

Chicopee = Ware + Swift + Quaboag



Chicopee 4Rivers Watershed Council
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C4RWC Bacteria Monitoring Program

2018 Season Report



Monitoring for healthy rivers.

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A digital version of this report can be found at www.chicopeewatershed.org
www.C4Rivers.org

Executive Summary

In 2018 the Chicopee 4Rivers Watershed Council (C4RWC) successfully conducted its fourth bacteria monitoring season. A group of dedicated volunteers executed this program by monitoring a total of eleven (11) sites on the Swift, Ware, Quaboag and Chicopee rivers. Seven distinct sampling events were completed during the major recreational contact season.

C4R was able to maintain this program in 2018 with broad based community support. This sampling is a key part of a larger effort to engage watershed residents in greater watershed awareness and stewardship. Another component of this effort is Blue Trails: improved river access for exploration/recreation. Water-based recreational activities are determined to be appropriate based on the concentration of bacteria in the river or water body. A rivers general health can also relate to bacteria levels.

By conducting a continuing annual program of volunteer monitoring, C4RWC aims to provide watershed residents and visitors with practical information concerning the safety of using and enjoying local rivers and ultimately presenting the health of the watershed. Bacteria results were posted regularly on www.connecticutriver.us through a partnership with CRC. The data collected was determined to be of reliable quality.

Fourth-year results indicate a generally healthy river system for a variety of types of recreation: though numerous rain events that preceded samplings likely caused a number of high bacteria conditions, limiting some recreational uses.

Typically, it is wise to limit primary contact after a heavy rainstorm. Often in areas located downstream of urban centers, which collect greater amounts of stormwater runoff, it is not unusual for bacterial concentrations to run high. 2018 sampling saw a number of rain events, high river flows, which contributed to higher bacteria levels.

The success of this monitoring program illustrates the value and importance of volunteer activities to monitoring public health. As C4RWC continues its efforts to promote public recreation and enjoyment of local rivers through a series of “Blue Trails,” this volunteer monitoring program should increase in importance and engage more residents to be “the eyes and ears” of the watershed. Such stewardship efforts are vital to maintaining the health and resiliency of our watershed and the many communities that call it home.

Introduction

As part of promoting a series of recreational “Blue Trails” within the watershed, C4RWC determined that it would be beneficial to manage a “complementary” bacteria monitoring program. This program serves several purposes: first, to gauge general water quality and river health; and second, to inform the public on the safety of recreational activities on/in the river. For people to enjoy our rivers with piece of mind, it is particularly important to determine if the Blue Trail and other segments meet the MassDEP water quality contact standards.

C4RWC relies on fundraising and grants to help support program costs, mainly laboratory analyses of samples and some monitoring equipment. C4RWC is grateful for support from:

Palmer Conservation Commission, Warren CC, Wilbraham CC, Springfield CC, Town of Ware Parks & Community Development, LWPA, QQLA, Country Bank and individual donors.

C4RWC used the CRC, Connecticut River Conservancy, lab in Greenfield for sample analysis. Sampling kits were organized for each sample site.

Another key step was to find volunteer samplers. Outreach brought 12 people forward to help. All received training in proper sampling techniques, and bi-weekly sampling began on June 13, 2018 and ran through September 6th. In all we conducted seven sampling events at (11) sampling sites on the Ware, Swift, Quaboag and Chicopee Rivers – ALL 4 Rivers.

Volunteers also noted temperature and other site conditions observed during each sampling event. Weather conditions within 48 hours of sampling events were recorded.

The 2018 sampling year was a strong success. Volunteer samplers did well and there were few complications. Reporting on line also worked well. This third year experience illustrates C4RWC commitment to monitoring and will guide any enhancements to C4RWC’s monitoring program as we look continually to optimize the choice of monitoring sites, and encourage more people to explore the Watershed and its rivers.

Special thanks to our volunteers!

Catherine Callaghan, Tom Rouleau, Randy Weiss, Don Taft, John Piechota, Angela Pannaccione, Dave Cotter, Gerard Charette, Nick Zeo, Tim Obrien, Joyce Eichacker, Keith Davies/coordinator.

Project Approach

Purpose

A 2003 Mass-EOEA comprehensive watershed assessment notes that *“data gaps are most pronounced for certain ecological characteristics, including animal and habitat data, and water quality data. The latter is of particular concern since the quality of the water flowing through and out of the basin is often considered to be a reflection of its overall environmental condition or health. Water quality data is collected by a number of organizations and agencies in the Chicopee River basin, but not in a basin-wide coordinated way.”* C4RWC mission is to work towards a resolution to this deficiency.

The Chicopee River and its watershed offers many fine recreational and nature viewing opportunities. Unfortunately there is a lack of regular water quality data to determine if the river is consistently meeting the state’s surface water quality standards (SWQS). Many years ago, the river struggled with point source pollution, such as sewage discharges, which in time have been largely dealt with. Recreational activities are related to either primary or secondary contact standards, which are closely tied to the bacterial condition of the waters. Bacterial data has been too sporadic to make clear/regular contact standard determinations. Having adequate bacteria data to make a clear determination would inform people whether water recreation is safe and healthy.

MassDEP-Division of Watershed Management, (DWM), samples the Chicopee River Watershed on a five-year rotating basin schedule. Very little sampling is done in between cycles. There is a need for more regular and consistent monitoring, a local group such as C4RWC can help to provide monitoring to fill this gap.

In order to provide a more adequate data set with which to determine whether standards are being attained, having ***more sites sampled at more regular intervals***, in season, offers the means to make a clear determination. Sampling at key access sites across the watershed, 6-8 times at each, during the prime contact months, May through September, should offer an adequate baseline. Funding may limit the ability to cover this broad range continually, so C4RWC will focus on key areas and target additional sites when possible.

An expanded data set will give a broad collection of locations and time periods, more wet/dry event information to review, and even a means to begin to consider source issues.

Additional new data will help C4RWC and MassDEP to make accurate water quality determinations for the Chicopee Basin.

Definitions: (MassDEP)

PRIMARY AND SECONDARY CONTACT RECREATIONAL USE (DEP)

The *Primary Contact Recreational Use* is supported when conditions are suitable (fecal coliform bacteria densities, turbidity and aesthetics meet the SWQS) for any recreational or other water related activity during which there is prolonged and intimate contact with the water and there exists a significant risk of ingestion. Activities include, but are not limited to, wading, swimming, diving, surfing and water skiing.

The *Secondary Contact Recreational Use* is supported when conditions are suitable for any recreational or other water use during which contact with the water is either incidental or accidental. These include, but are not limited to, fishing, boating and limited contact related to shoreline activities.

State limit for primary contact is 235 cfu/single date maximum and seasonal mean of 126 cfu. The secondary contact standard is 1240 cfu single day and 630 cfu seasonal mean.

Stakeholders for this project include residents, visitors to, and recreational users of the Chicopee 4Rivers Watershed; municipalities, and state, regional and federal environmental agencies. The data produced in this study will be shared with all stakeholders, to aid them in making personal decisions on safe use of the river for recreational purposes; understanding causes and effects of weather, land use and other human activities on water quality; and developing management strategies for preservation/restoration of watershed health. All data that are reported will be compared with Massachusetts surface water quality standards.

Objectives:

Since key access sites across the basin have not been extensively nor annually monitored by MassDEP for bacteria loading, this project is meant to complement MassDEP's limited monitoring program by conducting bacteria sampling on waters not monitored by MassDEP in order to facilitate the ability to make water quality standard attainment determinations for primary and/or secondary contact on a regular annual basis.

This monitoring program is intended to:

- Advance improvement of the water quality of rivers and streams in the Chicopee 4Rivers Watershed that may be impaired due to bacterial contamination. Steps towards achieving this goal may entail locating sources of bacteria contamination within targeted sub-watersheds and recommending appropriate action to initiate remediation.
- Contribute to ongoing and future assessments of whether bacterial contamination impairs the river's ability to support primary and secondary contact recreation.
- Convey this information to local, state and federal agencies and to river users through 'rapid response' analysis and communication. 24 hour turnaround of sampling results enables quick public notice.

Methods

C4RWC's volunteer guide notes the procedures, reasonings, and details of the monitoring processes. These procedures have been used since 2015 and again in 2018.

Once adequate funding was secured, C4RWC began to assemble needed equipment and select a qualified lab. Sampling kits were assembled for each volunteer and each site. Coolers and ice pack sets were acquired. A sampling pole, 42 inches long with a spring clamp attached to one end, was fabricated for each volunteer. This pole enabled the sampler to reach out into the current and grab a sample from a deeper point in the stream and lessen edge effects.

Each volunteer received training in sample collection, data form completion, appropriate sample care (keeping sample cold), hold time requirements, label completion, safety concerns/requirements, Quality Control (QC) requirements, and sample delivery logistics. Volunteers followed a preset sampling schedule and were reminded of sampling events 3-4 days ahead of time and regularly resupplied with sample bottles and forms if needed. Sampling was done, rain or shine, considering safety, and fortunately no events were cancelled.

Collection was done via a "grab" type sampling procedure using a sampling pole. Samples were collected in 100 ml sterile bottles prepared with thiosulfate – as a precaution against chlorine that could be present in the water sampled below a water treatment plant and which would affect sampling results. Bottles were labeled with date and time of collection and put on ice in a cooler immediately after collection. Volunteers also completed a field sheet and internal C4RWC Chain of Custody (CoC). Samples were then brought to a central meeting place where a C4RWC runner collected all samples into a single iced cooler and transported all

samples to the lab for analysis. Once there, samples were checked in and temperature and time recorded. Samples were analyzed for bacteria using a Colilert system.

Typically only 24 hours elapsed until the lab report was issued. Data was then posted on line (www.ConnecticutRiver.us) through a partnership with CRWC and PVPC, then tabulated by event date and site.

River and air Temperature was sampled using a conventional non-mercury spirit type thermometer, which, was placed in the flow and permitted to equilibrate for two minutes before reading. Temperatures were recorded on a field sheet with other site observations.

Meanwhile, the project coordinator had downloaded weather/rain data from NOAA/NWS for sites at both the Westover and Worcester airports for both the 24 and 48 hours previous to the sampling event. These airports are closest to our monitoring sites. Rainfall was recorded and tabulated for analysis. Wet weather can elevate bacteria, so viewing this data is important. River flows were also downloaded from available USGS stations.

With all this information collected and tabulated, we are able to review the rivers' contact standards.

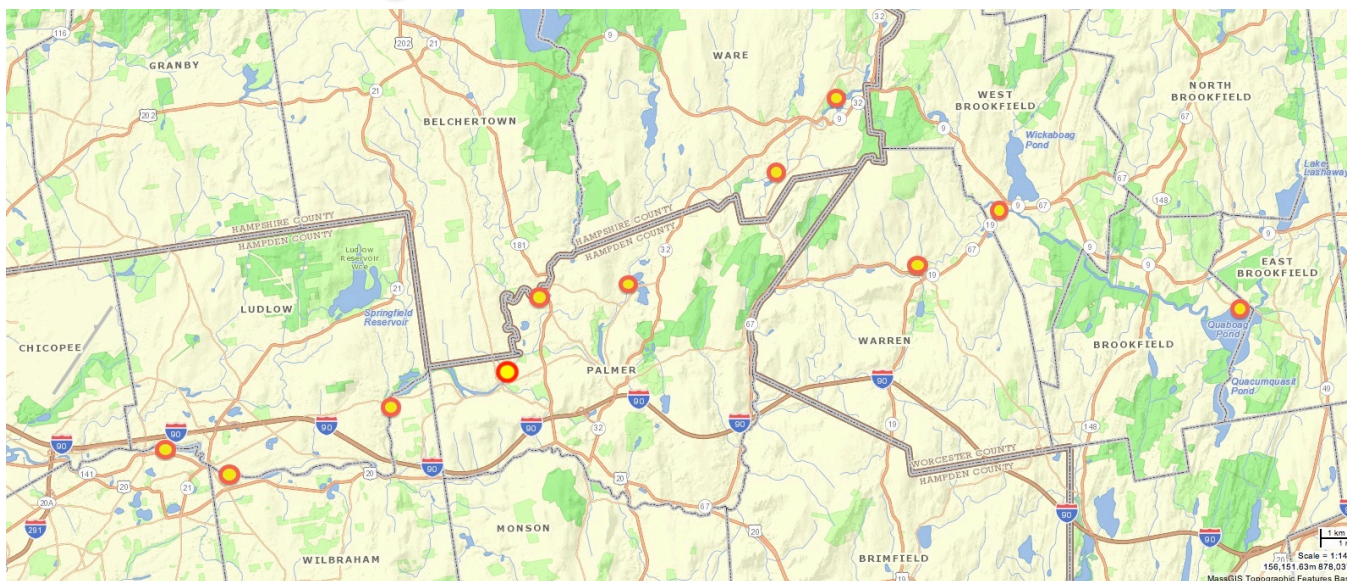
2018 Monitoring sites

The sites selected for monitoring have been chosen with the following factors in mind:
geographic representation in reaches of recreational activity and ease of access.

Table 1: 2018 Sampling Sites

Site Name	Site ID	Location	Latitude	Longitude
Chicopee-Indian Orchard access	CIO1	Water St, Springfield	42.161	-72.5012
Chicopee-Putts Bridge access	CPB1	River Rd, Wilbraham	42.153	-72.4102
Chicopee-lower Red Bridge access	CRB1	Red Bridge Rd Wilbraham	42.1745	-72.4102
Quaboag Pond	CQPd1	Quaboag St, Brookfield	42.2034	-72.0628
Quaboag Rt 67/9	CQ67-9	Rt 67 near Rt 9 W Brookfield	42.2348	-72.1620
Quaboag – Lucy Stone Park	CQLSP1	Lucy Stone Park, Old West Brookfield Rd, Warren	42.21743	-72.1841
Ware R Bennett St	CWB1	Bennett St, old bridge	42.2084	-72.3148
Swift R – First Street	CSFS1	First St cul-de-sac, Bondsville	42.209	-72.3495
Ware R – Grenville Park	CWGP1	Off Church St in Ware	42.2667	-72.2275
Ware R – Banas Farm	CWBF1	End of Robbins Rd, ½ mile path to river	42.2442	-72.2544
Ware R - 3 Rivers	CW3R1	Near Aaggo Movers, above confluence	42.1818	-72.3651
Ware – E Grenville	CWEGP1	Off East St, Rt 9		

Sampling Sites Map



Results

Bacteria

The table below notes the bacteria levels for the 2018 sampling season. A discussion and interpretation of these results is presented in the Conclusions section.

C4RWC 2018 Bacteria Sampling Results summary

Site Name	ID#	Bacteria Counts							Geo Mean	Use Note
		Date	Date	Date	Date	Date	Date	Date		
		6/13	6/28	7/12	7/26	8/9	8/23	9/6		
Quaboag Pond access	CQPd1	1	101.7	6.3	12	8.6	6.3	7.4	8.45	primary
Quaboag 67/9 access	CQ67-9	48	816.4	34.5	78.5	35.5	42.8	8.5	54.18	primary
Quaboag-Lucy Stone Park	CQLSP1	119.8	2419	101.2	167	119.8	56.3	110	167.07	secondary
Swift - First St	CSFS1	95.9	224.7	13.4	60.2	65	27.5	27.9	50.75	primary
Ware - Grenville Park	CWGP1	79.4	77.6	117.8	275.5	686.7	204.6	344.8	192.19	secondary
Ware - Banas Farm	CWBF1	93.3	325.5	110.6	150	980.4	235.9	113	200.81	secondary
Ware - Bennett St	CWB1	38.4	248.9	69.5	154.1	344.8	307.6		148.80	secondary
Ware - East Grenville	CWEG1	117.8			365.4			461.1	270.75	secondary
Ware - Three Rivers	CW3R1	55.4	410.6	63.8	185	166.4	123.6	79.4	123.51	primary
Chicopee Red Bridge	CRB1	52	95.9	20.1	72.3	78	123.6	43.5	60.71	primary
Chicopee Putts Bridge	CPB1	549.3	2419	22.8	686.7	1299.7	178.9	1203	479.40	secondary
Chicopee Indian Orchard	CIO1	48	1986.3	42.2	270	90.5	66.3	76.7	125.85	primary
Determination		dry	wet	dry	wet	wet	wet	dry		

Yellow shaded spaces exceed primary contact standards.

State limit for primary contact is 235 cfu/single date maximum and seasonal mean of 126 cfu. The secondary contact standard is 1240 cfu single day and 630 cfu seasonal mean.

Weather

Weather was recorded from the Westover and Worcester Airports for the 24 & 48 hour periods prior to the sampling event. During these time periods, streams are most greatly affected by stormwater runoff, which can illustrate runoff’s impacts on water quality.

C4RWC 2018 Bacteria Sampling Results summary

Rain Data

Site Name	Date	Date	Date	Date	Date	Date	Date
	6/13	6/28	7/12	7/26	8/9	8/23	9/6
Rain Data							
within 24/48 hr	0"	1.02"	0"	0.5"	0.21"	0.24"	0"
Determination	dry	wet	dry	wet	wet	wet	dry

rain in past 24 and 48 hours
 if > 0.25 in 48 hr = wet weather
 OR
 if > 0.10 in past 24 hr = wet weather

Field sheets

Field sheets were used by volunteers to record any observations about water color or odor as well as water temperatures.

Odor and color are somewhat subjective. By and large there were no notable odor or color observations reported, nor any on going observations of concern. Color was often clear or a slight tea tint was noted. Occasionally a musty odor was observed, no significant or troubling odors were reported. Below are water temperatures as recorded by the volunteers.

Table: 2018 River Temperatures - F

C4RWC 2018 Bacteria Sampling Results summary		deg F						
Site Name	ID#	Date	Date	Date	Date	Date	Date	Date
		6/13	6/28	7/12	7/26	8/9	8/23	9/6
Quaboag Pond access	CQPd1	68	70	78	78	85	75	82
Quaboag 67/9 access	CQ67-9	68	71	75		80	74	77
Quaboag-Lucy Stone Park	CQLSP1	68	71	75	75	80	71	77
Swift - First St	CSFS1	54			58	68	62	59
Ware - Grenville Park	CWGP1	68	70	73	75	75	71	78
Ware - Banas farm	CWBF1	65	68	73	76	76	70	76
Ware - Bennett St	CWB1		70	75		76	70	
Ware-3R	CW3R1	60	62	65	72	73	70	68
Chicopee Red Bridge	CRB1	65	67	72	75	79	70	75
Chicopee Putts Bridge	CPB1	67	68	75	75	79	69	75
Chicopee Indian Orchard	CIO1	68	70	78	76	80	72	76

Source Tracking (ST)

There was no source tracking performed in 2018, though the high readings at the Putts Bridge site, CPB1, may need to be ST in 2019 if readings start high. Ware River sites may also need to be considered for ST activity.

Training:

All volunteers received training in sampling, sample handling, recording, labeling, and safety procedures.

Sample Handling/Hold Times:

All samples were transported on ice packs, in coolers, and were received amply chilled. All samples were delivered to the lab within the six hour maximum hold-time limit. A few samples were delivered so soon that they had little time to chill. There were a few writing legibility issues in noting sample IDs on forms and these were successfully sorted out.

All source tracking sampling was collected by the lead coordinator using consistent collection techniques.

Observations/Discussion

2018 was a wet year and a warm year. Late spring started off cooler and lower in rainfall, but by mid June, weather heated up and got wet! Rainfall was high and air temperatures were higher as well. River temperatures were higher than 2017 by a degree or two at most sites. River flows were up (and continue to be as of this writing).

(6) of the (11) sites met primary contact standards for the season, down from 2017 (7), the Ware River sites were mostly secondary contact apparently due to wet weather events. The heavy rains seem to have caused a spike in bacteria in this area. The Putts Bridge site had many high readings and may need ST plans for 2019. All sites though were good for boating/paddling/fishing.

Values for sites, which, met the primary contact standard were mostly low, (IO & 3R barely made it): a good indication of a healthy river. The secondary sites geometric means were not noticeably high, but it may be warranted to investigate upriver conditions to see if a source of the higher bacteria can be determined.

The high results on the Ware River point to a need to resume monitoring in Gilbertville and Old Furnace as was done in 2016. Perhaps a better profile of the bacteria spike over a longer stretch of the river could have shed light whether and where a problem may exist.

The Quaboag site, CQ67-9, had been an area of concern in 2016. Fortunately, as in 2017, the area tested fine, so whatever was at issue in 2016, seems to have not returned. Still, it will be prudent to monitor this area to be sure no reoccurring problem exists.

The Indian Orchard site had good results (2 high). There is a partial CSO nearby which could spill sewage into the river at high rain events, some flow was noticed, though it was not determined if an appreciable sewage content was observed. Continued sampling at CIO1 is strongly recommended.

General river observations did not present any particularly startling notes.

Recommendations

C4RWC should continue sampling at noted sites to continue to build a data baseline and maintain awareness of river health for river users. Sites in Hardwick along the Ware River should again be sampled.

Additional sites could be added at other river sites (new Blue Trails) if funding is available to broaden the public's ability to be aware of overall watershed health.

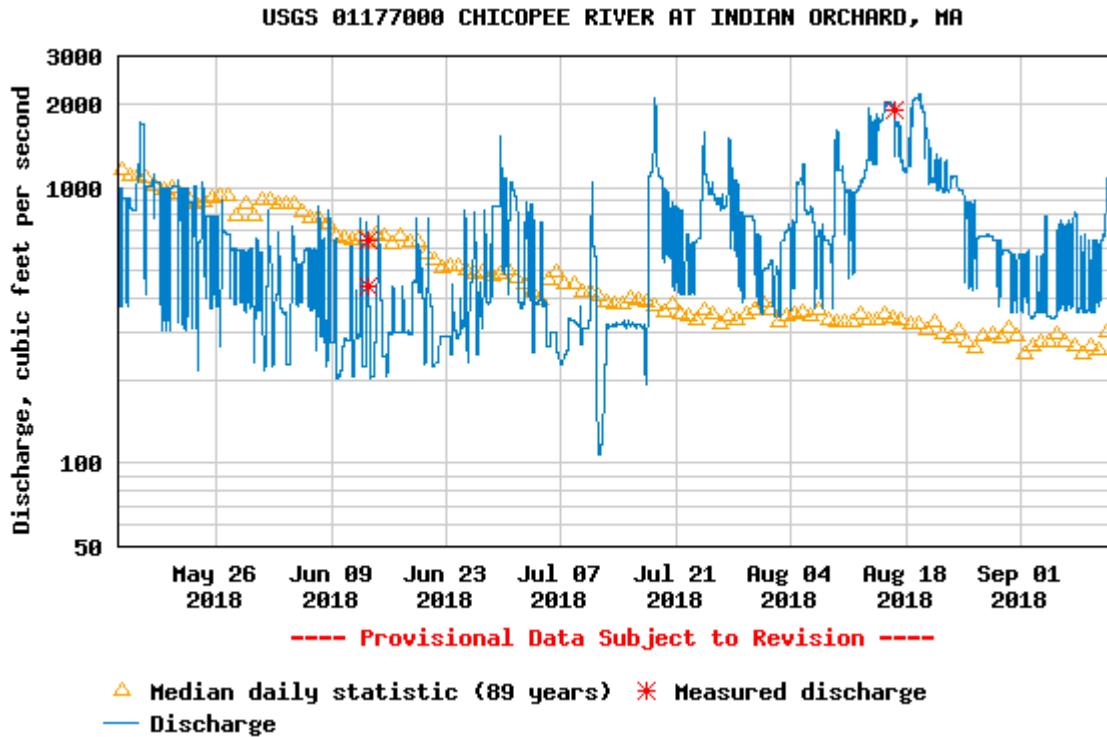
Reserve funds should also be marshaled to help strengthen the ability to investigate areas near sites of concern, ie: source tracking. Regular monitoring keeps the public informed and engaged.

Appendix

River Flows 2018

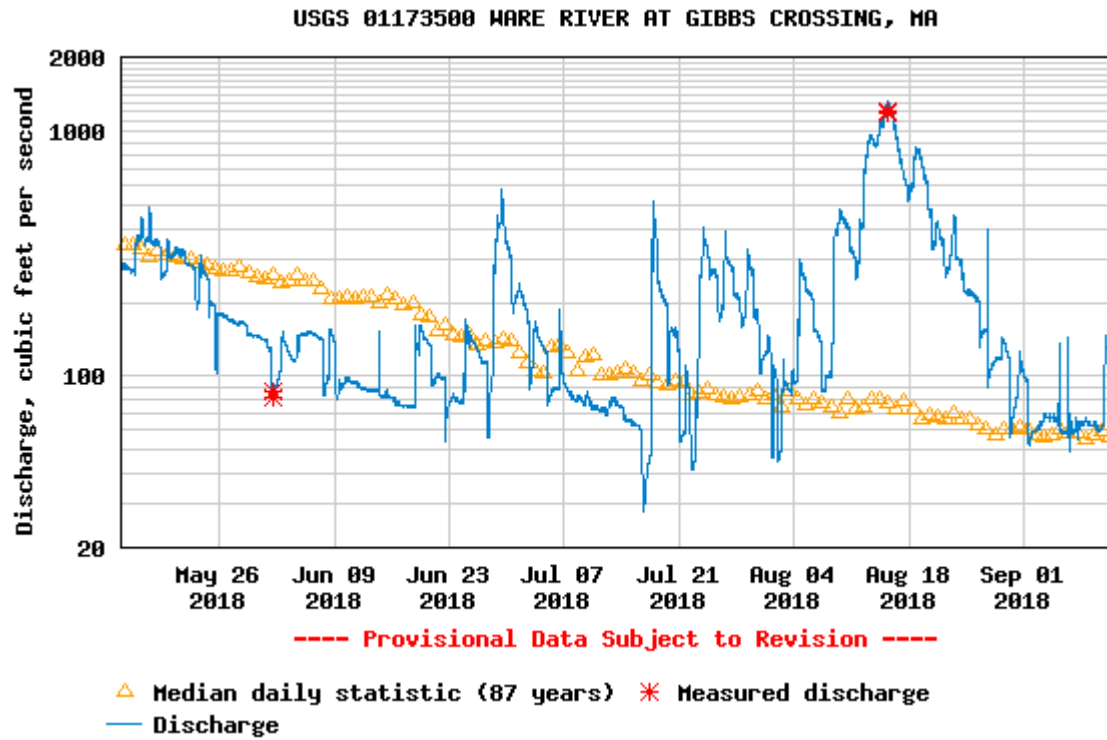
Charts for each of the 4 Rivers through the summer of 2018.
Small triangles show median flow over 75+ years.
2018 flows were above the median.

Chicopee River

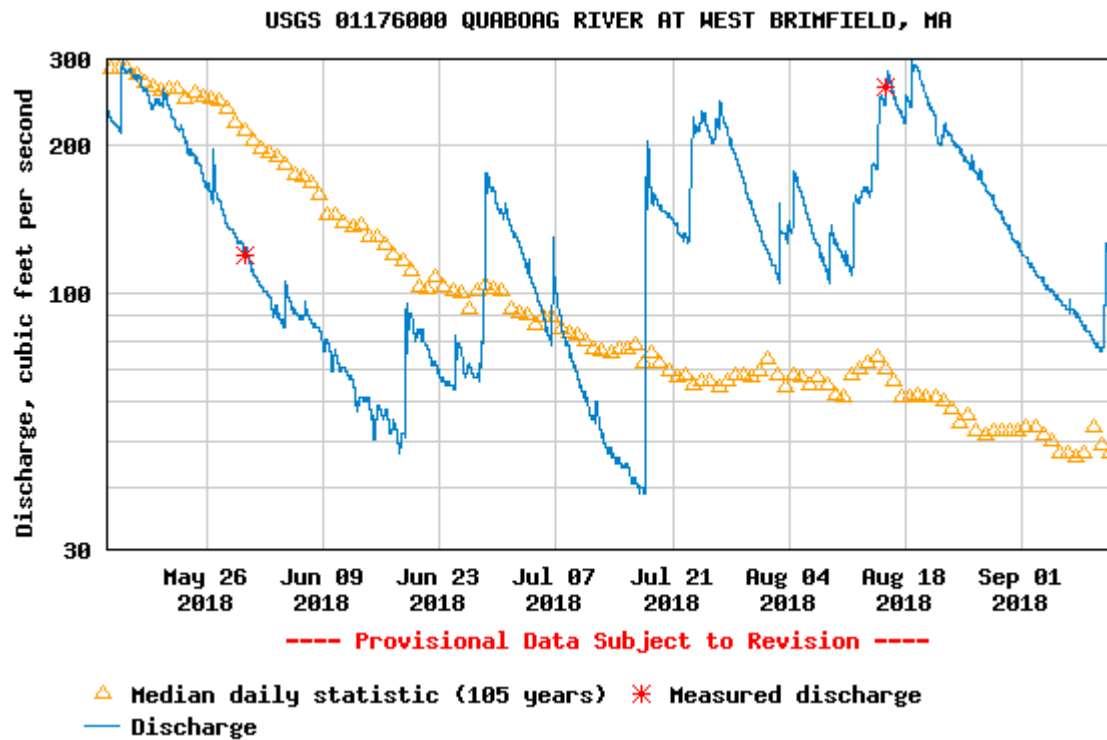


Chicopee River flow here is controlled by a small scale upstream hydro facility, thus the swings in flow. Best to interpret by looking at the mid range of the swing.

Ware River



Quaboag River



Swift River flow is controlled out of Quabbin Reservoir, so little natural variation.

