

French River Connection



2020 Water Quality Monitoring Report

NOVEMBER 20, 2020

FRENCH RIVER CONNECTION
P.O. BOX 45, WEBSTER MA 01570

<http://www.frenchriverconnection.org>
contact@frenchriverconnection.org

Introduction

This report summarizes the findings of the French River Connection sampling from our 2020 water quality monitoring campaign utilizing the Manta. We used the Eureka Manta+35 Multiprobe unit which was provided by the Last Green Valley. The unit analyzed for water temperature, pH, conductivity, DO, turbidity, and chloride. E. Coli was analyzed at the French River Connection Lab under a MassDEP format. Our goal continues to be to assess and improve the water quality of the French River. Methods to calibrate the Manta and to maintain quality control are contained in Program Plans published by The Last Green Valley, who owns the equipment and provided the necessary calibration materials.

The following volunteers made our water quality work possible, and we thank them:

Devon Avery

Jay Wade

Carolyn Josti

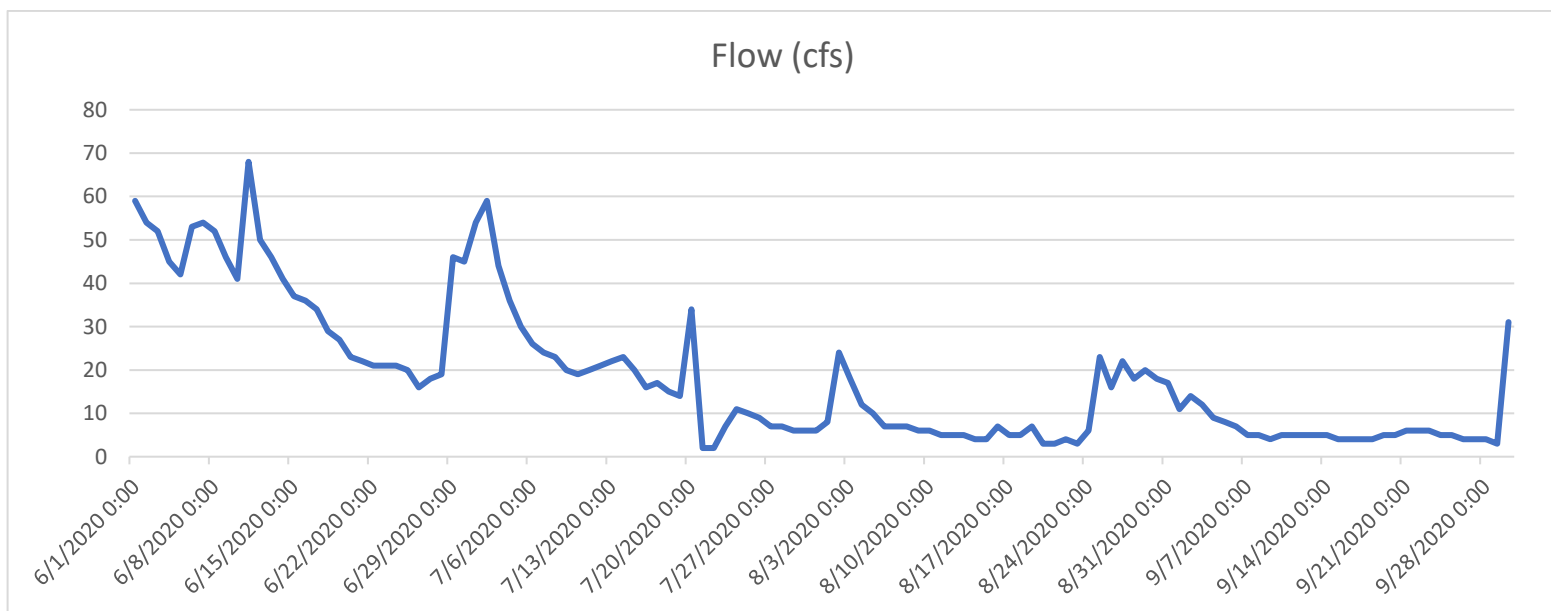
Jack Josti

French River Flow

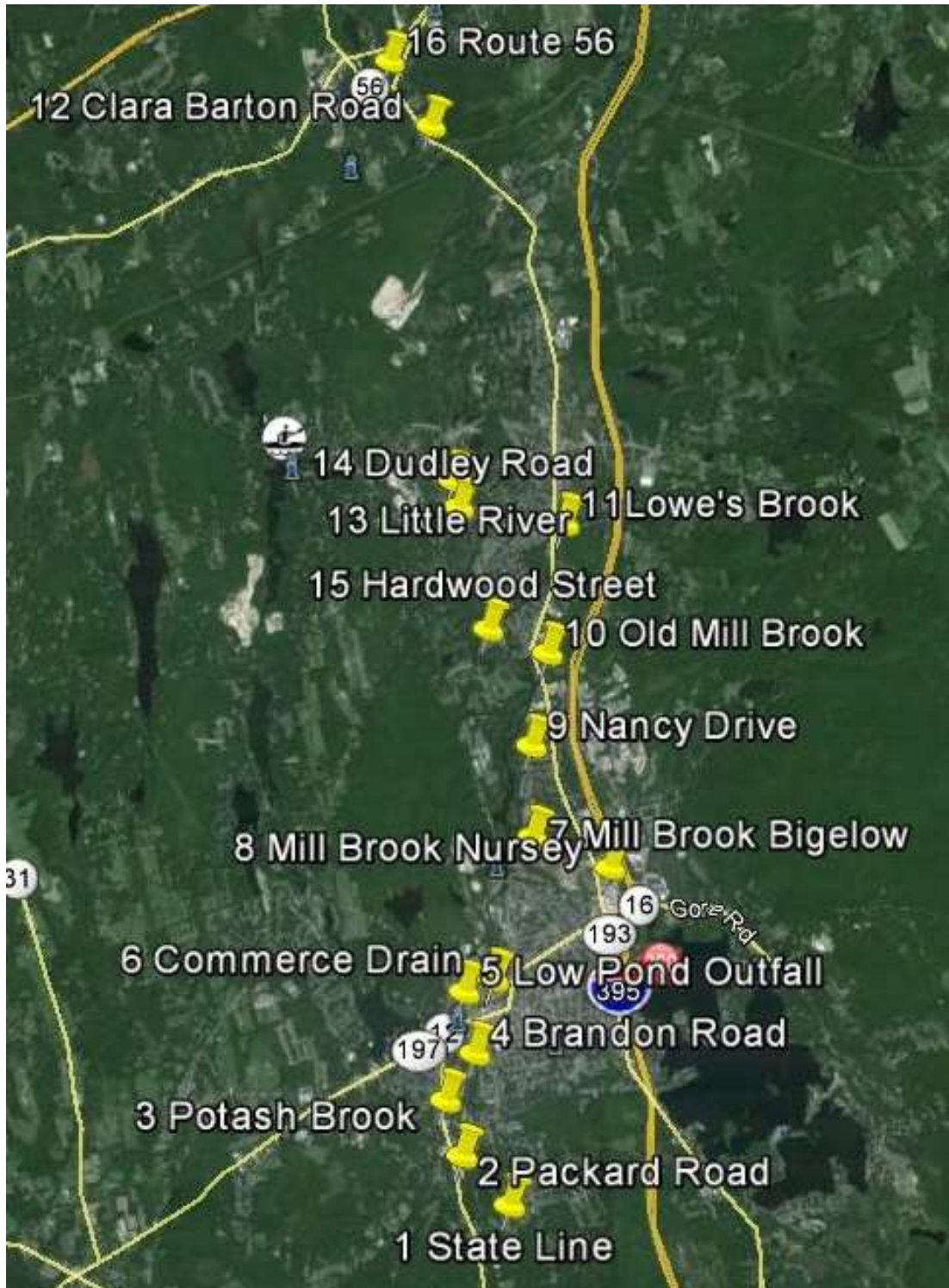
One of the major differences in the river year to year is the flow, measured in cubic feet /second. Average daily flow is provided to us by the Army Corp of Engineers:

https://reservoircontrol.usace.army.mil/NE/pls/cwmsweb/cwms_web.cwmsweb.cwmsindex

The flow rate at the time of sampling can possibly impact parameter values. The flow rate of the French River at the Army Corp of Engineers gage site in Webster, MA is illustrated in the graph below. The flow rate at this gage station is in general indicative of the flow rate at all sample sites except for the Mill Brook sites. The flow rate in Mill Brook is controlled at the Webster Lake outlet.



One of the observations we make is a judgment about flow at each station, characterized from very low to very high. It's easy for an experienced volunteer who has seen each location many times to make this characterization, but not so for a relative newcomer. Flow velocity, depth of water, bank exposure, and observations such as depth of water over the step dam at the State line are used to characterize the flow rate.



Site reports The following pages contain a brief report for each of the sixteen sites we monitor, as shown on the map. In these reports, we take note of pH values below 6.5 and DO below 5 mg/l which are the state standards, conductivity above 300 uSm/cm, turbidity above 5 NTUs, and E.Coli above 235 cfu/100 ml.

State Line, Webster N 42°02'27.5" W 71°53'02"

Stateline (boundary): this is a measure of water quality, below the Webster WWTP, as the main stem leaves the state. This site is chosen because it is on the state line. It is reached by parking where the P&W active rail line crosses Perryville Road in Webster and walking diagonally downstream until the river is reached.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	20.2	7.19	300.4	7.0	8.70	307.6	68.6
7/16/2020	22.57	7.03	378.4	0.7	7.86	49.5	40.3
8/13/2020	25.72	76.85	517.5	0.29	7.94	42.1	42.1*

*Chloride data not qualified

Water at this site is clear and odorless. Elevated conductivity was observed as in previous years and may be related to low flow this year. The dam overflow just upstream contributes to the amount of dissolved oxygen at this site.

Packard Pond Outflow, Dudley N 42°01'1.0" W 71°53'25.5"

Packard Pond (impact): carries a significant volume of water and drains Ardlock Acres conservation area and an area behind the Dudley transfer station, which may be a source of pollution. Park at the junction of Carpenter Road and Route 12 in Dudley, and monitor on the west side of the culvert.



Date	Water Temp C	pH	Specific Conductivity uS/cm	Turbidity NTUs	DO mg/L	E.coli Col/100ml	Chloride PPM
6/17/2020	11.45	6.65	220.4	NT	3.55	NT	NT
7/16/2020	19.74	6.49	202.8	3.69	4.77	NT	21.9
8/13/2020	22.63	6.52	212.1	4.61	4.58	NT	17.0*

*Chloride data not qualified

Water at this site is normally clear and odorless. There are small articles of trash scattered about, and plants along the sides of the channel. DO reading was below State standards three times. pH was below 6.5 once.

Potash Brook, Dudley N 42°02'13.5" W 71°53'33.3"

Potash Brook : carries a significant volume of water and drains an area west of Merino Pond which is partly residential and partly agricultural and may be a source of nutrient runoff. Turn off Route 12 onto New Boston Road and then right into the Dudley Pumping Station, and monitor on the south side of the bridge.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	15.0	7.29	386.2	2.48	9.53	461.1	0.6
7/16/2020	17.73	6.99	408.5	1.63	9.07	1203.3	76.7
8/13/2020			No Flow				

Water here is clear and odorless. Water temperatures here are generally the lowest we observe. The E. Coli and conductivity values at this site are normally high

Brandon Road, Dudley N 42°02'30.2" W 71°53'14.8"

Brandon Road (reference): At this location we can take data upstream of the Webster Wastewater Treatment Plant. Drive into the Ethan Allen Mill Complex north of the office and proceed directly to the river, just downstream from the Hill Street bridge



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	21.0	7.15	265.1	0.62	8.51	236.9	62.2
7/16/2020	25.38	7.04	299.0	0.75	8.00	20.4	31.5
8/13/2020	25.2	7.06	339.8	0.4	8.22	42.6	31.9*

*Chloride data not qualified

Water here is clear and odorless. High conductivity was observed once.

Low Pond Outflow, Dudley N 42°02'59.8" W 71°53'16.3"

Low Pond outflow (impact): carries a significant volume of water and drains a string of ponds including Low Pond and Merino Pond, around which there are significant residential developments which may be a source of runoff. Park on the north side of Stevens Linen in Dudley in the large parking lot and proceed to the right to the tailrace. Monitor where it emerges from under the building.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	18.6	7.16	128.7	1.20	8.68	NT	23.8
7/16/2020	15.6	7.06	144.8	1.94	8.01	NT	14.0
8/13/2020	22.2	7.04	155.6	1.03	7.78	NT	12.9*

*Chloride data not qualified

Water here is generally clear and odorless.

Commerce Parking Lot Storm Drain, Webster N 42°03'01.4" W 71°53'00.6"

Commerce parking lot storm drain (impact):
This continually running storm drain in downtown Webster has exuded an odor detectable at times and nearby rocks have exhibited an orange deposit. High E. Coli counts were found at this site. This is a possible point source of pollution. Enter the public parking lot at Tracy Court and go to the southwest corner. Monitor the storm drain outflow.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	20.64	7.20	294.3	0.7	9.13	328.2	80.1
7/16/2020	18.52	7.38	638.1	2.78	9.03	41.4	108.9
8/13/2020			No Flow				

There is some trash scattered about. Consistently higher levels of conductivity, E. Coli, and pH characterize this site. Normal pH levels were observed this year.

Mill Brook at Bigelow Road, Webster N 42°04'00.8" W 71°52'31.9"

Mill Brook at Bigelow Road (impact): As the outflow from Webster Lake, carries a significant volume of water. This station is downstream from a former stump grinding operation, which operated on raw material of unknown origin and character, and added chemicals to its product, and may have affected the chemistry of Mill Brook. Park near the bridge over Mill Brook on Bigelow Road, and monitor on the east side of the bridge.



Date	Water Temp C	pH	Specific Conductivity uS/cm	Turbidity NTUs	DO mg/L	E.coli Col/100ml	Chloride PPM
6/17/2020	18.09	6.56	491.2	0.96	5.27	198.9	136.9
7/16/2020	21.93	6.41	599.5	1.06	1.21	73.8	76.9
8/13/2020	24.45	6.58	495.3	3.17	3.42	65.0	54.4*

*Chloride data not qualified

Water here is very clear and odorless. There is considerable trash scattered about, and plants seen throughout the season include milfoil, algae, water lilies, cattails, and many others. Flow here is affected by operation of a dam controlling the level of Webster Lake. Frequent high levels of conductivity correspond to very low flows. This is typical of other years. pH is virtually always lower here than upstream at Webster Nursery, observed over the last thirteen years. The low DO levels may be related to the very low flow in Mill Brook this summer. High conductivity was observed three times and low DO twice.

Mill Brook at Webster Nursery, Webster N 42°03'45.0" W 71°51'50.3"

Mill Brook at Webster Nursery (reference): measures the quality of water leaving Webster Lake, and serves as a reference point above the former stump grinding operation. Park in the mall parking lot and monitor on the west side of the bridge.



Date	Water Temp C	pH	Specific Conductivity uS/cm	Turbidity NTUs	DO mg/L	E.coli Col/100ml	Chloride PPM
6/17/2020	21.89	7.12	362.9	0.06	8.73	19.9	107.0
7/16/2020	19.78	7.0	663.2	0.34	8.36	41.4	87.9
8/13/2020	22.04	7.02	730.0	0.86	8.46	21.8	90.7*

*Chloride data not qualified

Water here is generally clear and odorless. There is some trash scattered about the site, and algae and small attached plants were seen on occasion. High levels of conductivity were observed three times which is consistent with that seen downstream at Bigelow Road during low flow. Runoff from the new mall does not seem to be changing the water characteristics.

Nancy Drive, Webster N 42°04'41.2" W 71°52'28.0"

Nancy Drive (impact): an unnamed stream on the east side of the river in Webster near the Oxford line, which receives water from an industrial park and a casual junkyard, possibly carrying pollutants of all types. High conductivity levels have been measured here in the past. Take Nancy Drive from Route 12 and park at the end. Walk to the right by the house to a wooden bridge and monitor downstream.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	22.59	6.8	734.2	1.44	6.70	NT	191.2
7/16/2020	22.90	6.82	875.0	3.57	7.83	NT	79.1
8/13/2020			Too low to sample				

Water here is clear and odorless. The high levels of conductivity and low levels of DO, far below state standards, are typical of this site. However, low DO levels were not observed this year

Old Mill Brook, Oxford N 42°05'19.1" W 71°52'15.1"

Old Mill Brook (impact): carries a significant volume of water and flows through two industrial parks, which may be sources of pollution. Park on Route 12 under the railroad overpass and Old Mill Brook is on the west side. Monitor where it emerges from the culvert under Route 12.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	13.2	6.74	105.8	0.87	6.88	NT	180.6
7/16/2020	18.29	6.57	420.7	2.29	5.15	NT	59.2
8/13/2020	17.27	6.48	725.0	3.37	7.04	NT	31.8*

*Chloride data not qualified

The water here is clear and odorless. Low DO values which are quite typical of this site were only observed once this year. The elevated levels of conductivity that were observed in 2014,2015, 2016, 2018 and 2019 have returned this year.

Lowe's Brook, Oxford N 42°06'14.7" W 71°51'58.8"

Lowe's Brook (impact): The largest brook that we measure flowing into the French River, except for the Little River, drains Lowe Pond, above which significant commercial development is taking place, which may be resulting in runoff now from development, and in the future from operation. Park at the small convenience store on the east side where Lowe's Brook crosses Route 12. Monitor from the bridge over the small diagonally running road (State Street) behind the store.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	25.34	6.99	327.3	1.2	6.79	410.6	73.0
7/16/2020	23.63	6.83	290.2	0.66	6.55	129.1	27.5
8/13/2020	24.87	6.04	334.8	0.67	7.04	172.6	31.8*

*Chloride data not qualified

The water here is clear and odorless. There is trash scattered around the site. It is noteworthy that between 2010 and 2015, Lowe's Brook had at least one occasion in which DO values were below state DO standards. High conductivity was observed twice this year

Clara Barton Road, Oxford N 42°09'14.2" W 71°52'57.3"

Clara Barton Road (reference): This site is upstream of gravel pit operations in the area. Take Clara Barton Road off Route 12 in North Oxford. Park at the stone bridge and monitor off the bridge.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	14.3	7.25	281.0	1.66	7.99	22.6	61.1
7/16/2020	28.0	7.10	296.7	1.38	7.75	21.6	26.8
8/13/2020	26.09	7.11	368.9	0.96	7.72	4.1	33.4*

*Conductivity data invalid; not qualified

Water here is clear and odorless. High conductivity was observed on one occasion.

Little River, Oxford N 42°06'34.1" W 71°53'00.3"

The Little River (impact): this site is the largest inflow of water into the French River; it is the outflow from Buffumville Lake. Between Buffumville Lake and its confluence with the French River there are several industrial areas right on the river. We are monitoring here to see if there are any adverse effects from these sites. Where Dudley Road crosses over the French River there is a public parking lot at the Leovich Landing boat launch site. Park here and walked down the old Boston & Albany railbed about ¼ mile and monitor the Little River when reached



Date	Water Temp C	pH	Specific Conductivity uS/cm	Turbidity NTUs	DO mg/L	E.coli Col/100ml	Chloride PPM
6/17/2020	22.77	7.08	174.4	0.69	8.05	62.7	31.1
7/16/2020	23.71	6.92	225.9	0.20	8.51	105.0	18.6
8/13/2020	25.66	6.85	284.8	0.88	7.15	93.3	24.2*

*Chloride data not qualified

Water here is clear and odorless. There are grassy plants visible. The Little River failed to meet DO standards once in 2012, but that had not been seen before and was not repeated in the last eight years.

Dudley Road, Oxford N 42°06'25.5" W 71°52'58.4"

Dudley Road (reference): This site is above Lowe's Brook and is monitored as a baseline to see how much influence Lowe's Brook has on the French River. Park in the same location as for Little River and monitor off the bridge.



Date	Water Temp C	pH	Specific Conductivity uS/cm	Turbidity NTUs	DO mg/L	E.coli Col/100ml	Chloride PPM
6/17/2020	22.87	7.01	223.3	0.77	8.23	56.1	45.9
7/16/2020	23.25	6.89	280.3	0.41	7.86	59.4	27.9
8/13/2020	25.25	6.91	342.8	0.64	8.67	37.9	30.1*

*Chloride data not qualified

The water here is clear and odorless, with grasses observed at mid-season. There has been a summertime dip in DO since we started observing in 2007. High conductivity was observed on one occasion.

Harwood Street , Oxford N 42°05'28.6" W 71°52'48.7"

Harwood Street (reference): This site is below Lowe's Brook and combined with Dudley Road should give us a clear picture of any impact Lowe's has on the French River. Monitoring here also gives us a good flow measurement above North Village dam to compare with flow below as measured by the USGS gauge in Webster. There is a pull off next to the bridge where Harwood Street crosses over the French River. Park here and monitor off the bridge



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	22.0	7.04	251.0	1.07	7.88	95.9	55.5
7/16/2020	22.87	6.96	286.7	0.75	7.35	83.9	26.3
8/13/2020	25.21	6.96	353.2	0.65	7.06	39.9	27.3*

*Chloride data not qualified

The water here is clear and odorless. High conductivity was observed on one occasion.

Route 56, Oxford N 42.16345° W 71.888340°

Route 56 (reference): It is the furthest upstream site that we will be monitoring and gives us a baseline for all downstream monitoring. Take Route 56 off Route 12 in North Oxford. Park at the bridge and monitor off the bridge.



Date	Water Temp	pH	Specific Conductivity	Turbidity	DO	E.coli	Chloride
	C		uS/cm	NTUs	mg/L	Col/100ml	PPM
6/17/2020	23.59	7.28	261.1	0.59	3.02	13.5	68.3
7/16/2020	25.17	7.32	273.5	0.75	8.05	7.5	26.1
8/13/2020	25.35	7.16	339.9	0.35	8.36	9.7	30.8*

*Chloride data not qualified

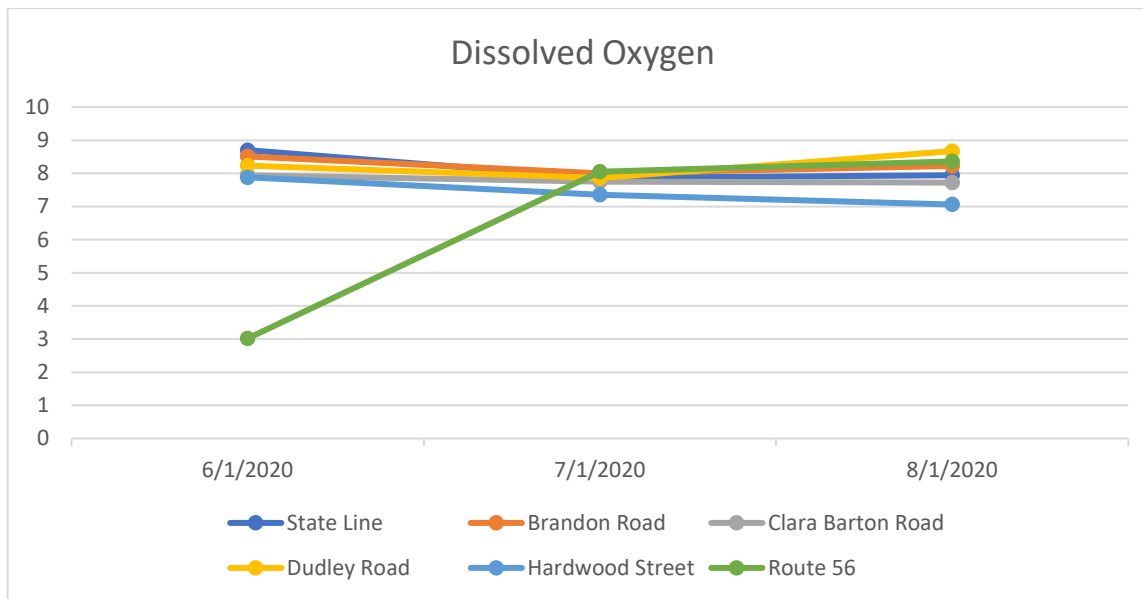
Water here is clear and odorless. High conductivity and low DO were observed on one occasion each.

French River Parameter Graphs

Since 2007, we have been creating plots for each parameter, showing variations over the monitoring season for each of the five mainstream locations. With the addition of the Route 56 site, we now show six sites. What we have noted is that the lines representing the locations are similar year to year, and that their relationship to each other is also similar. On the following pages are the charts for 2020. Turbidity and chloride were not charted this year.

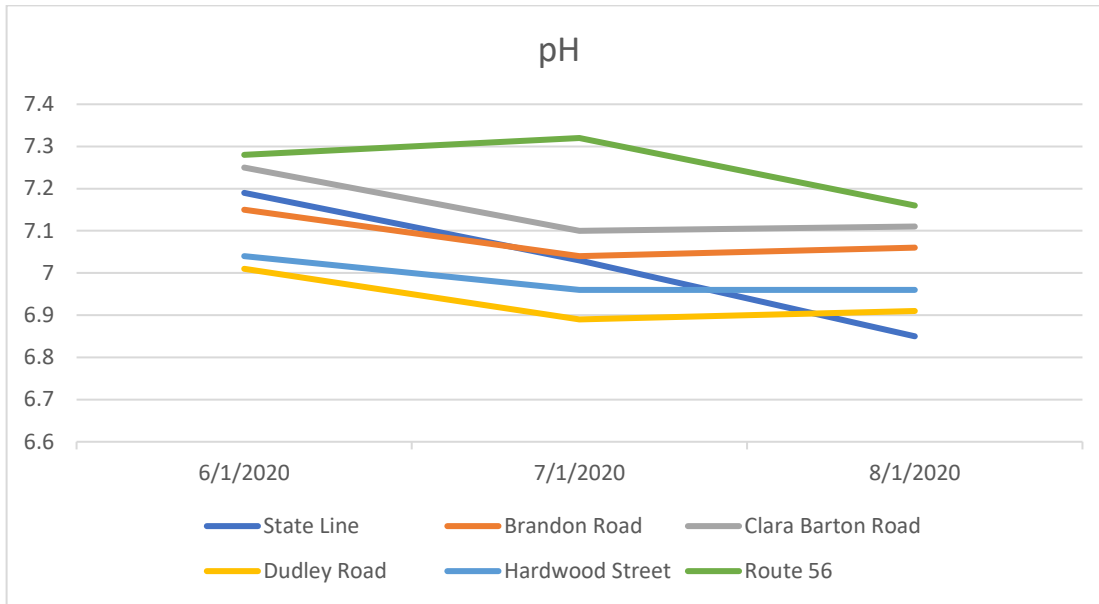
These have been compared with charts from previous years, and we find that the similarity continues. A negative trend that we have been watching is a dissolved oxygen “dip” at Dudley Road and Harwood Street has been becoming deeper and/or broader. This was less significant this year.

French River Dissolved Oxygen (mg/l)



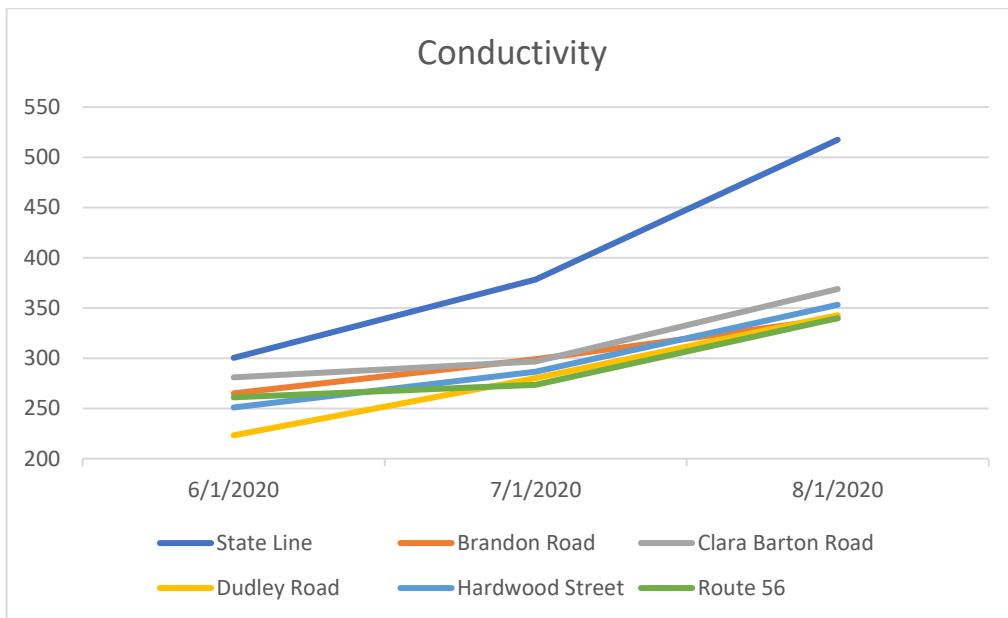
It is usual to observe Clara Barton, State Line, Brandon Road, and Route 56 exhibiting higher levels of dissolved oxygen throughout the season. There is no apparent reason for the low DO at Route 56 on 6/17. Dudley Road indicated a “dip” as in previous years, but the “dip” was not as low. Harwood Street did not exhibit a “dip” this year but DO levels were lower than last year.

French River pH



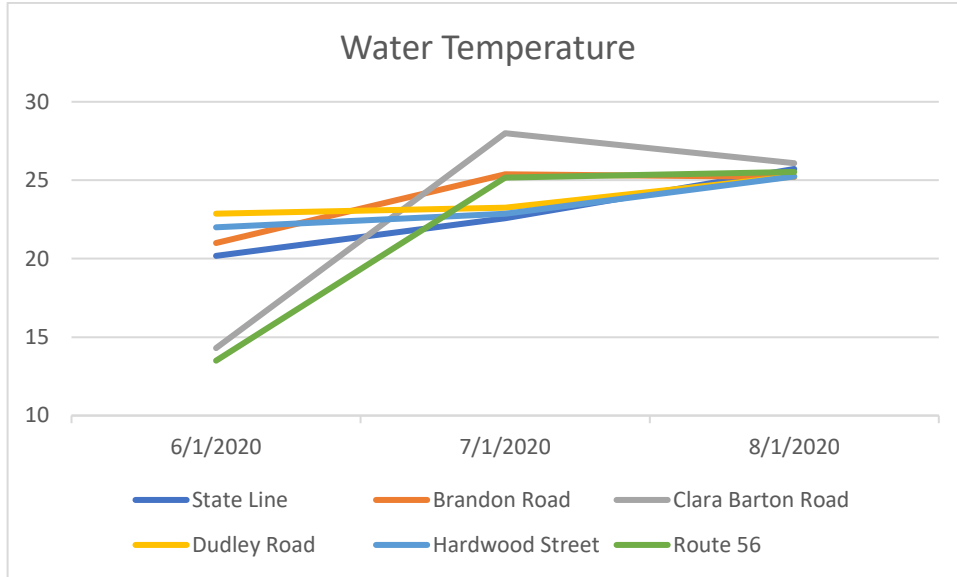
The values of pH, and the relative positions of the lines representing each station, are similar to the previous years. We generally find Clara Barton, State Line, Brandon Road and Route 56 within a 0.5 pH range. This is not true on every date, but most often it is. pH tended to be lower this year.

French River Specific Conductivity (uSm/cm)



Conductivity was higher this year than last and this is most likely related to low flow. The higher levels at State Line could be related to the Webster WWTP discharge which would have a greater impact on river water quality due to the lower dilution at very low river flow rate.

French River Temperature (°C)



Water temperature is extremely weather dependent, and always very similar over the length of the river. The highest temperature was recorded at Clara Barton Road.

E. Coli Monitoring

E.Coli was monitored at ten sites bi-weekly during June, July, August, and September in conformance with a grant that was awarded to the French River Connection by the State of Massachusetts. Once the data is approved by the MADEP we will publish a report with our findings and evaluation of the data. We also monitored site 3 (Potash Brook) because it is near a well field and has exhibited high readings in past years. We also monitored site 6 (Commerce Drain) because we wanted to monitor the runoff from Webster Main Street to see if the trend of high discharge levels was similar to past years

Chloride Monitoring

This is our second year of chloride monitoring. We did not have the opportunity to do spring sampling due to Covid 19 and were not able to qualify the data for the 8/13 sampling because post calibration checks were not met. We wanted to do chloride monitoring this year because we were curious about the effects of road salt application on water quality. At all but three site chloride levels were lower in July than June which could possibly indicate that the effects of road salt application may diminish on a seasonal basis, but many more years of sampling are required to determine if there is an increase in chloride concentration on a year to year basis.