Tyler (Bear) Creek
Kent and Ionia Counties
Grand River Watershed- Surveyed 2022

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Environment

Tyler Creek, or Bear Creek as it is known in Ionia County, originates southeast of the village of Clarksville in Ionia County (Figure 1). Bear Creek flows northwest before turning and flowing southwest towards the Coldwater River and the village of Freeport. Bear Creek turns into Tyler Creek upon crossing the county border into Kent County. Just north of M-50, Tyler Creek is joined by its largest tributary - Pratt Lake Creek. Pratt Lake Creek is a coldwater stream that has an adjoining watershed to the west of Tyler Creek. From the confluence of Tyler Creek and Pratt Lake Creek, Tyler Creek flows directly south and joins the Coldwater River. Tyler Creek is classified as a cold stream from approximately 2.0 miles upstream of the Kent/Ionia County line downstream to the confluence with the Coldwater River (Figure 1).

The Tyler Creek watershed is 30 square miles and is dominated by agricultural use (78%) which has resulted in loss of wetland areas (Rippke 2017). Most of the watershed is not developed (94%) as there are no buildings or other paved areas to support building structures. Tyler Creek is listed as impaired by E. coli standards by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) and the United States Environmental Protection Agency (EPA). E. coli is ranked as the highest priority pollutant within the Coldwater River watershed, levels are high enough that total body or partial body contact with water is not recommended in most of the watershed (Schrems 2022). The main contributors of E. coli are agricultural nonpoint sources, failing septic systems, a Dairy Concentrated Feeding Operation, and the loss of wetlands as filtering agents (Rippke 2017). Numerous grants have been awarded to assist in the reduction of E. coli within Tyler Creek aimed at first identifying sources and second correcting or addressing sources of contamination.

Groundwater inputs in Tyler Creek are lowest upstream and highest downstream. The geology of the Tyler Creek watershed is dominated by medium textured moraine till. Pratt Lake Creek is groundwater dominated with mean July water temperatures between 60.6 and 62.3F (Myers 2023). Pratt Lake Creek is also a designated trout stream managed with Type-1 regulations.

History

Tyler Creek had been managed as a trout fishery for several decades with an emphasis on Brown Trout which were first stocked in 1973. Brown Trout have been stocked into Tyler Creek on a near annual basis thereafter (Table 1). The first fisheries survey was conducted on Tyler Creek in May 1971. Three locations on the creek were backpack electrofished by Michigan Department of Natural Resources (DNR) Fisheries staff. Trout were observed at only one location and the other two locations were dominated by forage fish. Following the 1971 survey, a chemical treatment occurred on Tyler Creek (locations unknown) to eliminate species viewed as competitors with trout. After the seemingly successful chemical treatment, Brown Trout were restocked into Tyler Creek. A 1972 survey collected

36 Brown Trout confirming that stocked fish survived, with biologists at the time noted a troubling "reinfestation" with White Sucker and redhorse species which were caught during the survey. Electrofishing surveys were conducted again in August 1979 at four upstream locations. The abundance of Brown Trout was said to be low and "rough fish" were noted as dominate in the catch. All four stations were said to have poor habitat and algae were noted to be present at some locations.

In 1986, electrofishing surveys were conducted at four locations and Brown Trout were captured at all locations. Nongame fish abundance was again higher than trout abundance, and survey analysts recommended a need for chemical treatment in not only Tyler Creek, but the Coldwater River as well. The two downstream sites (84th Street and 100th Street) had good thermal habitat, Brown Trout present, and some level of natural reproduction. The chemical treatment occurred on September 15, 1992, from Nash Road downstream to the confluence with the Coldwater River. Fall fingerling Brown Trout were stocked approximately two weeks after the treatment and were distributed throughout the Tyler Creek watershed.

In 1997, three stocking locations were surveyed with backpack electrofishing. Brown Trout were captured at all three locations. The highest density of fish was observed at 92nd Street. Low returns of stocked Brown Trout and poor habitat led to the discontinuation of stocking at the 84th Street site. Beginning in 2005, the strain of Brown Trout stocked changed from Seeforellen to Gilchrist Creek, and stocking was reinstated at the 84th Street location.

A population estimate was conducted at the 92nd Street location in 2009 which utilized a tow-barge stream shocker. All Brown Trout were netted, measured, and marked with a fin clip on the first day. On the second day, methods were repeated, and all clipped and unclipped Brown Trout were counted. The mark-recapture population estimate in Tyler Creek was 869 Brown Trout per mile and 376 Brown Trout per acre of stream. Natural reproduction was considered high with 87 Brown Trout captured in the 2- and 3-inch bins considered young-of-year (YOY) fish that were not stocked. The largest Brown Trout captured was 16 inches in length. Four age-classes of Brown Trout were captured (age 0-3) and the mean growth index was +2.1. Age 1 and older trout were more than 2 inches larger than the statewide average lengths for their age class.

A single pass electrofishing survey was completed at the 84th Street station in 2009, where 755 feet of Tyler Creek was shocked, and 48 Brown Trout were captured ranging in length from 2.0-14.9 inches. Given the positive results of the 2009 survey, Brown Trout stocking continued throughout Tyler Creek and management focused on providing trout angling opportunities largely supported by stocking with some levels of natural reproduction.

Pollution from adjacent agricultural land has long been a concern for fisheries managers on Tyler Creek. The creek has had two large manure contamination events in the past 20 years. The most significant of which occurred in July 2006, when an unknown amount of liquid cow manure was released into Tyler Creek which resulted in a near complete elimination of the Brown Trout population and substantial damage to the entire fish community. A second incident occurred in January of 2019, when an estimated 50,000-100,000 gallons of cow manure was released into the creek. A fish kill was not documented; however, notification of DNR Fisheries staff did not occur until nine days after the event.

Current Status

In August 2022, electrofishing surveys were conducted at five locations on Tyler Creek (Figure 1). All five locations were where Brown Trout stocking occurred at public road-stream crossings. At each location, a single tow-barge electrofishing unit with two probes was used to sample the entire stream width. All trout were netted, enumerated, and measured to inch bin (e.g., 7-inch bin = 7.0-7.9 inches). The station length and additional data collected differed between stations (Table 2). The five stations that were sampled included: Montcalm Avenue, Freeport Avenue, 84th St., 92nd St., and 100th St. In addition, qualitative observations regarding fish cover and substrate were recorded at each sampling site.

Brown Trout were captured at all five locations with the highest catch per unit effort (CPUE) at the 92nd Street and 100th Street stations (Figure 2). Brown Trout in the 7-inch and 8-inch bins were the most abundant size classes collected across all stations, and the largest Brown Trout captured were at the 92nd Street and 100th Street stations (Figure 3).

Brown Trout in the 7-inch and 8-inch bins were most abundant at all stations. Brown Trout in Tyler Creek were consistently above statewide averages for growth (Table 3,4). The observed ages differed between sampling locations. Five age-classes (age 0-4) of Brown Trout were present at the 100th Street station (Table 3). Similarly, six age classes (ages 0-5) were collected at the 92nd Street site (Table 4). At the Freeport Avenue site, 73% of all samples were age-1 fish. Wild YOY trout were rare at all sites. For the five stations combined, YOYs only made up 12% of the Brown Trout catch.

At the Montcalm Avenue station, only four other species and one hybrid sunfish were captured with overall low fish abundance (Table 5). Warmwater species composed 69% of the catch. Fourteen additional species were collected at the furthest downstream station (100th Street). Brown Trout (n = 159) was the most abundant fish species captured followed by Blacknose Dace (n=104), White Sucker (n=81), and Mottled Sculpin (n=73). Coldwater and warmwater species made up 49% and 3% of the catch, respectively. Most of the fish collected were nongame species, but a few juvenile Black Crappie, Bluegill, Green Sunfish, Largemouth Bass, and Yellow Perch were also captured (Table 6). Species composition was similar across the three lower sites (Table 7). Only presence-absence data were collected for the Freeport Avenue site. The species composition was consistent with a cold stream as it included two coldwater species, three transitional species, and one warmwater species.

Hobo temperature loggers were placed at three stations (Montcalm, 92nd, and 100th) covering the range of the watershed. Temperatures were recorded hourly from late April to mid November 2023. Monthly mean temperatures varied between sites (Figure 4). Montcalm Avenue was the warmest site with a July mean temperature of 68.1 F (Figure 5).

At each station qualitative habitat measurements were recorded. Habitat suitability and diversity increased from upstream to downstream. The furthest upstream sites were devoid of riffles and pools, but instead were comprised primarily of "run" habitat. The three downstream sites had more habitat variability as well as habitat features including boulders, gravel bars, and some wood debris. Throughout the entire stream system, woody debris abundance was low. There were some remnant habitat structures at the lower three sites, but the structural integrity of these structures (bank covers, undercut banks) was starting to deteriorate.

Analysis and Discussion

Thermal habitat conditions were ideal for Brown Trout throughout most of Tyler Creek during 2022. The trout stream designation and type-1 regulation are appropriate. Given the cool July water temperature, groundwater inputs and the influx of water from Pratt Lake Creek are contributing to the coldwater system of Tyler Creek. The headwaters of Tyler Creek (i.e., Bear Creek) are relatively warm. The mean July water temperature and fish community composition at Montcalm Avenue were consistent with a cool (warm-transitional) stream.

The Brown Trout population in the lower reaches of Tyler Creek is robust compared to other trout streams within the Southern Lake Michigan Management Unit (SLMMU). Tyler Creek Brown Trout CPUE increased from upstream to downstream (Figure 2). The mean Brown Trout CPUE for trout streams in SLMMU is 80.9 and is 77.5 for trout streams statewide, the 75th percentile is 86.4 for SLMMU and 100.2 statewide. On Tyler Creek, the CPUEs for the three downstream stations (84th, 92nd, and 100th) were all greater than the 75th percentile compared to streams across the state and within the SLMMU. This indicates that the trout density is higher than in many other streams across the state.

Brown Trout have been regularly stocked into Tyler Creek since 1973. Although the 2022 surveys documented some natural reproduction, it is unlikely that the natural reproduction alone could support the fishery. The most abundant age class at all sites was age-1 indicating large contributions of hatchery fish. While continued stocking will be necessary, there are opportunities to improve the efficiency of stocking on Tyler Creek. We recommend eliminating stocking at the Montcalm Avenue and Freeport Avenue sites which have the lowest survival and visually had the lowest amount of available habitat. Stocking at the 84th Street site is also recommended for discontinuation because the habitat was more degraded relative to the 92nd and 100th Street locations. Immigration of fish from the two remaining stocking locations on Tyler Creek and the 84th Street stocking site on Pratt Lake Creek is expected to saturate the suitable trout habitat near the 84th Street and Freeport Avenue crossings on Tyler Creek (Myers 2023). The recommended number of Brown Trout stocked into Tyler Creek would remain the same. The objectives are to condense stocking into two locations with the best habitat and highest fishing pressure, while minimizing transportation costs and staff time associated with stocking.

Anglers continue to report good fishing at Tyler Creek and public access is available. Given the success of Brown Trout stocking which has led to higher densities of Brown Trout, Tyler Creek offers an opportunity for trout anglers to fish between two large population centers. The length frequency histogram also suggests angler harvest is most likely contributing to declines in size classes over 8 inches in length (Figure 3). Unfortunately, budget limitations have precluded creel surveys on Tyler Creek, so no fishing mortality estimates are available. In addition to fishing mortality, the scarcity of log jams and other holding cover seems to be limiting abundance of large Brown Trout in this system.

Management Direction

1. Continue stocking Brown Trout into Tyler Creek to provide a cool-coldwater fishery centrally located between Lansing and Grand Rapids.

2. Discontinue stocking at the three less viable upper sites. Redistribute stocked fish by increasing annual stocking requests to 1,200 fish at 92nd Street and 800 fish at 100th Street.

3. Encourage riparian landowners throughout the watershed to implement best management practices related to wetland retention, riparian buffer strips, functional septic systems, and reducing runoff into Tyler Creek.

4. Work with partners to implement the Coldwater River Watershed Management Plan by connecting with local farmers to communicate the importance of cattle exclusion, best management practices for manure, and establishment of riparian buffer strips.

5. Survey Tyler Creek every 10-15 years to ensure Brown Trout stocking is meeting management goals.

6. Work with Trout Unlimited and other partners to increase in-stream habitat, especially focusing on large woody debris where feasible.

References

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Tables and Figures

Table 1. Site location, date, number, and the average (Avg.) total length (TL, inches) of Brown Trout stocked in Tyler Creek from 2017 to 2023.

Date	Site Name	Number	Avg. Length (inches)
05/23/2017	100th St.	420	5.3
05/23/2017	84th St.	420	5.3
05/23/2017	92nd St.	420	5.3
05/23/2017	Freeport Ave.	420	5.3
05/23/2017	Montcalm Ave.	420	5.3
04/18/2018	100th St.	440	5.0
04/18/2018	84th St.	440	5.0
04/18/2018	92nd St.	440	5.0
04/18/2018	Freeport Ave.	440	5.0
04/18/2018	Montcalm Ave.	440	5.0
05/07/2019	100th St.	400	5.3
05/07/2019	84th St.	400	5.3
05/07/2019	92nd St.	400	5.3
05/07/2019	Freeport Ave.	400	5.3
05/07/2019	Montcalm Ave.	400	5.3
04/14/2020	84th St.	1140	4.7
04/14/2020	92nd St.	760	4.7
05/12/2021	100th St.	286	4.8
05/12/2021	84th St.	286	4.8
05/12/2021	92nd St.	286	4.8
05/12/2021	Freeport Ave.	286	4.8
05/12/2021	Montcalm Ave.	286	4.8
05/16/2022	100th St.	358	7.0
05/16/2022	84th St.	360	7.0
05/16/2022	92nd St.	359	7.0
05/16/2022	Freeport Ave.	360	7.0
05/16/2022	Montcalm Ave.	360	7.0
05/01/2023	100th St.	360	5.1
05/01/2023	92nd St.	360	5.1
05/23/2023	100th St.	360	7.3
05/23/2023	92nd St.	720	7.3

Table 2. Sampling data recorded at each of the five locations sampled in 2022. Station length is length of stream shocked, all species indicates whether all fish were measured to total length or if just presence/absence was recorded. Age and growth is if samples were removed from Brown Trout for age and growth analysis.

Sampling Station	Station Length	All Species	Age and Growth
Montcalm	1000 ft	Length	No
Freeport	500 ft	Presence/Absence	No
84th	575 ft	Presence/Absence	No
92nd	830 ft	Presence/Absence	Yes
100th	1000 ft	Length	Yes >10 inches

Table 3. Age and growth statistics for Brown Trout captured in the July 2022 survey of Tyler Creek at the 100th Street station. State average lengths are from Schneider et al. (2000).

Age	Number Aged	Length Range (in.)	State Average Length (in.)	Weighted Mean Length (in.)
2	8	10.4-12.2	9.2	10.9
3	13	12.0-14.1	12.2	13.1
4	3	14.0-16.2	15.2	N/A

Table 4. Age and growth statistics for Brown Trout captured in the July 2022 survey of Tyler Creek at the 92nd Street station. State average lengths are from Schneider et al. (2000).

Age	Number Aged	Length Range (in.)	State Average Length (in.)	Weighted Mean Length (in.)
0	11	3.2-4.3	3.2	3.6
1	30	6.8-9.7	6.2	8.3
2	16	10.1-12.4	9.2	11.4
3	13	12.3-15.3	12.2	13.6
4	2	14.3-16.3	15.2	N/A
5	1	16.8	18.2	N/A

Table 5. Species, total number captured, percent contribution by number, and the range in total length (inches, in.) of fish captured in Tyler Creek at the Montcalm Ave. station (July 2022).

Species	Number	Percent by Number	Length Range (in.)
Bluegill	10	23.8	1.0-4.9
Brown Trout	12	28.6	7.0-14.9
Green Sunfish	12	28.6	2.0-5.9
Hybrid Sunfish	1	2.4	4.0-4.9
Largemouth Bass	6	14.3	2.0-4.9
Yellow Perch	1	2.4	2.0-2.9

Table 6. Species, total number captured, percent contribution by number, and the range in total length (inches, in.) of fish captured in Tyler Creek at the 100th Street station (July 2022).

Species	Number	Percent by Number	Length Range (in.)
American Brook Lamprey	2	0.4	6.0-7.9
Black Crappie	1	0.2	4.0-4.9
Bluegill	2	0.4	1.0-2.9
Blacknose Dace	104	21.9	1.0-3.9
Brown Trout	159	33.5	3.0-16.9
Chestnut Lamprey	3	0.6	6.0-9.9
Creek Chub	30	6.3	1.0-6.0
White Sucker	81	17.1	1.0-16.9
Green Sunfish	3	0.6	2.0-3.9
Johnny Darter	8	1.7	2.0-3.9
Largemouth Bass	3	0.6	2.0-2.9
Mottled Sculpin	73	15.4	1.0-3.9
Central Mudminnow	1	0.2	2.0-2.9
Pumpkinseed	1	0.2	4.0-4.9
Yellow Perch	3	0.6	2.0-5.9

Table 7. Presence/absence of fish species captured during the 2022 electrofishing surveys at five stations on Tyler Creek.

Species	Thermal Classification	Montcalm	Freeport	84th	92nd	100th
American Brook Lamprey	Transitional					x
Black Crappie	Warm					x
Blacknose Dace	Transitional		x	x	x	x
Bluegill	Warm	x		x	x	x
Brown Trout	Cold	x	x	x	x	x
Central Mudminnow	Transitional				x	x
Chestnut Lamprey	Warm					x
Common Shiner	Warm			x		
Creek Chub	Transitional		x	x		x
Green Sunfish	Warm	x		x	x	x
Hybrid Sunfish	Warm	x			x	
Johnny Darter	Transitional		x	x	x	x
Largemouth Bass	Warm	x	x	x	x	x
Mottled Sculpin	Cold		x	x	x	x
Pumpkinseed	Warm			x	x	x
Rainbow Trout	Cold			x	x	
White Sucker	Transitional		x	x	x	x
Yellow Perch	Transitional	x				

Figure 1. Map of Tyler (Bear) Creek in Kent and Ionia Counties. Red circles indicate survey locations for 2022 summer electrofishing.

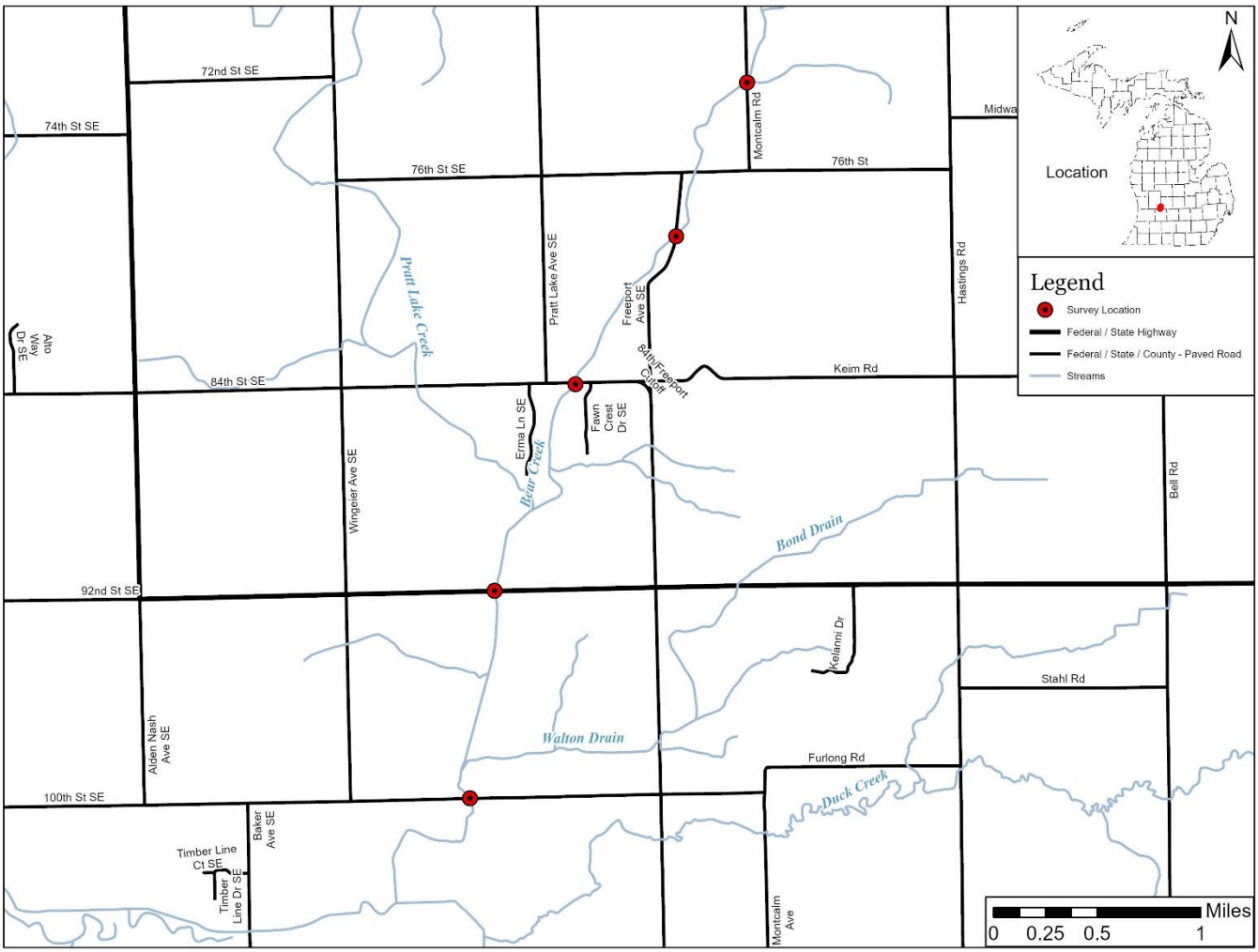


Figure 2. Brown Trout catch per unit effort with electrofishing gear at five sites on Tyler Creek in July 2022. Catch per unit effort is defined as the number of Brown Trout captured per 1,000 feet of creek shocked.

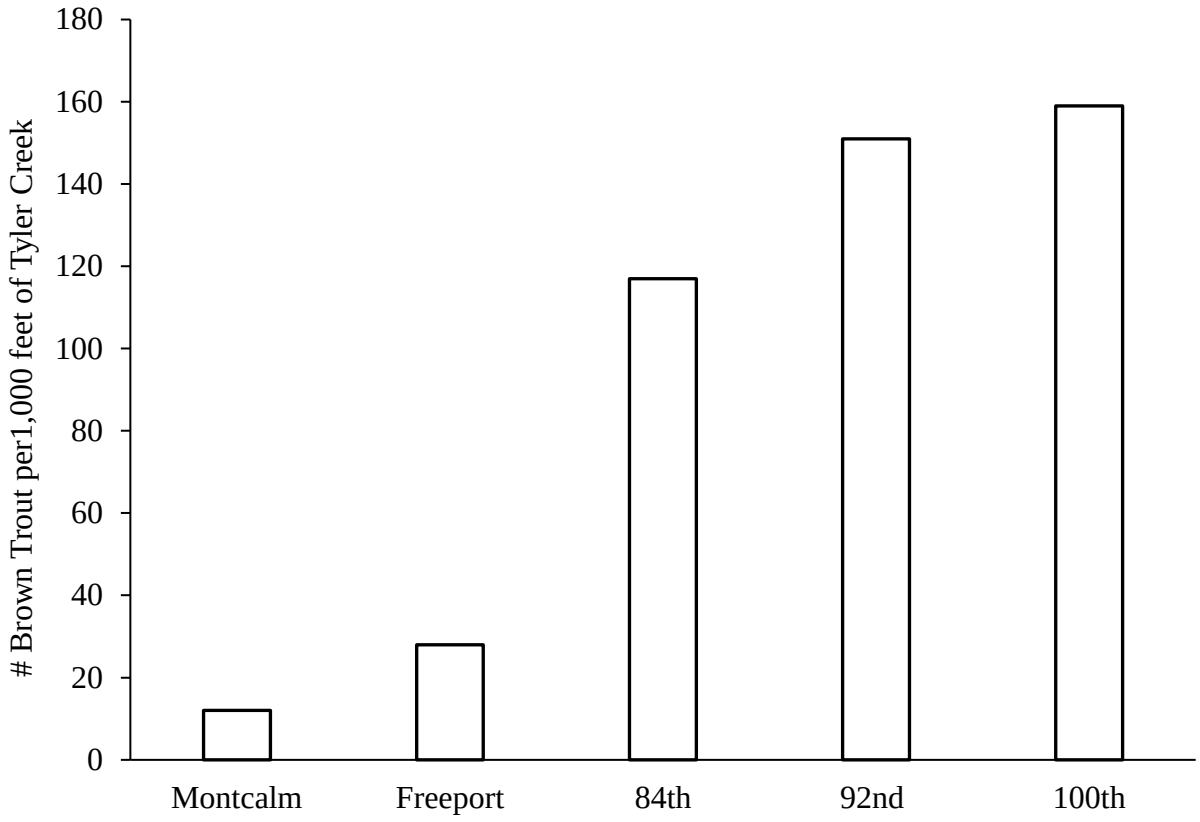


Figure 3. Length frequency histogram for Brown Trout captured in Tyler Creek across five sites (Montcalm Avenue, Freeport Avenue, 84th Street, 92nd Street, and 100th Street) in July 2022.

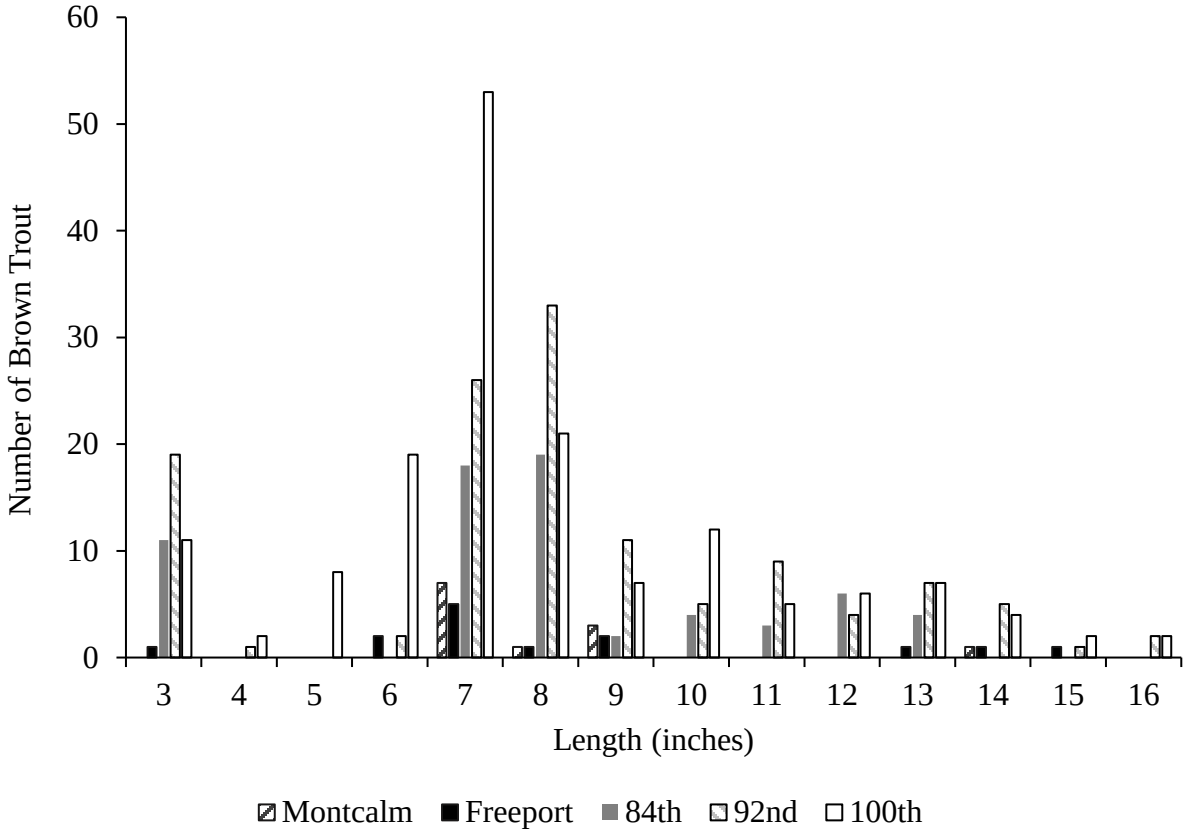


Figure 4. Mean monthly water temperatures at three locations on Tyler Creek, recorded from April through November 2022.

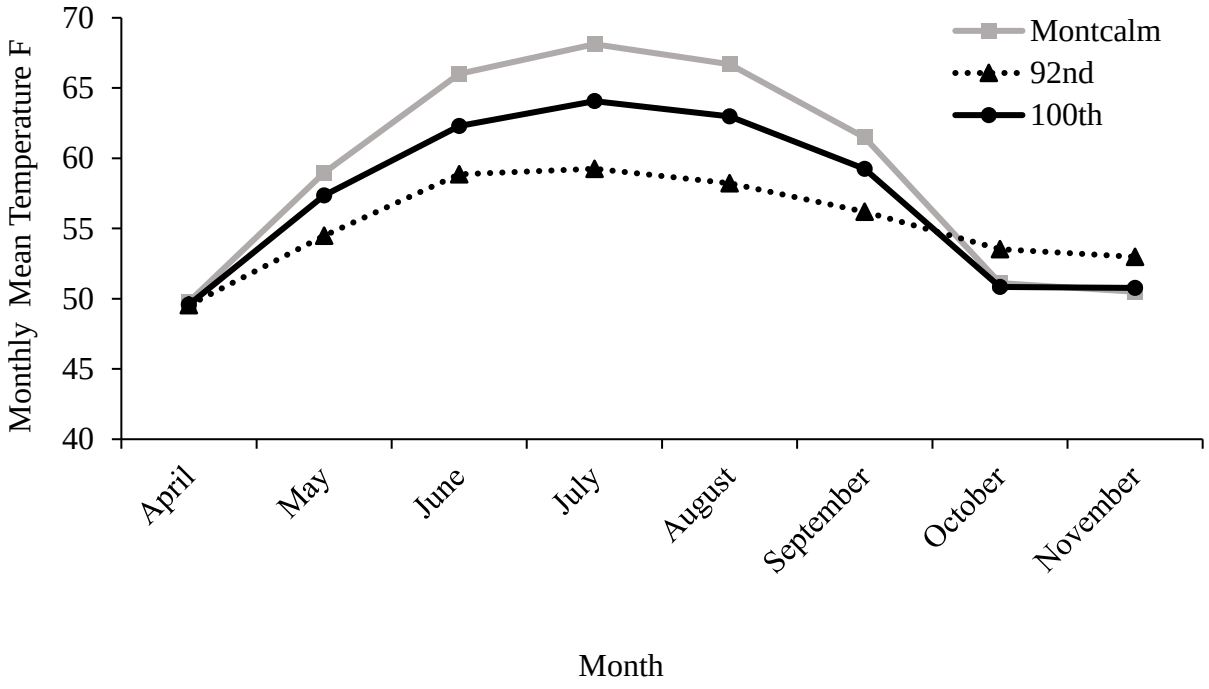
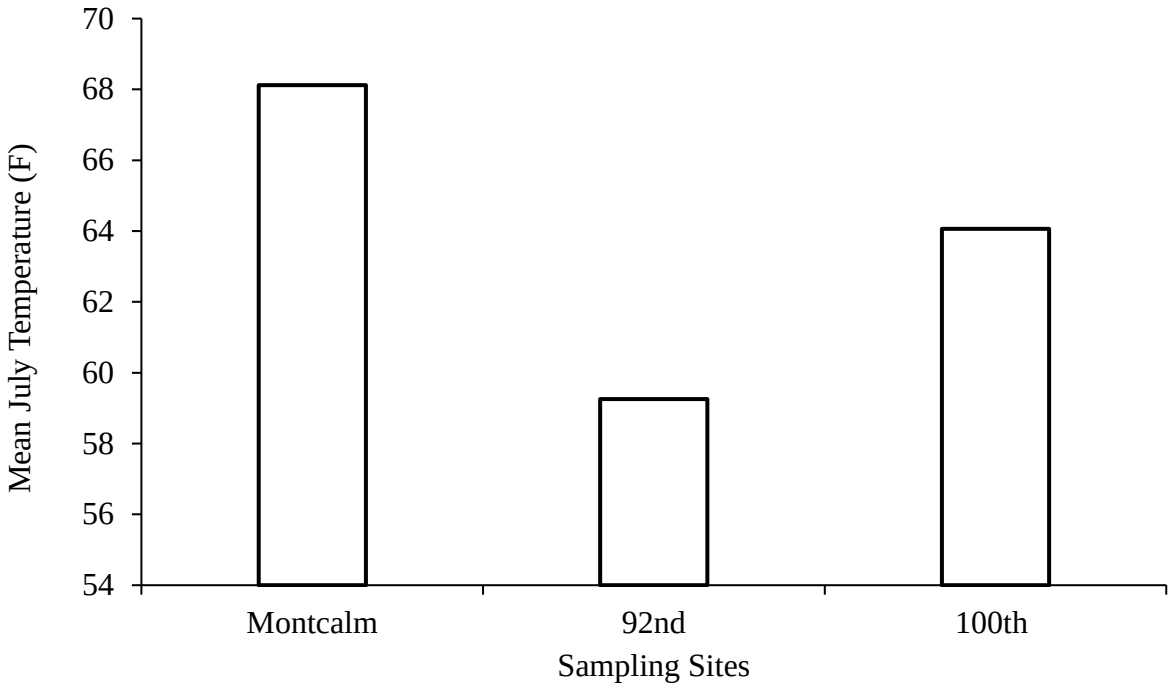


Figure 5. Mean July water temperatures (F) at three sampling locations in Tyler Creek recorded July 2022.



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