also appear to be low enough not to be a problem. The highest levels measured in 2001 were 0.05 mg/l in September.

pH levels were all within an acceptable range, rising from a low of 7.02 in June to a high of 7.60 in September before dropping again in October to 7.46.

Alkalinity, or Acid Neutralizing Capacity, ranged from 38.8 to 82.1 mg/l of calcium carbonate. All readings indicate the river here is not sensitive to acid rain, since they are all well above 20 mg/l.

Conclusions: Dissolved Oxygen, Water Temperature, and Fecal Coliform levels all failed to meet their state standards at some time or another during the sampling season. Since this is a slow-moving stretch just above a dam, it is not too surprising the DO levels were low, and the summer water temperatures were high. Fecal Coliform levels were high enough, often enough, to indicate that there is a problem occurring upstream from that site that merits further investigation. We will look more closely upstream from this site in 2002 to see if we can determine whether the source is from human activities along the river, or if it is possibly from the large population of beavers living upstream from town in the Hinsdale Flats.

Metal Bridge in Hinsdale - 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l			5.98	4.78	5.00	5.10	7.96
pH			7.02	7.36	7.56	7.60	7.46
ALKALINITY in mg/l calcium carbonate			38.3	64.4	82.1	67.4	49.8
FECAL COLIFORM in colonies/ 100 ml			230	480	180	2,500	170
NITRATE-NITROGEN in mg/l			0.05	0.08	0.06	0.01	<0.01
TOTAL PHOSPHORUS in mg/l			0.02	0.04	0.04	0.05	0.02
WATER TEMPERATURE in degrees Celsius			15.0	22.5	21.0	18.0	7.0
AIR TEMPERATURE in degrees Celsius			17.5	17.0	15.0		0.0

Partridgefield:

This site was also monitored by Holly Adams, starting in April and continuing through October. Results from this site are as follows:

Dissolved Oxygen levels started at a high of 10.58 mg/l in April, dipped down to a low of 7.18 mg/l in August, and then rose back up to 9.90 mg/l in October, following the typical reverse relationship to water temperature that you would expect. DO levels were always above the state standard of 6 mg/l.

Water Temperatures ranged from 7.0 to 19.0 degrees Celsius, with all values below the 20 degrees Celsius state standard.

Fecal Coliform levels at Partridgefield followed an overall pattern similar to the fluctuations seen just upstream at the Metal Bridge site. Interestingly, the levels at Partridgefield were usually lower than at Metal Bridge, but in July and August they were a bit higher. Fecal Coliform ranged from a high in September of 800 colonies per 100 ml, to a low of 50 colonies in October. FC levels at Partridgefield exceeded state standards for primary contact on 4 of the 7 days that we sampled. Only in April, June, and October were the levels low enough to be considered safe for swimming.

Nitrate-Nitrogen levels were considerably higher here than just upstream at the Metal Bridge site. Levels here ranged from a low in April of 0.08 mg/l to a high the next month of 0.35 mg/l. (May's sampling day was the first day of rain after weeks of dry weather.) All the sites on the main stem that were sampled in both April and May, including as well as downstream from Partridgefield, showed a marked increase from April to May, from dry weather to wet.

Total Phosphorus levels at Partridgefield tend to be somewhat similar to the levels just upstream at Metal Bridge, and higher than the levels just downstream at the High School site. Values ranged from below the detection limit of 0.01mg/l in April to a high of 0.06 in September. All sites saw an increase in phosphorus levels in September.

pH levels were all within the state requirements by being above 6.5 and below 8.3. Levels increased throughout the sampling season until it dropped in October to 7.76 from a high of 8.01 in September.

Alkalinity levels, or Acid Neutralizing Capacity, ranged from 24.4 mg/l in April, to over 100 mg/l in August. All levels are considered "Not Sensitive" to acid rain.

Conclusions: Partridgefield is a wide, fast-moving site with a lot of mixing, plus relatively cold water, leading to the consistently high oxygen levels. The high fecal coliform levels, however, indicate a source of bacteria upstream from this site. The increase in nitrates starting at the Partridgefield site may also indicate a source of fertilizers somewhere upstream from there, though the levels measured were probably not high enough to create any problems. We will continue monitoring here in 2002, as well as upstream, in an effort to pinpoint the source(s) of bacteria and nitrates.

Partridgefield – 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l	10.58	8.30	8.60	7.40	7.18	7.58	9.90
pH	7.25	7.78	7.66	7.91	7.93	8.01	7.76
ALKALINITY in mg/l calcium carbonate	24.4	83.4	48.9	75.0	102.0	88.2	71.6
FECAL COLIFORM in colonies/ 100 ml	110	240	160	510	240	800	50
NITRATE-NITROGEN in mg/l	0.08	0.35	0.11	0.24	0.30	0.23	0.18
TOTAL PHOSPHORUS in mg/l	<0.01	0.03	0.03	0.05	0.03	0.06	0.01
WATER TEMPERATURE in degrees Celsius	7.5	15.0	15.0	19.0	19.0	16.5	7.0
AIR TEMPERATURE in degrees Celsius	0.0	11.0	17.5	18.5	15.0	12.0	0.0

High School:

This site was monitored in April by Holly Adams, in May by both Holly and Mike Darroch, and from then on by Mike alone. The results from this site are as follows:

Dissolved Oxygen levels at the High School site behaved as expected, falling as the water temperatures increased, and then climbing again as the water temperatures began to drop in the fall. All samples were above the state requirement of at least 6 mg/l. Levels ranged from a high in April of 11.00 mg/l, down to 7.48 mg/l in August, and then back up to 10.88 mg/l in October.

Water Temperatures ranged from 5.5 to 18.0 degrees Celsius, with all values staying below the 20 degrees Celsius state standard.

Fecal Coliform at this site was below the state standard for safe swimming of 200 colonies per 100 ml in every month except September when it reached a high of 1,000 colonies per 100 ml.

Nitrate-Nitrogen levels at the High School site remained low enough that they probably don't create any problems for the river environment, however the levels were quite a bit higher in May, August and September, following patterns similar to the sites both upstream and downstream from it. Values ranged from 0.08 to 0.36 mg/l.

Total Phosphorus levels at the High School site tend to be lower than the levels upstream at Partridgefield, and very similar to the levels just downstream at the Orchard Ave. site. Values ranged from below the detection limit of 0.01mg/l in April to a high of 0.06 mg/l in September. All sites saw an increase in phosphorus levels in September. These levels are probably not high enough to cause any problems for the environment.

pH levels at the High School site were consistently some of the highest that we measured anywhere in the East Branch, though they were still within the acceptable range of 6.5 to 8.3. Only Hubbard Avenue had similarly high values, though Partridgefield and Orchard were not much lower. Values at High School ranged from 7.50 to 8.17.

Alkalinity, or Acid Neutralizing Capacity, at this site is consistently high enough to not be sensitive to acid rain. Values ranged from 28.3 to 110.3 mg/l calcium carbonate.

Conclusions: This site is on Old Windsor Road near Wahconah Regional High School. It is below the town of Hinsdale, so levels of some parameters that were elevated in Hinsdale were still high at this site, though many had decreased by the time they reached the High School, fecal coliform being a good example. Fecal levels at the High School site were above 200 colonies only once, though the Partridgefield site exceeded the standard four times. This site is of interest also because it is just upstream of a golf course.

High School - 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l	11.00	8.76	9.12	8.42	7.48	7.88	10.88
Ph	7.50	8.01	7.93	8.02	8.17	8.17	7.95
ALKALINITY in mg/l calcium carbonate	28.3	88.8	55.2	83.0	110.3	98.6	74.2
FECAL COLIFORM in colonies/ 100 ml	20	100	140	30	160	1,000	50
NITRATE-NITROGEN in mg/l	0.08	0.36	0.12	0.13	0.31	0.23	0.16
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.02	0.03	0.02	0.06	0.01
WATER TEMPERATURE in degrees Celsius	7.0	14.0	14.5	17.5	18.0	16.0	5.5
AIR TEMPERATURE in degrees Celsius	5.0	11.0	15.0	13.5	18.0	11.5	-4.5

Orchard Road:

This site was monitored in April by Holly Adams, in May by Holly and Mike Darroch, and from then on by Mike alone. The results from this site are as follows:

Dissolved Oxygen levels at this site behaved as expected, falling as the water temperatures increased, and then climbing again as the water temperatures began to drop in the fall. All samples were above the state requirement of at least 6 mg/l. The low, 6.22 mg/l, was recorded in April, but this value was inaccurately low due to a chemical not fully dissolving. It should have been similar to the April value just upstream at the High School, which was 11.00 mg/l. The high at Orchard Road was 10.48 mg/l in October.

Water Temperatures ranged from 17.5 degrees in August to 5.5 degrees in October, with all values below the state standard of 20 degrees Celsius..

Fecal Coliform at this site was below the state standard for safe swimming of 200 colonies per 100 ml in every month except September when it reached a high of 640 colonies.

Nitrate-Nitrogen levels at the Orchard Road site remained low enough that they probably do not create any problems for the river environment, however the levels were quite a bit higher in May, August and September, following patterns similar to the sites upstream from it. Values ranged from a low of 0.09 mg/l in April to a high of 0.42 mg/l in May.

Total Phosphorus levels at the Orchard Road site tend to be very similar to the levels just upstream at the High School site. This seems to indicate that the golf course in-between these two sites is not increasing the phosphorus levels in the river. Values ranged from below the detection limit of 0.01mg/l in April to a high of 0.06 mg/l in September. All sites saw an increase in phosphorus levels in September. These levels are probably not high enough to cause any problems for the environment.

pH levels at this site were fairly high, ranging from 7.54 to 7.99. Though high, none of the measurements ever exceeded the state standard of 8.3.

Alkalinity, or Acid Neutralizing Capacity, at this site is consistently high enough to not be sensitive to acid rain. Values ranged from 29.2 to 115.3.

Conclusions: Water quality at the Orchard Road site is generally pretty good, especially considering it is located right after the river runs through a golf course. Fecal coliform levels jumped from a low of 20 colonies in a dry weather sample in April, to a wet weather sample in May with 130 colonies, due perhaps to geese on the golf course? The only month when fecal levels exceeded the state standard was in September, another wet weather sample, when almost all sites exceeded 200 colonies per 100 ml. All other measurements fell within their state standards.

Orchard Road – 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l	6.22	8.32	9.04	8.16	7.20	8.20	10.48
pH	7.54	7.86	7.83	7.95	7.99	7.93	7.89
ALKALINITY in mg/l calcium carbonate	29.2	93.0	53.8	82.5	115.3	99.8	81.8
FECAL COLIFORM in colonies/ 100 ml	20	130	110	100	140	640	20
NITRATE-NITROGEN in mg/l	0.09	0.42	0.13	0.18	0.36	0.26	0.21
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.02	0.03	0.02	0.06	<0.01
WATER TEMPERATURE in degrees Celsius	7.0	14.0	14.5	16.5	17.5	15.0	5.5
AIR TEMPERATURE in degrees Celsius	6.0	11.0	15.0	14.0	17.5	11.5	5.5

Wahconah Falls State Park:

This site was monitored by Sam and Denie Smith from April through September. In April the site was a stone's throw farther upstream, but starting in May the samples were taken near the old stone foundation, downstream of Windsor Reservoir, but upstream of the falls. The results from this site are as follows:

Dissolved Oxygen levels at the State Park were some of our highest, behaving as expected, falling as the water temperatures increased, and then climbing again as the water temperatures began to drop in the fall. All samples were above the state requirement of at least 6 mg/l, and ranged from a high in April of 11.54 mg/l to a low in August of 7.46 mg/l.

Water Temperatures ranged from a low of 5.0 mg/l in April to a high of 17.0 degrees in both June and August. All values were below the 20 degrees Celsius state standard.

Fecal Coliform at the State Park was very low in 2001, even after rain events. The highest level was 90 colonies measured in June.

Nitrate-Nitrogen levels were considerably lower at the State Park than at most of the sites on the main stem. It was also lower than the site downstream from it, at its intersection with Route 9. Values ranged from below the detection limit in June to 0.12 mg/l in September.

Total Phosphorus levels at the State Park tended to be low all year, except for a spike in September. Values ranged from below the detection limit of 0.01mg/l in April and August to a high of 0.06 mg/l in September. All sites saw an increase in phosphorus levels in September, though these values are all probably low enough to not cause any problems.

pH levels at the State Park gradually climbed throughout the monitoring season, from a low of 6.95 in April, to a high of 7.86 mg/l in September. All samples were within the state requirements by being higher than 6.5 but lower than 8.3.

Alkalinity, or Acid Neutralizing Capacity, at this site was fairly low, even low enough in April at 6.4 mg/l to be considered "Highly Sensitive," and in June to be low enough with 13.6 mg/l to be considered "Sensitive."

Conclusions: The monitoring site at Wahconah Falls State Park is located just downstream from Windsor Reservoir but upstream of the falls. It is a fast-moving, fairly shallow stretch of water that exhibited exceptionally good water quality in 2001, even during wet weather. The only parameter of concern to this site is its low acid neutralizing capacity, which means it could be susceptible to negative impacts from acid rain. Levels of 5-10 mg/l are considered "Highly Sensitive," according to the Acid Rain Monitoring Project at UMassAmherst, and levels of 10-20 mg/l are rated as "Sensitive." Levels above 20 mg/l are rated as "Not Sensitive."

Wahconah Falls State Park – 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l	11.54	8.72	8.00	8.32	7.46	8.32	
pH	6.95	7.40	7.33	7.63	7.71	7.86	
ALKALINITY in mg/l calcium carbonate	6.4	27.9	13.6	36.4	46.7	64.6	
FECAL COLIFORM in colonies/ 100 ml	<10	10	90	<10	20	70	
NITRATE-NITROGEN in mg/l	0.07	0.10	<0.01	0.07	0.05	0.12	
TOTAL PHOSPHORUS in mg/l	<0.01	0.01	0.02	0.01	<.01	0.06	
WATER TEMPERATURE in degrees Celsius	5.0	13.0	17.0	16.5	17.0	14.0	
AIR TEMPERATURE in degrees Celsius	8.0	11.0	14.0	12.0	15.0	12.0	

Wahconah Falls Brook at Route 9:

This site was monitored by Dicken Crane, starting in June and continuing through October. The results from this site are as follows:

Dissolved Oxygen levels here followed the usual inverse relationship with water temperature, falling as the water temperatures increased, and then climbing again as the water temperatures began to drop in the fall. All samples were above the state requirement of at least 6 mg/l, ranging from a low of 7.00 mg/l in August to a high of 9.60 mg/l in October.

Water Temperatures ranged from 17.5 degrees in August to 6.0 degrees in October, with all values below the 20 degrees Celsius state standard.

Fecal Coliform levels in Wahconah Falls Brook at Route 9 exceeded state standards in three out of the five months that it was tested. The highest level was in September, with a value of 720 colonies per 100 ml of sample. Levels above 200 colonies are not considered safe for swimming, where water could be accidentally ingested, while levels below 1,000 are still considered safe for secondary contact, i.e. boating and fishing. Values at this site ranged from 60 to 720 colonies per 100 ml.

Nitrate-Nitrogen levels in Wahconah Falls Brook at Route 9 ranged from a low of 0.09 mg/l in June (it was not monitored in April or May), to a high of 0.33 mg/l in July. After July, the levels gradually decreased each month, coming down to 0.18 mg/l in October.

Total Phosphorus levels in Wahconah Falls Brook at Route 9 tended to be low, and very similar to the levels upstream at the State Park site. Values ranged from below the detection limit of 0.01 mg/l in August and October, to a high of 0.03 mg/l in September. All sites saw an increase in phosphorus levels in September.

pH levels at this site ranged from 7.35 in June (this site wasn't monitored in April or May) to highs near 7.8 in August and October. All levels were within the state standards by being higher than 6.5 but lower than 8.3.

In June, the Alkalinity, or Acid Neutralizing Capacity, was just below 20 mg/l, however every month after that the levels were higher than 20 mg/l, and therefore high enough to be considered "Not Sensitive" to acid rain. Values ranged from 19.1 to 82.2 mg/l.

Conclusions: Fecal Coliform and nitrate-nitrogen levels are the only parameters that appeared to be elevated at times. Fecal coliform was high in July, August and September, though September was a wet weather sample and fecal coliform was high at almost all our sites that month. Nitrate-nitrogen was highest in July, and then it dropped gradually from there. We will continue to monitor Wahconah Falls Brook between this site and the State Park to try to determine the source(s) of these elevated parameters.

Wahconah Falls Brook at Rt. 9 – 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l			8.84	8.56	7.00	8.16	9.60
pH			7.35	7.67	7.81	7.70	7.80
ALKALINITY in mg/l calcium carbonate			19.1	62.4	77.5	62.6	82.2
FECAL COLIFORM in colonies/100 ml			180	440	260	720	60
NITRATE-NITROGEN in mg/l			0.09	0.33	0.27	0.21	0.18
TOTAL PHOSPHORUS in mg/l			0.02	0.01	<.01	0.03	<0.01
WATER TEMPERATURE in degrees Celsius			15.5	16.0	17.5	15.0	6.0
AIR TEMPERATURE in degrees Celsius			16.5	15.5	17.0	12.5	-1.0

Center Pond Bridge:

This site was monitored by Tom Doyle and Cas Makowski, starting in June and continuing through October. The results from this site are as follows:

Dissolved Oxygen levels at Center Pond Bridge were above the state requirement of at least 6 mg/l, even though the water is deep and slow moving here. Levels ranged from its low of 6.88 mg/l in September to its high of 9.34 mg/l the following month.

Water Temperatures were fairly high in Center Pond in the summer. In July and August the temperatures either reached or exceeded the state standard of 20 degrees Celsius. The lowest temperature was 8.0 degrees in October.

Fecal Coliform levels exceeded state classification requirements in June, August and September, reaching a high of 980 colonies per 100 ml in September.

Nitrate-Nitrogen levels at Center Pond by the Route 8 Bridge were relatively low, though they did climb in August and September, reaching a high of 0.34 mg/l in September. These levels are probably low enough that they do not create a problem for the pond, though it is harder to determine what levels are acceptable when there are no state standards to measure it against.

Total Phosphorus levels at Center Pond Bridge followed a similar pattern to the next site upstream, Orchard Road, and ranged from 0.01 mg/l in August and October to a high in September of 0.06 mg/l. This site was not monitored in April or May. All sites saw an increase in phosphorus levels in September, though even that level is probably not high enough to cause problems.

pH levels in Center Pond ranged from 7.52 in June (it was not monitored in April or May) to a high of 7.90 in October.

Alkalinity levels, or Acid Neutralizing Capacity, were all well above the needed 20 mg/l of calcium carbonate to be considered "Not Sensitive" to acid rain. Values ranged from 42.8 to 108.0 mg/l.

Conclusions: Dissolved oxygen levels managed to remain high enough even though the water temperatures exceeded their state standard on two occasions. Fecal coliform levels were too high on three of the five days that it was sampled. All other parameters remained at acceptable levels throughout the sampling season.

Center Pond Bridge – 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l			8.36	7.12	7.20	6.88	9.34
pH			7.52	7.85	7.88	7.77	7.90
ALKALINITY in mg/l calcium carbonate			42.8	75.9	107.2	108.0	79.6
FECAL COLIFORM in colonies/ 100 ml			250	150	280	980	60
NITRATE-NITROGEN in mg/l			0.16	0.16	0.27	0.34	0.16
TOTAL PHOSPHORUS in mg/l			0.02	0.03	0.01	0.06	0.01
WATER TEMPERATURE in degrees Celsius			14.5	20.0	20.5	18.0	8.0
AIR TEMPERATURE in degrees Celsius			15.0	14.0	16.5	14.0	-3.0

Hubbard Avenue:

This site was monitored by Gregory Veremko, from April and continuing through October, though in June it was monitored by Carolyn Sibner. The results from this site are as follows:

Dissolved Oxygen levels at the Hubbard Avenue site were usually well above the state standard of 6 mg/l, even though this section is classified as a Warm Water Fishery and therefore is only required to have 5 mg/l of dissolved oxygen. Values ranged from a high of 11.36 mg/l in April to a low of 7.16 mg/l in September. This stretch is wide and shallow with lots of riffles.

Water Temperatures were usually low enough at Hubbard Avenue to meet the state standard for a Cold Water Fishery, which requires temperatures remain below 20 degrees Celsius, however Hubbard Avenue is our only site that is classified as a Warm Water Fishery. Warm Water Fisheries must remain below 23 degrees Celsius, which Hubbard Avenue definitely did. Hubbard's temperatures ranged from a low of 6.0 to a high of 20.0.

Fecal Coliform at Hubbard Avenue exceeded state standards on 4 out of the 7 days that we monitored: in May, June, August and September. May's jump to 900 from only 10 in April was due to a rainstorm the night before, the first after weeks without any rain. September's rain on the day before our monitoring also caused a spike, however, the level at Hubbard was considerably lower than the spikes at many of the other sites, although they did not have the high levels after the rainstorm in May which

caused such a large spike at Hubbard. Pet waste on the banks in Dalton, as noted in the shoreline survey done upstream from this site, may have caused the spike in the spring.

Nitrate-Nitrogen levels at Hubbard Avenue were some of the highest of all the sites we tested, though they are probably still low enough to not be a problem. Levels ranged from below the detection limit of 0.01 mg/l in June, to a high of 0.40 mg/l in August.

Total Phosphorus levels at Hubbard Avenue tend to be somewhat higher than the levels at the next site upstream, Center Pond Bridge, except in September when the Center Pond site had a higher spike. Values ranged from below the detection limit of 0.01 in April to a high of 0.05 mg/l in September. All our sites saw an increase in phosphorus levels in September.

pH levels at this site were some of the highest in the entire East Branch. Although all the samples taken were within the acceptable range of 6.5 to 8.3, the highest measurement, 8.22 measured in August, is near the top of the acceptable range.

Alkalinity levels, or Acid Neutralizing Capacity, were all well above the needed 20 mg/l of calcium carbonate to be considered "Not Sensitive" to acid rain, reaching a high of 147.2 mg/l in September. The lowest measurement was 28.4 mg/l in April.

Conclusions: This site is in Pittsfield, just downstream from the Dalton town line and Hubbard Avenue. It is just upstream from the USGS gauging station at Coltsville. Although classified as a Warm Water Fishery, this site maintained dissolved oxygen and water temperatures good enough for a Cold Water Fishery. Unfortunately, fecal coliform and nitrate levels were higher than most of the other sites. pH levels were also rather high. Fortunately, however, the acid neutralizing capacity is very high so the river here is not threatened by acid rain. We will continue to monitor this site to see if the same pattern of high levels repeats itself in 2002.

Hubbard Avenue – 2001

PARAMETER	April	May	June	July	Aug	Sept	Oct
DISSOLVED OXYGEN in mg/l	11.36	9.04	9.58	8.64	7.52	7.16	10.36
pH	7.50	8.03	7.91	8.05	8.16	8.22	8.11
ALKALINITY in mg/l calcium carbonate	28.4	122.6	58.8	91.4	139.5	147.2	114.4
FECAL COLIFORM in colonies/ 100 ml	10	900	280	80	590	320	120
NITRATE-NITROGEN in mg/l	0.12	0.36	<0.01	0.27	0.40	0.34	0.20
TOTAL PHOSPHORUS in mg/l	<0.01	0.02	0.03	0.05	0.02	0.05	0.02
WATER TEMPERATURE in degrees Celsius	6.0	15.0	14.5	19.0	20.0	18.0	8.0
AIR TEMPERATURE in degrees Celsius	9.0	12.0	18.0	17.0	18.0	15.0	0.0

VI. CONCLUSIONS AND RECOMMENDATIONS

After just one year of testing, it is hard to draw any concrete conclusions about the data we collected. There are some patterns that showed up at the sites, most of them not too surprising, but some of them indicate the need for further follow-up.

We recommend continued monitoring of all these sites in 2002, with additional testing upstream of the sites that showed fecal coliform problems.

Depending on funding and time constraints, we may decrease the monitoring of pH, alkalinity, and possibly nitrates and phosphorus, to once or twice a year, since these parameters usually did not indicate any problems for the health of the river or its ability to meet its state classification as a Class B Cold Water Fishery.

Flow and turbidity are two parameters we would like to start measuring in 2002. Flow conditions in the summer and fall can become dangerously low, and high turbidity caused by sedimentation from runoff can smother and choke organisms living there. Ideally, these sites will be monitored on the same days as the other parameters, but if need be they will be monitored on separate days.

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Submitted by Carolyn W. Sibner