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Western District Headquarters
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December 11, 2023

Lee Gezelman
Lake Garda Improvement Association
P.O. Box 222
Unionville, CT 06085

Dear Mr. Gezelman,

Thanks to you and the Lake Garda Improvement Association for requesting that we sample the fish community in Lake Garda, which we did on October 11, 2023. Please find attached with this letter a summary report of our findings.

Sincerely,

Spencer M. Mallette

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Attachment: Summary Report for the October 11, 2023, Fisheries Sample of Lake Garda, Burlington/Farmington, CT by the Connecticut Department of Energy and Environmental Protection Fisheries Division

**Summary Report for the October 11, 2023, Fisheries Sample of Lake Garda,
Burlington/Farmington, CT by the Connecticut Department of Energy and Environmental
Protection Fisheries Division**

Background

- Lake Garda straddles the Burlington and Farmington town lines in the Farmington River Valley region of Connecticut. Owned and operated by the Lake Garda Improvement Association (LGIA), this 42.6-acre waterbody was created by the impoundment of Rose Brook in the 1920's. According to a 2012 sedimentation analysis done by Macchi Engineers, LLC, Lake Garda is an average of just over 5 feet in water depth, with a maximum depth of 14.5 feet. The lake does not have public fishing access, as only members of the community are permitted to fish there.
- A request to sample Lake Garda was made by the LGIA on January 27, 2023, to learn more about the fish population in the impoundment and to detect the presence of illegally introduced Grass Carp. Furthermore, the Pond and Lake Connection (PLC) is managing the waterbody for the LGIA and was also interested in assessing the impact of Common Carp in the pond, as PLC believes these fish are the primary driver for the lake's turbidity issues.
- On October 11, 2023, Lake Garda was sampled for the first time ever by the Connecticut Department of Energy and Environmental Protection (CT DEEP) Fisheries Division. To get an adequate depiction of the State of Connecticut's freshwater fisheries resources, the CT DEEP Fisheries Division samples a variety of freshwater lakes and ponds, which can include public waters, private water supply reservoirs and private lakes, such as Lake Garda. Gathering data from all these different waterbodies allows CT DEEP to assess the State's freshwater resources and make comparisons of fish population size, fish age, and fish growth based on varying usage type (i.e. public waters see far more angling pressure than closed to fishing water supply reservoirs or private lakes and therefore the fish populations can be markedly different in terms of size and age structure).
- Furthermore, the CT DEEP Diadromous Fish Restoration Program has expressed interest in Lake Garda and one staff-member attended the night electrofishing sample. This group is currently developing "The Plan to Restore Diadromous Fishes to the Farmington River Watershed", a plan to identify the potential habitat for five highly migratory native fish species, including Alewife and American Eel. Lake Garda, and nearby Monce Pond, will be included in the plan as potential adult spawning and juvenile rearing habitat for sea-run Alewife as well as habitat for adult American Eel. Lake Garda has the potential to sustain an annual Alewife run of up to 9,000 adults

during their spring spawning migrations. The plan is a guide that will aid CT DEEP and others when prioritizing fisheries work within the Farmington River Watershed.

Key Concepts

- The Fisheries Division samples lake fish populations using boat electrofishing following standardized sampling protocols. The electrofishing boat is deployed at night in nearshore areas of a waterbody. The boat is propelled at slow speeds (usually less than one mile per hour) and DC current is pulsed into the water from an onboard generator through special stainless-steel droppers that are suspended from two probes off the bow of the boat. Stunned fish are netted, identified, and measured, then released back into the waterbody (electrofishing is a mostly non-lethal method of fish collection).
- Throughout this document, species are sorted into three categories that roughly correspond to their trophic level (i.e., their position within the food chain):
 - “Top-level”: predators that reach large sizes and prey primarily on other fish.
 - “Mid-level”: species that reach intermediate sizes and may consume fish prey.
 - “Low-level”: smaller species that prey primarily on invertebrates and other matter.
- A species’ relative abundance is expressed as catch-per-hour (CPH) of active electrofishing time. CPH provides a standardized index of abundance that facilitates comparison of species densities between lakes or over time within a lake.
- For most species, the CPH is calculated for two size classes: fish that are “stock size” or larger and those that are “quality size” or larger. “Stock size” is defined as the smallest size fish of a given species most commonly caught by anglers. “Quality size” fish are defined as the size of a given species at which most anglers consider the fish desirable to catch. See Appendix A for stock and quality size range classifications of popular Connecticut fish species.
- Proportional size distribution (PSD) is an index of size structure within a waterbody that describes the percentage of stock-size fish that are also quality-size or greater (i.e. total number of quality-size fish or greater caught by the total number of stock-size fish or greater caught for a given species). This can be thought of as the proportion of “big fish” within a population. For some “low-level” species there is no stock-size designation, but there is a quality-size designation. PSD values for these species are still calculated, but in this case, the PSD value is a proportion of all size ranges of fish captured that are of quality-size or greater (i.e. total number of quality-size or greater fish caught by the total number of fish of all sizes caught for a given species).

Key Findings

- On October 11, 2023, five CT DEEP Fisheries Division employees arrived at Lake Garda around 6:00pm, began the sample at 6:44pm, and completed the sample at 10:14pm. Six zones were completed around the lake (Appendix B), nearly encompassing the entire shoreline apart from a couple hundred meter stretch just north of the boat launch. Each zone took between 22-34 minutes to sample, with total “on-time” being exactly 1.00 hours (“on-time” is the time when the boat is actively putting electricity into the water to stun and capture fish).
- Overall sample conditions were reported as good by the team leader, even though water visibility was considered poor. The effectiveness of the netters was still good even in the poor visibility conditions.
- During the sample, 11 different fish species were caught and identified (Table 1). Additionally, a total of 25 Musk Turtles and 3 Painted Turtles were observed.
- Largemouth Bass was the only top-level species present in Lake Garda. Largemouth Bass is one of the most sought-after sport fish in Connecticut and nationally. Overall, total catch-per-hour (CPH) of both stock and quality-size fish is well below the statewide average (Table 1). However, PSD was above average, which indicates that the likelihood of catching a “big” Largemouth Bass is more likely than your average state waterbody (Table 1).

Table 1. Stock size catch-per-hour (CPH), quality size CPH and proportional size distribution (PSD) of caught fish species in Lake Garda during the October 11, 2023 night boat electrofishing sample relative to the State average for public lakes. Entries of "Average" indicate CPH was within $\pm 10\%$ or PSD was within ± 5 percentage points of State average.

Species	Number Sampled	Stock Size CPH			Quality Size CPH			Lake Garda PSD Relative to State Average
		Lake Garda	State Average	Stock Size CPH Ranking	Lake Garda	State Average	Quality Size CPH Ranking	PSD Ranking
Top-Level								
Largemouth Bass	25	14.0	57.9	Below	9.0	29.4	Below	Above
Mid-Level								
Black Crappie	25	1.0	21.3	Below	1.0	17.1	Below	Above
White Perch	958	182.0	127.6	Above	170.0	48.9	Above	Above
Yellow Perch	334	184.0	102.1	Above	98.0	48.2	Above	Average
Brown Bullhead	2	2.0	11.7	Below	2.0	10.6	Below	Above
Bluegill	186	118.0	343.3	Below	37.0	142.3	Below	Below
Pumpkinseed	79	33.0	59.3	Below	9.0	23.5	Below	Below
Low-Level								
Golden Shiner	8	8.0	20.9	Below	0.0	6.7	Below	Below
American Eel	1	1.0	24.3	Below	0.0	6.4	Below	Below
Grass Carp	2	NV ¹	NV	NV	NV	NV	NV	NV
Common Carp	2	NV	NV	NV	NV	NV	NV	NV

NV¹ = No value is calculated because not enough public lakes contain this species in sufficient abundances to create a statewide average.

- Six “mid-level” species were present in Lake Garda (Black Crappie, White Perch, Yellow Perch, Brown Bullhead, Bluegill, and Pumpkinseed; Table 1; Appendix C).
 - Black Crappie, colloquially referred to as “Calico Bass”, occurs within all major drainages in Connecticut. At Lake Garda, they are below statewide average for stock and quality-size CPH, though above average for PSD. However, because of the low number of stock or quality-size fish caught (Appendix C), no definitive statements can be made. The large number of sub-stock size fish caught could be an indication of a strong year-class, as Black Crappie are erratic spawners that are known to go through extreme boom-or-bust reproductive years.
 - Both Yellow and White Perch had well above average CPH values for both stock and quality-size fish (Table 1). White Perch was by far the most abundant species caught in this sample, including hundreds of individuals below stock-size (Appendix C). This indicates that White Perch are likely benefiting from the lack of large predatory fish species in the lake that would typically keep their population in check. White Perch are prolific spawners, and often eat eggs of other species, especially Yellow Perch. White Perch also had an above average PSD, indicating that there are a greater proportion of “big” individuals than the state average (Table 1). In comparison, Yellow Perch, another prolific spawning species, has an average PSD. This species could likely be suffering from competition with White Perch (Appendix C); however, population numbers are still strong enough for above average densities. This is a species the LGIA should keep an eye on moving forward if water clarity remains murky, as decreased clarity could reduce predation pressures on juvenile White Perch.
 - Brown Bullhead is Connecticut’s only native catfish species and is widely distributed around the state. Even though PSD was above average for this species, no definitive statements can be made about it as relatively few individuals (two) were caught. They are a difficult species to sample with nighttime boat electrofishing unless in high abundances.
 - Two sunfish species were present in Lake Garda: Bluegill and Pumpkinseed. Both species had below average values in both CPH categories and PSD (Table 1).
- Four “low-level” species were caught during the sample (Golden Shiner, American Eel, Grass Carp, Common Carp; Table 1).
 - Golden Shiner is the most common lake and pond minnow species in Connecticut, found in almost all lakes, ponds and larger streams. They tend to be the preferred prey species for predatory species when in high abundance. However, Golden Shiner stock and quality-size CPH and PSD were below average (Table 1; Appendix C).

- American Eel are a catadromous species, which means spawning takes place out at sea, and the young return and grow to maturity in freshwater habitats. Access to freshwater habitats is critical for this species, and the American Eel found in Lake Garda had to swim up the Connecticut River into the Farmington River, before ascending Unionville Brook to reach the waterbody. Densities of American Eel are difficult to determine via nighttime boat electrofishing, therefore a definitive statement about this species cannot be made without further sampling.
- Two different carp species were caught by CT DEEP Fisheries Division in Lake Garda: Common Carp and Grass Carp. Two of each species were caught; a 71cm and 81cm Common Carp, and a 119cm and 121cm Grass Carp. Both species are difficult to capture during nighttime boat electrofishing as they are sensitive to the electrical current put out by the boat and will leave an area before the boat gets close enough to stun them. However, there is no statewide CPH or PSD available for either species as they are not present in enough waterbodies to get a statewide average (Table 1). Other sampling methods would be better suited to get a relative abundance of these species in Lake Garda.

Summary

Nighttime boat electrofishing only represents a singular “snapshot” in time, so our sample may not provide a complete picture of the fish community in Lake Garda. More samples over a short period of time would help create a more thorough picture of the fish community. However, the fish community at Lake Garda contains a typical assemblage of warmwater fish species for Connecticut lakes and ponds, with a few exceptions. First, the high abundance of White Perch, often considered a nuisance species, could prove detrimental to the health of the other fish species populations with the lack of large numbers of predatory fish (i.e., only Largemouth Bass in Lake Garda). It is not unusual for fish to experience strong year-classes when conditions are favorable and the reverse when conditions are unfavorable, which could be the case with both perch species. Even with the low density of big Largemouth Bass, the above average index of large fish in Lake Garda is typical of what is seen in most waterbodies that have closed or limited fishing access.

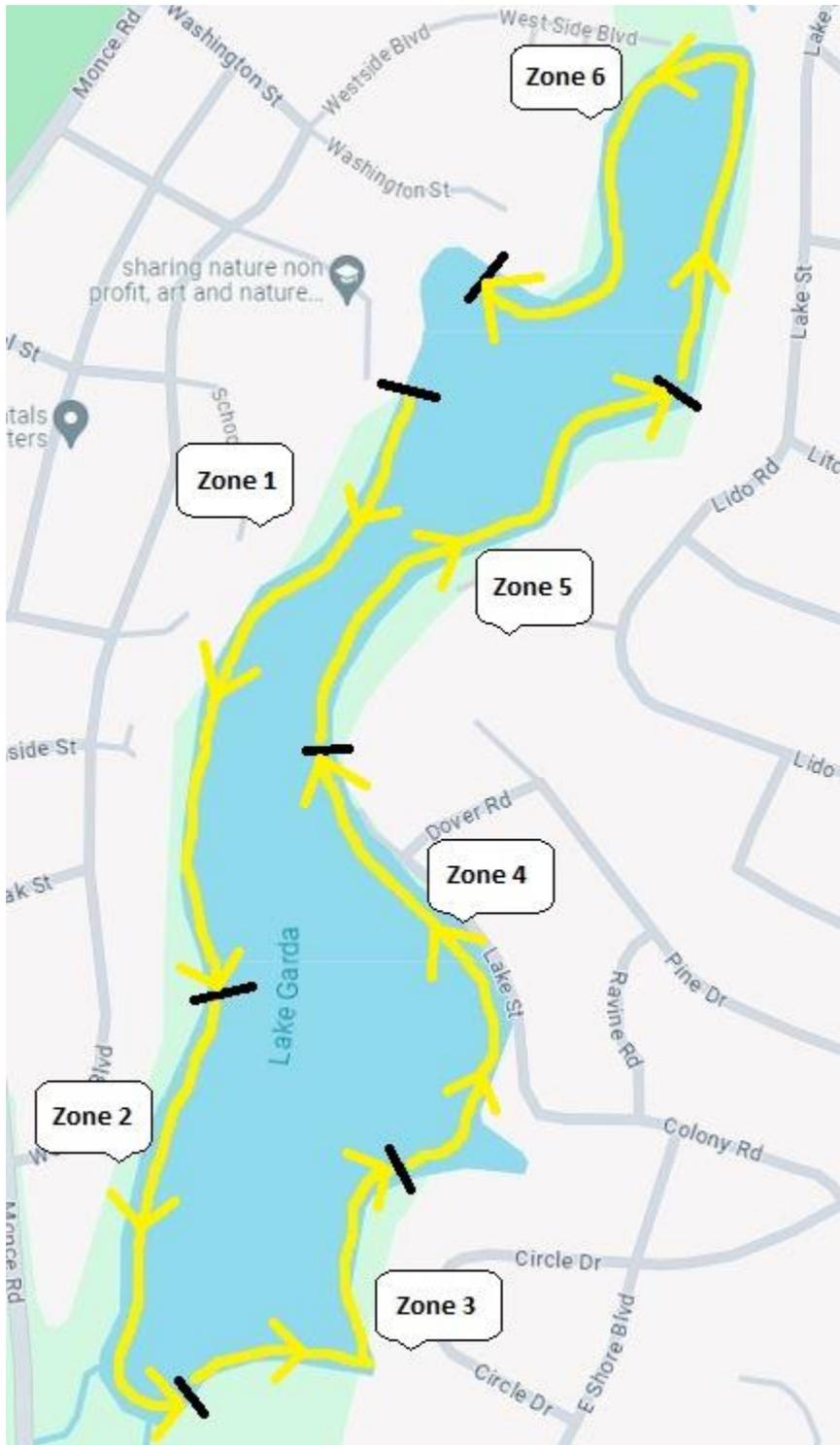
Second, regarding either carp species being at nuisance densities, no definitive statement can be made to support this. With so few carp being captured, a sufficient picture of the populations of these two species cannot be drawn. To further help support this idea, other methods of capture would be better suited for getting an estimate. One such method would be to trap these fish using deployment of nets in habitat they would frequent and marking fish to get a population estimate. Another, more time-consuming

method, would be angling for these fish and again marking them for recapture rates. If immediate removal of Common Carp is desired, the state-wide regulation of 5 fish per person, per day, would be applicable. Bowfishing, if authorized at Lake Garda, would allow for up to 12 Common Carp per angler, per day, to be harvested. For removal of Grass Carp, a state-issued scientific collectors permit would need to be requested and approved through the CT DEEP. Otherwise, any Grass Carp caught must be released alive.

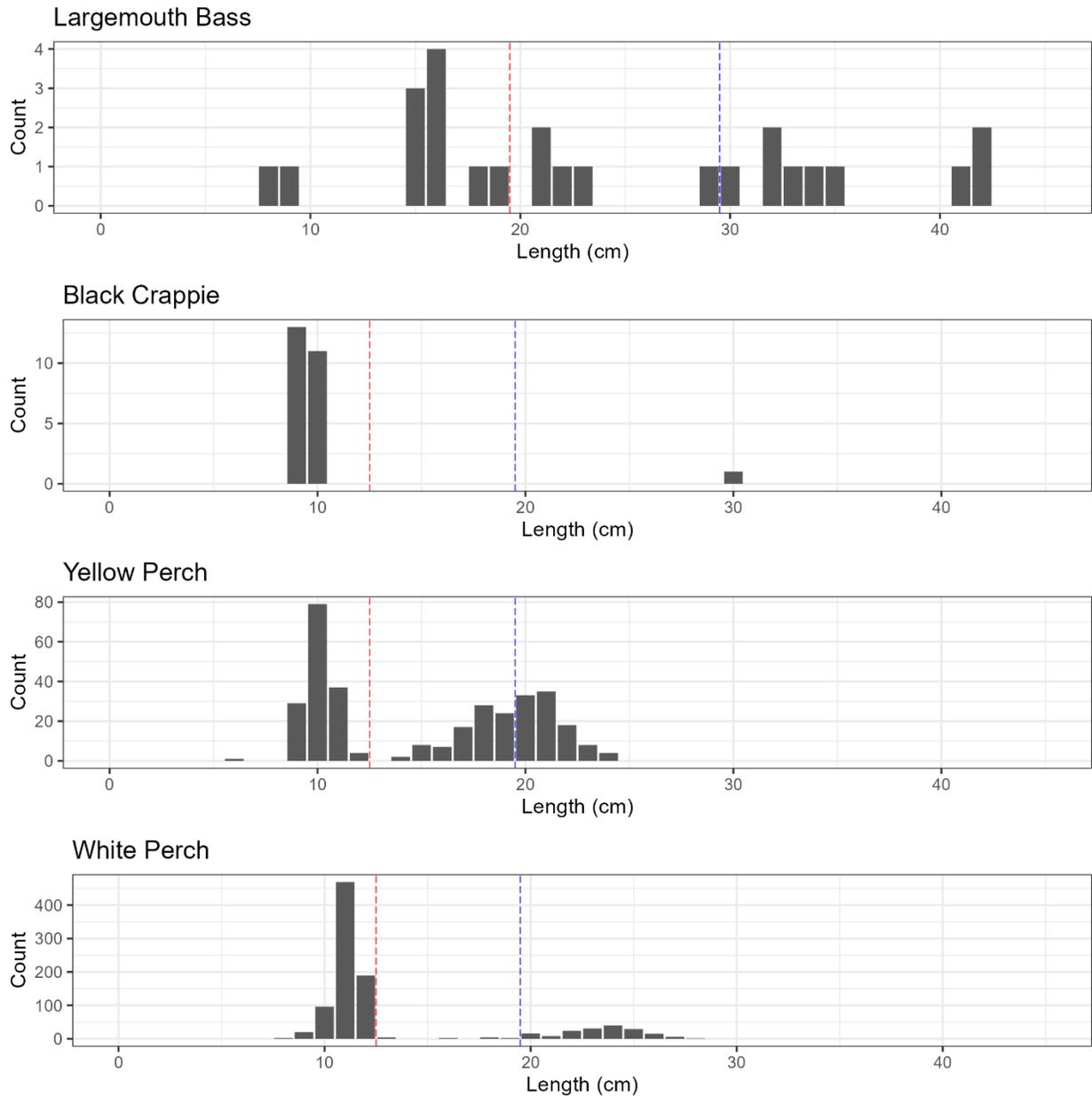
If you have questions please feel free to contact Spencer Mallette (phone: 860-424-3138; email: spencer.mallette@ct.gov) or Chris McDowell (phone: 860-707-2767; email: Christopher.McDowell@ct.gov) or Andrew Bade (phone: 860-424-3673; email: Andrew.bade@ct.gov).

Appendix A. Size cutoffs for various Connecticut fish species				
Species	Metric (cm)		English (inches)	
	Stock	Quality	Stock	Quality
Top -Level				
Largemouth Bass	20	30	8	12
Smallmouth Bass	20	30	8	12
Northern Pike	35	60	14	24
Chain Pickerel	25	38.1	10	15
Channel Catfish	20	30.5	8	12
Walleye	25	38.1	10	15
Brook Trout	20	33	8	13
Brown Trout	20	33	8	13
Rainbow Trout	20	33	8	13
Mid-Level				
Black Crappie	13	20.3	5	8
White Perch	13	20.3	5	8
Yellow Perch	13	20.3	5	8
Brown Bullhead	15	22.9	6	9
White Catfish	20	30.5	8	12
Rock Bass	8	15.2	3	6
Bluegill	8	15.2	3	6
Pumpkinseed	8	15.2	3	6
Green Sunfish	8	15.2	3	6
Redbreast Sunfish	8	15.2	3	6
Low-Level				
Golden Shiner	-	15	-	6
White Sucker	-	30	-	12
American Eel	-	38	-	15
Alewife	-	14	-	5.5

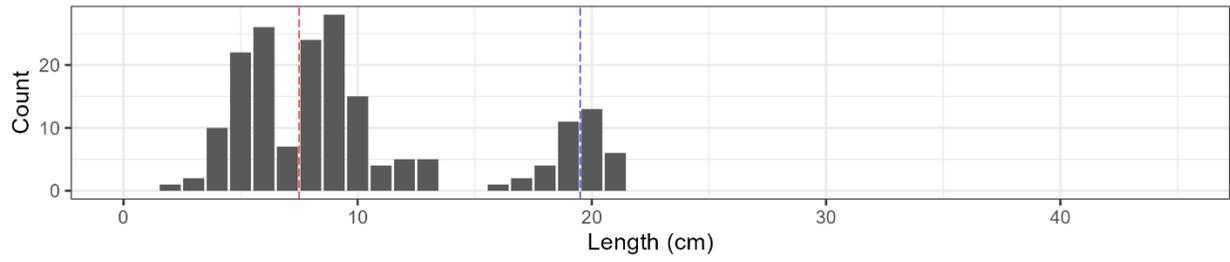
Appendix B. Locations sampled by the Connecticut Department of Energy and Environmental Protection using nighttime boat electrofishing in Lake Garda, Burlington/Farmington, Connecticut on October 11, 2023. Arrows indicate direction of movement.



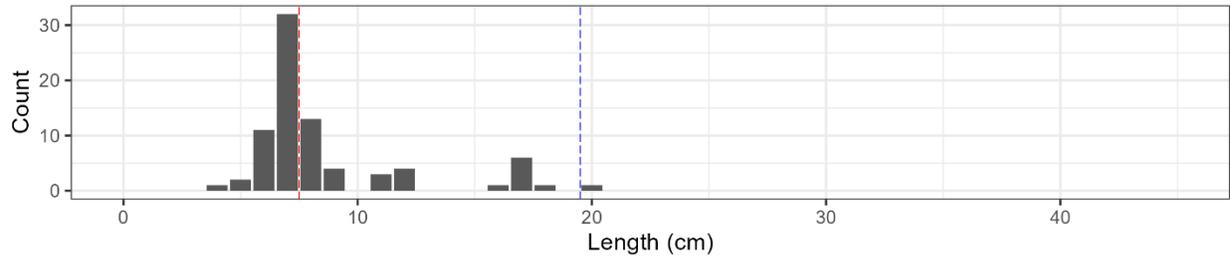
Appendix C. Length-frequency graphs of the seven most abundant species caught on October 11, 2023, using nighttime boat electrofishing in Lake Garda, Burlington/Farmington, Connecticut. Length values before the red line represent fish caught below species-specific stock-size values. Length values between the red and blue lines represent fish caught of species-specific stock-size. Length values after the blue line represent species-specific quality-size and above fish caught. No Golden Shiner were caught that were above the reported quality-size length. Four species (Brown Bullhead, American Eel, Common Carp, Grass Carp) were caught in low abundances, so no figure was created.



Bluegill



Pumpkinseed



Golden Shiner

