2021 SEP Project Report

Water Quality Monitoring & Watershed Preservation Project

Lower Chicopee River

1/7/22

View above Davitt Bridge, Chicopee

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Executive Summary

In late 2020, C4R, being the main community action group focused on watershed health in the Chicopee River basin, was awarded a SEP grant to perform environmental projects for the benefit of the Chicopee River. To this, C4R identified suitable projects to meet this charge. A bacteria study of waters in the lower river and supporting an invasive water chestnut removal effort were chosen as action items for 2021 and likely to be continued in 2022.

Bacteria results did not offer many surprises, though the main stem river showed good quality conditions. The existence of CSOs in the lowermost section did impact one site. The tributaries each showed poorer quality but, may be of too low volume to create a significant impact on the main stem. A second year of study may add to clarify these observations and lead to a suitable long-term program.

C4R has begun to lead the management of water chestnut removal on the river. C4R has partnered with CRC to organize an ongoing effort as the previous program management effort was phased out. A good set of events were held and it was deemed a productive year of management. Water chestnut management is an ongoing effort, yet it is hoped that it has reached a level low enough to maintain control. Having consistent funds and support will be needed for this work.

C4R coordinator conducted all bacteria work and coordinated and helped lead WC field work.

Introduction

The Chicopee River is in itself a short river, not quite 18 miles long from where it comes together in the Town of Palmer to where it meets the Connecticut River in the City of Chicopee, MA. Three smaller rivers of much larger area meet to form it. But it has been a hard working river. First as a vital resource to Native Americans, then as an industrial powerhouse driving the region's heyday during its peak manufacturing era. Today, the mills do not operate as before, largely in limbo, hoping for revitalization, and people are just beginning to return to enjoying recreational use of the river.

Fostering efforts to support this return, C4R, has taken on a role to better connect people to the river. These efforts consist of recreation, outreach and projects/programs to monitor and restore the river's health.

The SEP grant offered an opportunity to tackle two efforts, discussed below.

The 2 Programs:

Water Quality-Bacteria Sampling: This program focusses on collecting water samples during the summer at a range of sites dispersed across the watershed at both main stem river and smaller tributary sites. Samples are analyzed for bacteria concentrations to see if levels are healthy for human contact/recreation. The grant will help to establish and focus a suitable monitoring program on the lower river.

Water Chestnut Removal: This aquatic plant is not native to the region. Its growth in an impoundment can dramatically displace native habitat and alter ecosystems. There are 2 sites in the river where this plant has been found. A past US F&W program to control it was recently disbanded, so C4R in partnership with CRC is stepping forward to manage the effort. An ongoing program to manage this needs to be in place and the grant will facilitate its foundation.

Fortunately, C4R has experience is both these efforts and could readily mobilize the programs for the 2021 season (May-October).

Project Approach

Bacteria Sampling

Purpose

One of the most familiar means that people use to relate to the health of being in or on waters is bacteria count. People are aware that swimming areas get closed if bacteria levels are too high. So, to inform people of the health of a local river for recreational use, it is helpful to monitor bacteria levels. C4R chose to monitor both the main stem river and major input tributary brooks to investigate this. A somewhat similar study was done by C4R and PVPC in 2016, so a follow up study, 5 years later seemed prudent. As people venture out on rivers more, being aware of its health is important.

Objectives

Our goal with this effort is to begin a baseline of bacteria data to serve as a basis to monitor health trends, identify areas of concerns and better inform the public. We hope to use this project study to establish a long-term monitoring program.

Methods

C4R has in place an established DEP approved QAPP to guide our bacteria monitoring. This plan contains methodologies and quality control practices for sample collection, analysis and data organization. C4R utilized this plan for this project, much as it has for its long-term program which has been employed on monitoring at upstream sites, above Indian Orchard and the 3 major tributaries, for the past 7 years. Reports for that work can be viewed at C4Rivers.org.

(7) sample events were performed between June and the end of September,

Sites

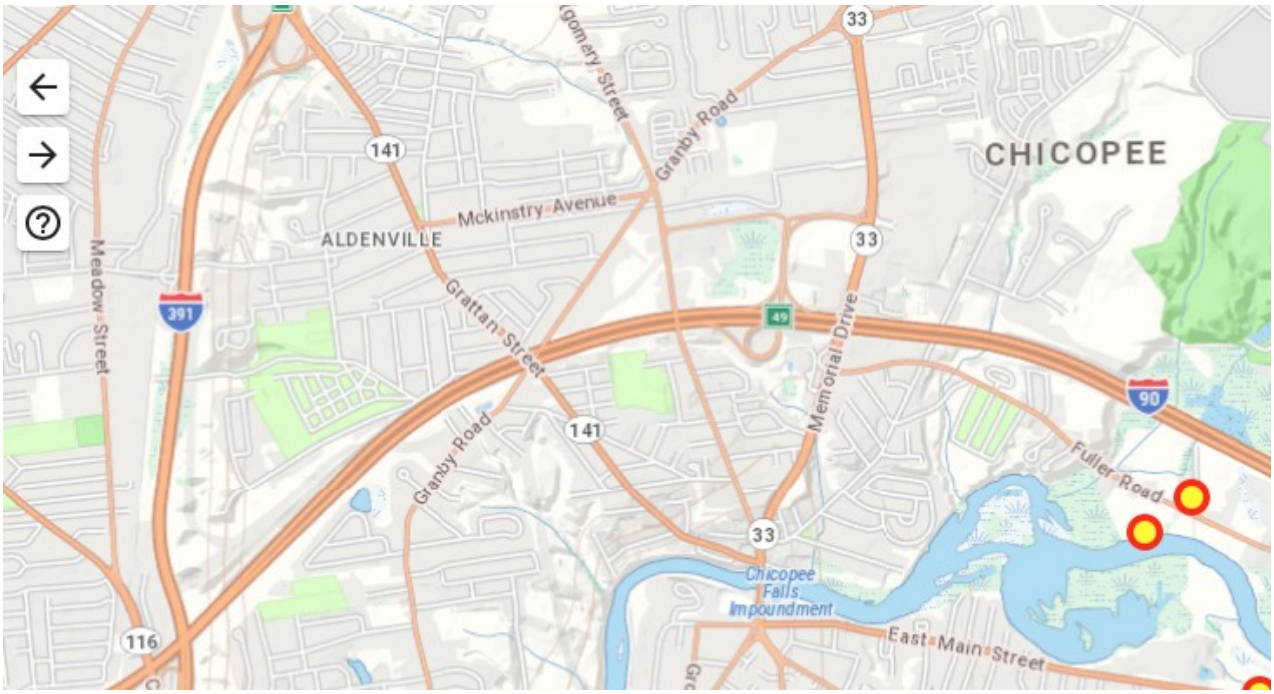
C4R chose (3) main stem sites and (5) tributary sites for the 2021 program. C4R has a long-term site above the dam at Indian Orchard (far right on map) on the Chicopee River, so the Grochmal, Fuller Rd, and Davitt Bridge sites cover a good range.

Also, there is some historic data at Davitt Bridge, so sampling here renews the collection of data to compare.

The tributaries discharge flow into the river and have some past history of bacteria sampling (DEP, PVPC), though not done regularly, so revisiting these offers updated data. Most of these brooks drain urban areas, so they can deliver noticeable loads of bacteria during storm events. Comparing brook data with river data may shed some light on their influence.

The table and map below note the sample sites.

SEP sites	
Main Stem Chicopee	
Grochmal	CGM1
Fuller Rd	CFR1
Davitt Bridge	CDB1
Tributaries lower river	
UNT @ Grochmal	CGM-UNT
Fuller Bk	CFB1
Cooley Bk	CCB1
Poor Bk	CPoB1
Abbey Bk	CAB1
Duplicate	



This coverage of sites should be useful to gain a good overview of bacteria conditions to help C4R meet it objectives.

Water Chestnut Removal

Purpose

Water Chestnut (WC) is a major aquatic invasive plant species in the region. To restore or preserve native aquatic habitats, effective WC removal and management should be undertaken where a population is discovered. The Oxford Marsh on the Chicopee River has been plagued by WC for well over a decade. Prior to 2019, it was managed by US F&W and since that time the program disbanded and C4R in partnership with CRC began to organize management efforts. The grant will help C4R better organize to partner on this effort to help it head into the future as WC management is a long-term effort.

Objectives

The goal for C4R will be to learn the tools to manage WC, establish working partnerships with area specialists, create work teams, engage the public, and perform 5-7 WC outings per year going forward.

Methods

Fortunately, US F&W and CRC have accrued a wealth of information and guiding principles on WC management. C4R is also fortunate to have close ties to retired F&W specialists on WC management. We, therefor, have a good set or protocols to utilize.

C4R will tap these resources to plan and organize WC removal events at 2 sites in the Chicopee River. C4R will, once we better master the system, create an in-house database to keep a record of volunteers and service resources to maintain this effort going forward beyond the grant. Though the future will be best managed in continued partnership with CRC and other groups.

Basic methods entail training volunteers on safe boating practices, needed gear, effective “pulling” of WC plants, safe collection and storage of removed plants, and ecologically safe disposal of plants. Effective communications with the community and volunteers is also a key component.

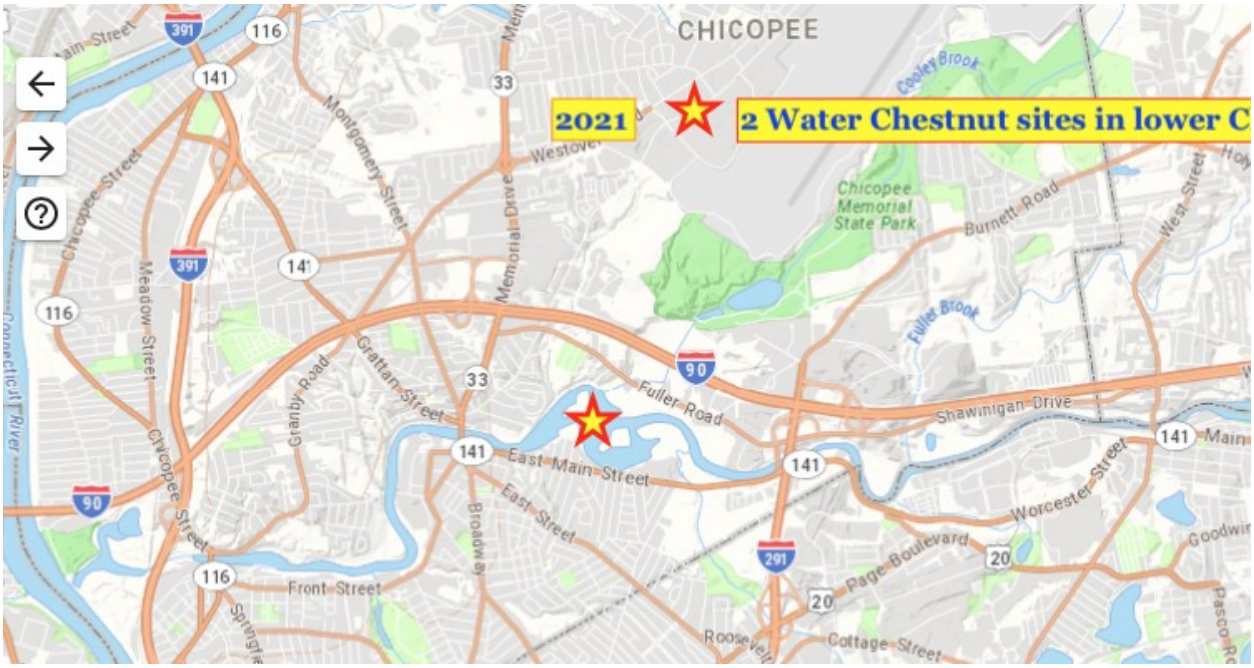
Sites

There are 2 sites on the Chicopee River with WC populations: Oxford Marsh and Red Bridge impoundment.

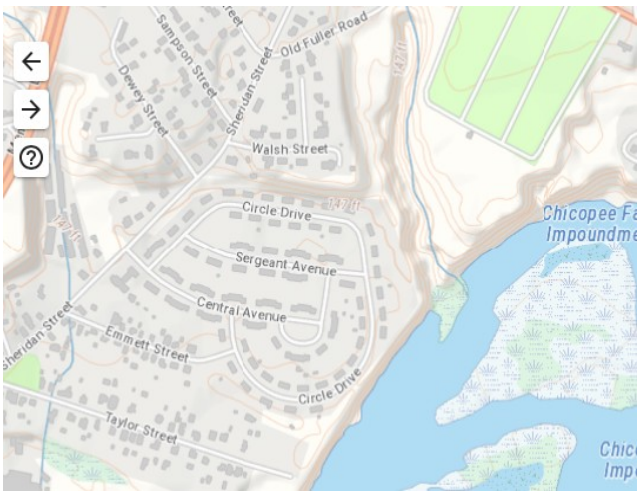
The Oxford Marsh site had been a US F&W site for over a decade and considerable progress was made to bring the area into a manageable condition (Thank

you!). But, without ongoing management, the site could relapse into a major WC hot spot.

In 2020, a new site was reported by a friend of C4R in a back cove off the Red Bridge impoundment, 10 miles upstream of the Oxford Marsh. C4R mobilized a couple of events in 2020 to contain this. We returned in 2021.



Close ups of the 2 sites.



Oxford Marsh

Red Bridge

Results

Bacteria Monitoring

C4R coordinator collected all samples typically on days when upstream sampling program was also performed. A separate delivery of samples to the CRC lab was done, all samples were kept cold and delivered within required hold times.

2021 Bacteria											
		Bacteria Counts								Geo Mean	Use Note
Site Name	ID#	Date	Date	Date	Date	Date	Date	Date	Date		
Lower Chicopee Study		6/10	6/24	7/8	7/22	8/12	8/26	9/9	9/29		
Grochmal	CGM1	54.5	42.6	410.6	52	54.4	52		37.3	65.60	primary
Fuler Rd	CFR1	73.8	35.9	727	53.8	54.8	59.8		55.2	78.73	primary
Davitt Bridge	CDB1	95.9	95.9	2420	88.2	101.7	57.3		54.6	129.91	secondary
Fuller Brook	CFB1	307.6	328.2	2420	325.5	461.1	201.4		218.7	399.18	secondary
Cooley Brook	CCB1	204.6	137.6	648.8	69.7	115.3	126.7		139.6	159.24	secondary
Grochmal-UNT	CGM-UNT	517.2	579.4	2420	344.8	727	224.7		137.2	476.82	secondary
Poor Brook	CPoB1	365.4	117.8	2420	261.3	195.6	201.4		81.6	263.20	secondary
Abbey Brook	CAB1	167.4	139.6	2420	76.7	111.2	59.1		17.5	125.81	primary
Weather		DRY	DRY	WET	DRY	DRY	DRY	WET	DRY		
weather beyond 24 hr		rain 39 hr	rain 36 hr	>0.20-24 hr				0.10"	0.08" >12 hr		
Temperatures - F											
Grochmal	CGM1	76	72	72					62		
Fuler Rd	CFR1	76	72	72		75	75		62		
Davitt Bridge	CDB1			71					62		
Fuller Brook	CFB1										
Cooley Brook	CCB1	63	64	72	67	67	68		58		
Grochmal-UNT	CGM-UNT						69				
Poor Brook	CPoB1	62	56	74	64.5	65	67		54		
Abbey Brook	CAB1						72				

Wet weather means rainfall >0.10" within 24 hours of sampling. Wet weather often correlates with elevated bacteria levels. A couple events had rain outside of WET time window.
Primary use <126, Secondary use <625 of mean values, MA DEP.

Access to sites for sampling was good, samples grabbed in the flow, but the Grochmal-UNT tributary outfall site was difficult to reach, so the pole grab was made as close to the outfall as possible making the assumption that its flow was what made up the pool below.

The use note refers to DEP standards for safe use. Primary means swimmable, secondary is only recommended for fishing and boating.

There was only 1 WET event, but it does show storm water influences.

QC samples taken met all QAPP goals. All planned samples were collected.

Observations: during the WET event, the cloudiness and odor of the river at the site just above Davitt Bridge was quite poor. The City of Chicopee does still have a few CSOs above this site and the impact on the river was obvious, also bacteria count was maxed out.

Poor Brook often had a hint of cloudiness to it and obvious sandy wash out. Fuller Brook & Grochmal-UNT had a less noticeable cloudiness.

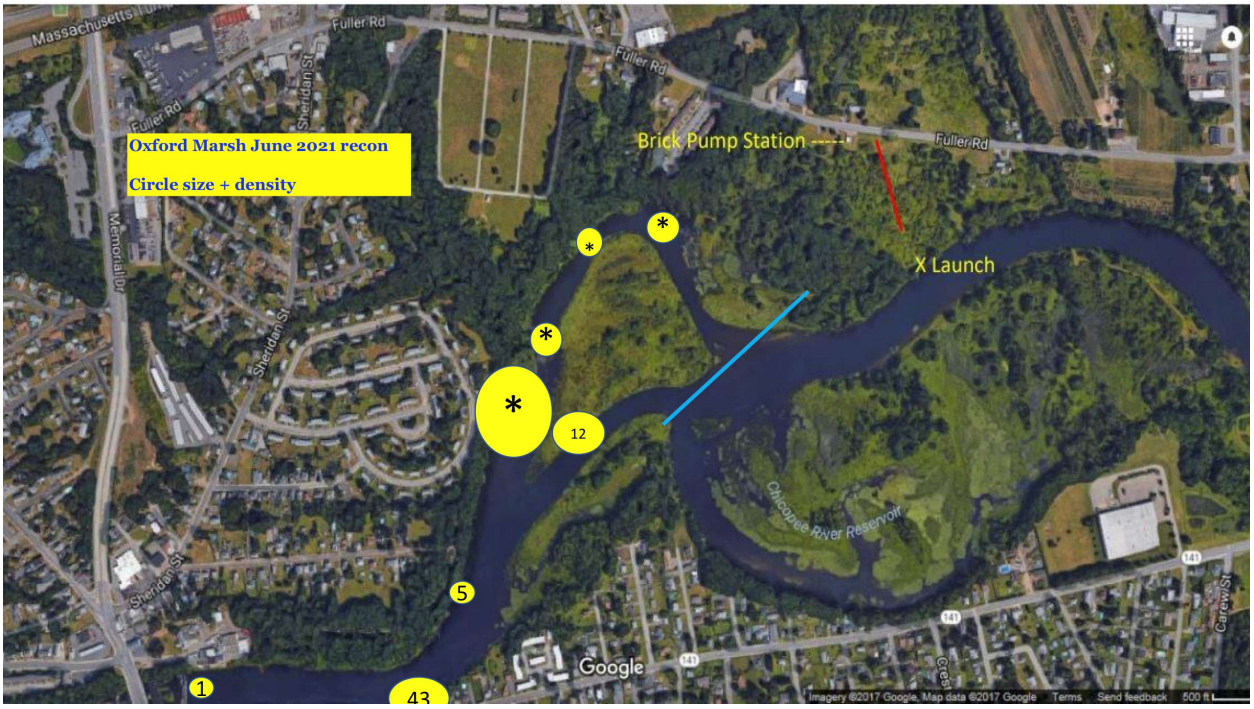
It was interesting to see the cooler water temperatures from Cooley and Poor Brook. Poor Brook originates in the City of Springfield in a rather urban area, but it flows thru a wooded area above the sample site near the river. Cooley flows from a wooded area and a state park.

Water Chestnut Removal

(9) river outings were held to survey and remove (pull) water chestnut from the (2) noted sites. Volunteers helped at most events, (4-6 people), a few were conducted by either C4R staff and/or the 2 key retired F&W support volunteer members.

Red Bridge recon map:

Oxford Marsh Recon #1 Map:



Removal results:

C4R 2021 WC			
station_name	**collection_date**	**hours**	**notes**
Oxford Marsh	6/3/2021 14:15	5.5	286 plants (actual count)
Oxford Marsh	6/5/2021 12:00	19.5	459 plants (est O.076 # per plant/ wt. of 100)
Oxford Marsh	6/19/2021 12:30	23.5	271 plants (est 0.1380# per plant -avg. wt. per 100)
Oxford Marsh	7/15/2021 15:00	18.75	269 plants (est 0.2719 # from 135 weighed)
Oxford Marsh	8/27/2021 0:00	12	48 plants (est 0.8156 # per plant from 32 weighed)
Red Bridge	6/7/2021 11:30	9	366 plants (actual count)
Red Bridge	6/24/2021	3	259 plants (actual count)
Red Bridge	7/16/2021	3	34 plants (actual count)
Red Bridge	8/31/2021	2.5	1 plant (8 rosettes)

Data c/o Jeff Boettner

Both sites were picked as clean as possible. Oxford Marsh is a large area with other vegetation and difficult to cover, but removal rate was perceived to be good. Red Bridge is smaller, less overgrown, so removal was high.

Discussions

Bacteria

The main stem sites along the Chicopee River in general sampled at or near primary standards. Only the rain event, likely effected by CSO pollution hurt the quality of the Davitt Bridge site (popular fishing site).

During the lone rain event, all sites were high, yet (outside of Davitt-CSO) the main stem numbers were noticeably better than the tributaries. During the WET, the main stem (excluding Davitt) slipped to secondary use. Cooley Brook, mostly wooded did bump up. The other tributaries, all within more urban settings, saw high spikes in bacteria. Typically this is due to storm water run-off, excessive flow off streets, parking lots, roofs, lawns and such. Abbey Brook sampled well. In the past the ponds just above the sample site see many geese, thus adding bacteria, yet this did not show up in the dry sampling events in 2021.

Recommendations: The 2021 results offer a useful starting point to begin to profile these brooks and river points in more detail. Data seems similar to a 2016 study, confirming concerns with Fuller & Poor Brooks. The SEP grant has additional funds, so it will be a benefit to conduct a second study season to build on the data to review any trends more clearly.

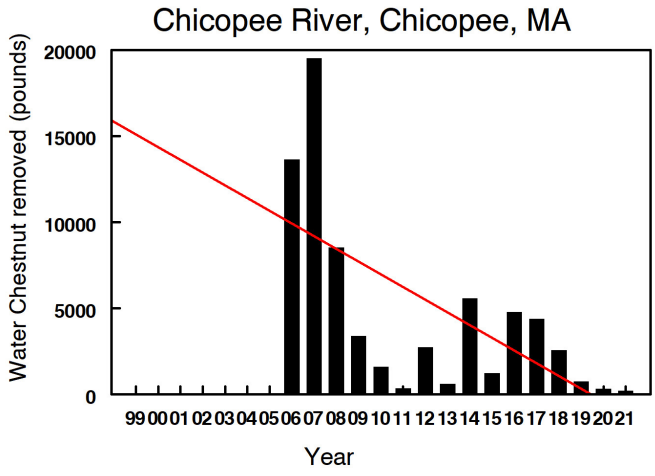
If possible, the possibility to capture a better balance of WET/DRY events could be useful to gage stormwater impacts. With additional data, it may serve to support the need to fund a broader study if there is a will or possibility to work towards projects to improve water quality and healthy access to these waters for the community.

Water Chestnut

The many past years of WC management have seemed to have born fruit as the volume of WC collected was relatively low (see trend). The ability of C4R, since 2020, in partnership with CRC and others, to maintain this effort serves to uphold this condition. With the end of the US F&W effort, the local groups actions are crucial to protect the river going forward. Unfortunately, WC does not seem to be permanently eradicable, but with consistent effort, perhaps a modest effort can maintain the status quo.

Below is a chart highlighting the trend:

Oxford Marsh Water Chestnut Removal Trend



c/o Jeff Boetner

The SEP grant has facilitated the organization of the new team to continue the management effort. Remaining funds will be used to further strengthen the team in 2022 to set up the longer-term effort.

Recommendations:

- Improve the C4R volunteer database
- Focus structure for key timing for removal events.
- Invest in supply kits, first aid kits, and education materials for future work.
- Build on community & organizational contacts (con comm, city/town offices, AMC & more) for WC management and optimizing river access points.
- Establish list of suitable disposal sites for all removed plant matter.
- Conduct broader river recon paddles between the 2 sites to see if any other new WC areas exist.

THE END