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## Virginia Department of Wildlife Resources 2023 Queens Lake Management Report

The Department of Wildlife Resources conducted an electrofishing survey of Queens Lake on June 12<sup>th</sup>, 2023. The previous electrofishing survey was conducted on October 26<sup>th</sup>, 2016. Richard Toth has been the primary contact person representing the Lake Committee of Queens Lake. Richard and his friends were instrumental in constructing a support frame to allow for the safe launch of the DWR electrofishing boat. A 20-foot Clark boat rigged with a Midwest Lakes electrofishing box and a Honda generator were used for this survey. The 2016 fall survey relied upon an 18.5-foot boat rigged with a Smith Root 7.5 GPP electrofishing unit. The 2023 survey consisted of three runs of 1,200 seconds each for a combined effort of one hour of electrofishing. This was an increase from the 2016 survey, which relied upon two survey runs for 40 minutes of effort. The survey was able to provide additional insight into the health of the current fishery. Collected fish were placed inside a 165 gallon live well with total lengths measured and weights recorded. The water temperature at the time of the survey ranged from 24.6°C to 25.4°C (76.3°F – 77.7°F), which was elevated from the 2016 survey (65.1°F). Full community assessments of any given fishery, by way of an electrofishing survey, are best conducted with a spring survey (April to May) or a fall survey in October. The June 2023 survey made the most of the day. Any specific comparisons to the October 2016 survey must account for the large gap in time and the difference in season. Queens Lake continues to be rather turbid with excessive sediment clogging the upper basin of the lake. A substantial area of the upper basin has been lost to severe deposition of sediment. The conductivity ranged from 316  $\mu\text{S}$  to 321  $\mu\text{S}$ , which showed an increase from 2016 (256 $\mu\text{S}$ ).

The survey revealed the presence of six fish species, down slightly from the seven fish species collected in 2016. The species found in order of abundance were Bluegill, Largemouth Bass, Redear Sunfish, American Eel, Black Crappie, and Grass Carp. The 2023 survey failed to find any Gizzard shad and/or Golden Shiner. A total of 1,212 fish were collected during the 2016 survey over the course of 40 minutes of electrofishing. The 2023 survey failed to yield the same level of excitement for overall abundance with 395 total fish boated. The Bluegill catch comprised 44.3% of the total catch, down from the 71% found in 2016. The Largemouth Bass catch comprised 29.37% of the total catch, which showed an increase from 2016 (15%). The October 2016 survey found an abundance of juvenile Bluegill produced during the multiple spawning waves of late spring and summer 2016.



**One of the surprises of the 2023 survey was a Grass Carp of 36.29 inches found holding near the edge of a downed tree.**

**Table 1.** Catch rates of all fish species collected from Queens Lake on October 26<sup>th</sup>, 2016

Species	N	CPUE #/hr	% of Catch	Min TL (in.)	Max TL (in.)	Mean TL (in.)
Bluegill	866	1,299	71.45	0.87	8.46	3.81
Largemouth Bass	189	283	15.59	2.44	22.87	11.25
Black Crappie	52	78	4.29	3.19	7.13	4.22
Redear Sunfish	48	72	3.96	2.83	11.61	8.99
Gizzard Shad	42	63	3.47	4.13	9.84	7.77
Golden Shiner	9	13	0.74	3.86	7.01	6.05
American Eel	6	9	0.5	11.22	25	14.17
<b>Total # Fish</b>	<b>1,212</b>					

**Table 2.** Catch rates of all fish species collected from Queens Lake on June 12<sup>th</sup>, 2023

Species	N	CPUE #/hr	% of Catch	Min TL (in.)	Max TL (in.)	Mean TL (in.)
Bluegill	175	175	44.3	2.09	7.76	4.17
Largemouth Bass	116	116	29.37	1.65	18.62	7.28
Redear Sunfish	52	52	13.16	4.72	12.56	11.26
American Eel	40	40	10.13	11.22	26.18	15.12
Black Crappie	11	11	2.78	1.85	15	6.38
Grass Carp	1	1	0.25	36.29	36.29	36.29
<b>Total # Fish</b>	<b>395</b>					

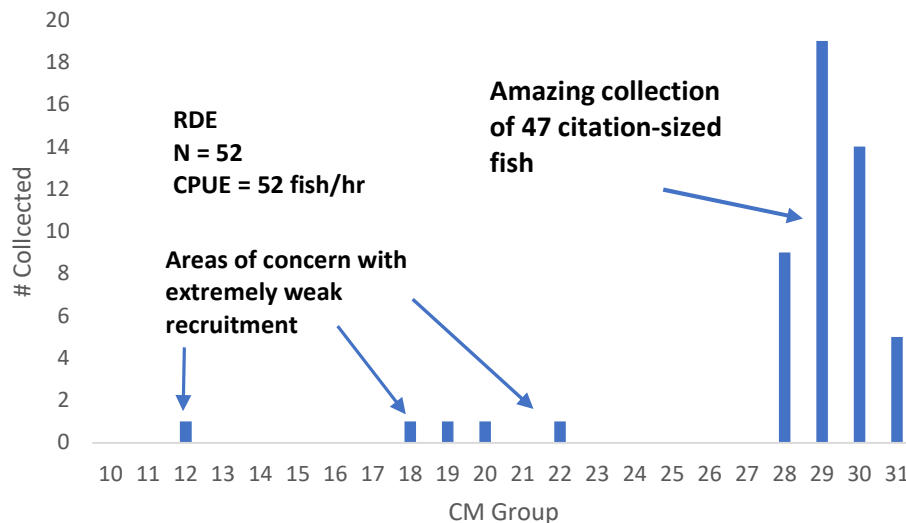


**The largest Redear Sunfish that graced the measuring board on June 12<sup>th</sup>, 2023**

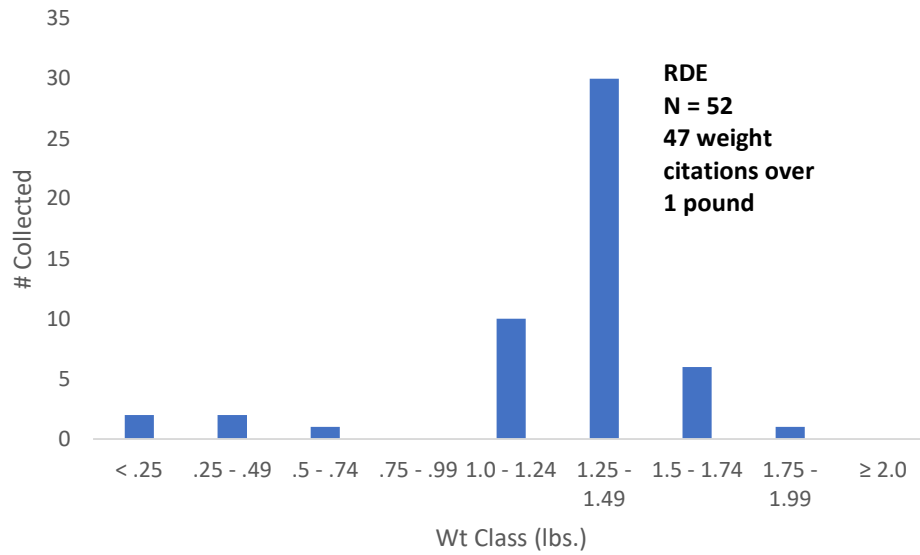
## Redear Sunfish

Queens Lake continues to have the best trophy Redear Sunfish population within Region 1, District 1. Some of the larger reservoirs within Region 1 have the potential to produce a few citation-sized Redear Sunfish that hit the magic length of 11” or 1 pound in weight. These few citations fail to impress when compared to the trophies produced within Queens Lake. The 2023 survey yielded 52 Redear Sunfish, which represented a Catch Per Unit of Effort (CPUE) of 52 fish/hr. This CPUE showed a decline when broadly compared to the 2016 survey (CPUE = 72 fish/hr). These catch rates are not nearly as strong as the Bluegill CPUE, but that is no surprise. Redear Sunfish typically do not have the multiple spawning attempts that Bluegill have during the late spring to mid-summertime frame. Collected Redear Sunfish ranged in size from 4 to 12 inches. The distribution revealed limited recruitment of juvenile Redear Sunfish with only 3 fish less than 8 inches in length. The larger specimens were in great physical condition and appear to be finding plenty of forage. The mean relative weight value for the collected Redear Sunfish was an impressive 110, with some fish calculated out in the 120-130 range. The largest Redear Sunfish measured 12.56 inches with a weight of 1.84 pounds. The survey collected an amazing number of 47 weight citations. This tally of trophy sized fish was more impressive than the 21 length citations collected during the 2016 survey. The 2016 survey revealed 19 specimens that also qualified as weight citations. The trophy stock of Redear Sunfish is the most impressive part of the Queens Lake fishery. Anglers should continue to practice catch and release on these 10 to 12-inch fish to ensure that high quality genetics stays a part of the population. Supplemental stockings of Redear Sunfish fingerlings could help to strengthen poor year class strength.

The average size Redear Sunfish measured an impressive 11.26 inches, up from the 8.99 inches in 2016. Adult Redear Sunfish will typically feed on small mussels and snails. Their feeding habits have given them the common name of shell crackers. Redear Sunfish can typically be caught by anglers using more of a bottom presentation of baits. Red wiggler worms usually do the trick. Limited recruitment success of Redear Sunfish may be the result of predator species foraging on Redear Sunfish eggs and fry or the potential loss of suitable spawning habitat to excessive siltation.



**Figure 1.** Length frequency distribution of Redear Sunfish collected from Queens Lake on June 12<sup>th</sup>, 2023



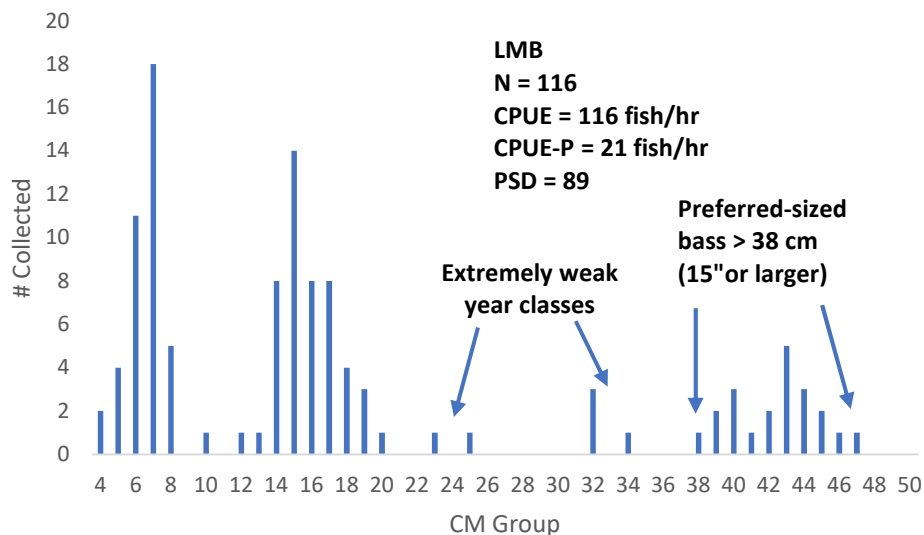
**Figure 2.** Weight class distribution of the Redear Sunfish collected from Queens Lake on June 12<sup>th</sup>, 2023



**One of the citation-sized Redear Sunfish collected from the upper third of Queens Lake**

## Largemouth Bass

The 2023 survey revealed a decline in Largemouth Bass abundance when compared to the 2016 survey. The collection of 116 Largemouth Bass yielded a CPUE (Catch Per Unit of Effort) of 116 fish/hr. The 2016 survey collected 189 Largemouth Bass over the course of 40 minutes of electrofishing for a CPUE of 283 fish/hr. The 2016 catch rate ranked much higher than most public impoundments, but rates similar to bass populations found in other private waters. The 2023 catch rate of 116 fish/hr actually falls more in line with a balanced bass population but the vast majority of collected bass were juvenile fish. The CPUE of juvenile bass (< 8 inches) was 88 fish/hr, down from the 103 fish/hr found in the fall survey of 2016. The CPUE of stock-sized bass (fish  $\geq$  8 inches) was a depressing 28 fish/hr, down sharply from the 2016 survey (CPUE = 180 fish/hr). From all indications, the stockpile of bass within the 14 to 18 inch range found during the 2016 survey have most likely met their fate of natural mortality.



**Figure 3.** Length frequency distribution of Largemouth Bass collected from Queens Lake on June 12<sup>th</sup>, 2023

The length frequency distribution revealed a large contribution of YOY (Young of Year) bass and juvenile bass from the 2022-year class. These two-year classes will be drawn upon to pick up the slack from the extremely weak year classes of the two previous spawns. Some natural size variation can exist due to a staggered spawn amongst the bass brood stock. Not all bass spawn at the same time as earlier hatched fish might be able to get a favorable head start on the rest of the year class. The growth rate of the bass population primarily depends on the abundance of prey species that can be easily consumed. The decline in juvenile Bluegill abundance may yield some limiting factors on overall bass growth rate. The lack of Gizzard Shad during the 2023 survey provides additional questions as to how the bass population will be impacted.

Size class	Size Range	N	% of LMB catch	Mean TL (mm)	Mean Wr
Juvenile	< 150 mm	51	43.96	84.7	n/a
Young	150 - 199 mm	37	31.89	167.7	120.1
Stock	200 - 299 mm	3	2.59	232.3	121
Quality	300 - 379 mm	4	3.45	329	99.3
Preferred	380 - 499 mm	21	18.1	428.1	91.2
Memorable	≥ 500 mm	0	0		

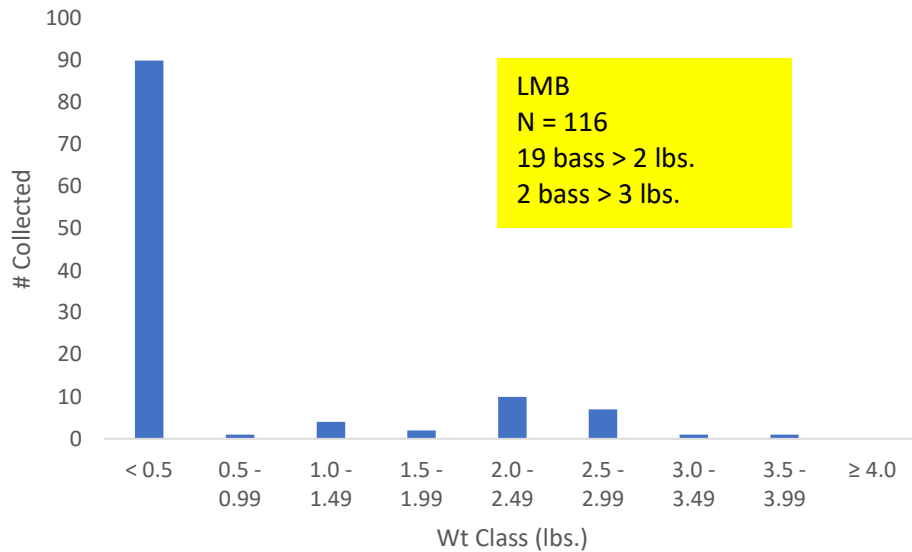
**Figure 4.** Percent contribution and mean lengths and relative weights of the various size groups of Largemouth Bass collected from Queens Lake on June 12<sup>th</sup>, 2023

Fisheries biologists of the past established certain size classifications to describe the fish they collected. It is through these size classifications that population dynamics are analyzed. The size designations are stock, quality, preferred, memorable, and trophy. The PSD (Proportional Stock Density) is the proportion of stock-sized bass (8 inches or larger) that are also equal to or greater than 12 inches (quality size). A balanced bass/bluegill fishery has a bass PSD value within the 40 – 60 range. With largemouth bass being the most popular game fish in this country, it has been considered that a “preferred” bass is one that is over 15 inches in length. The RSD-P (Relative Stock Density of Preferred bass) is the proportion of stock-sized bass that are also equal to or greater than 15 inches in length. The PSD and RSD-P values represent the distribution of collected fish, but one must consider the total number of bass collected along with the total of stock-sized bass in the sample.

The 2023 survey showed a PSD value of 89, which was the exact same value as the 2016 survey. The 2023 PSD value is the direct reflection of 28 stocked-sized bass (≥ 20 cm) in which 25 of them were of quality-size (≥ 30 cm). The 2016 fall survey provided a wealth of more excitement with 120 stocked-sized bass (≥ 20 cm) in which 107 of them were of quality-size (≥ 30 cm). The PSD values fall well above the desired range of 40 – 60 that represents a balanced Largemouth Bass/Bluegill fishery. The 2023 survey yielded an RSD-P value of 75 based on the collection of 21 preferred-size bass (≥ 38 cm). The 2016 RSD-P value of 62 represented the collection of 75 preferred-size bass (≥ 38 cm). The 2016 catch rate of 112 preferred bass/hr was very impressive and set the bar pretty high for Queens Lake. The 2016 survey provided a total of 7 memorable-sized bass (≥ 50 cm). The 2023 survey failed to yield the same level of excitement with only 21 preferred-size bass collected and zero memorable bass in the mix.

Weights were taken on Largemouth Bass to calculate relative weight values. Relative weight values are an indication of body condition. A value from 95 to 100 represents a fish that is in the healthy range and finding a decent amount of food. The higher the value, the better the condition of the fish in terms of overall body mass. The relative weight values for stock, quality, and preferred-sized bass (≥8”, ≥12”, ≥15”) were 121, 99, and 91, which showed some major differences from 2016 (97, 97, 97 respectfully). The relative weight value for stock-sized bass represents a limited sample set of three bass with individual relative weight values of 131, 125, and 107. The bass with the relative weight value of 131 is destined to become a citation for Richard Toth to catch in about 6 years. The four bass that fell into the specific stock designation had individual relative weight values of 103, 103, 107, and 84. The less-than-ideal relative weight value (Wr = 91) for the 21 preferred-sized bass may reflect some post-spawn weight loss of fish that have yet to fully recover from the rigors of spawning stress.

Property owners and anybody that fishes Queens Lake should keep a keen eye out for any otters that might be living and feeding on the lake. The last thing in the world you want is 3 or 4 otters destroying the fishery’s limited trophy bass component. The 2016 survey collected five bass greater than 5 pounds in weight. These five largest specimens weighed in at 5.04, 5.39, 6.52, 7.02 and 8.08 pounds. These bass showed some of the potential that the fishery can produce. The 2023 survey tanked pretty hard with the five largest bass weighed in at 2.67, 2.77, 2.79, 3.09, and 3.52 pounds. The electrofishing survey may have missed some of the larger bass that might still be present, or it might have revealed a discouraging trend in the bass population.



**Figure 5.** Weight distribution of Largemouth Bass collected from Queens Lake on June 12<sup>th</sup>, 2023

Run #	N and Wr	Young	Stock	Quality	Preferred	Memorable
		(150 -199 mm)	(200 - 299 mm)	(300 - 379 mm)	(380 - 499 mm)	(≥ 500 mm)
1	N	14	2	2	10	0
1	Wr	125.2	119	93.5	91.3	
2	N	9	1	1	5	0
2	Wr	119.4	125	103	88	
3	N	14	0	1	6	0
3	Wr	115.4		107	93.7	

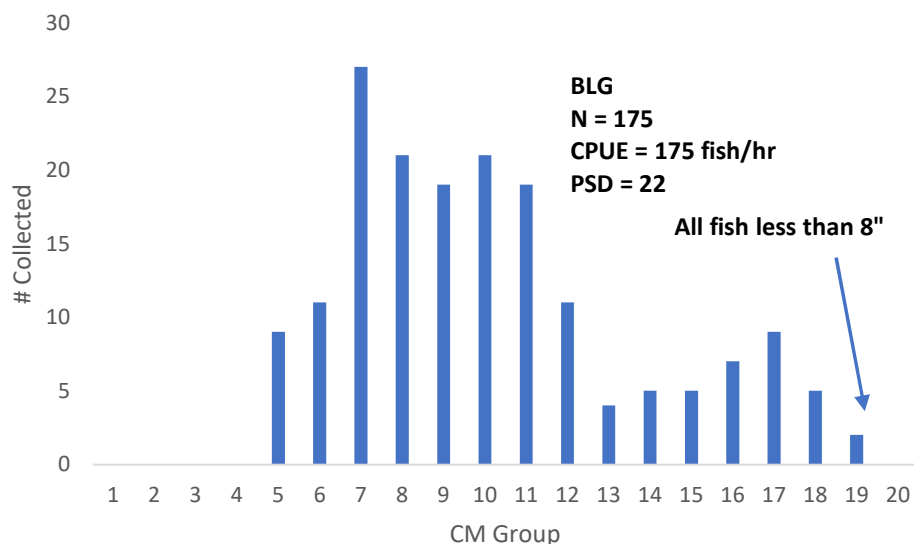
**Figure 6.** Specific catch information of abundance and mean relative weight values for Largemouth Bass collected from the three electrofishing runs on June 12<sup>th</sup>, 2023



## Bluegill

The 2023 electrofishing survey revealed a decline in Bluegill abundance when compared to the 2016 survey. The three survey runs revealed 175 Bluegill (CPUE = 175 fish/hr) which failed to match the 2016 CPUE of 1,299 fish/hr. The length distribution ranged from 5 to 19 cm (2 to 7" range). A large proportion (58.85%) of collected Bluegill were within the 7 to 12 cm range (3 to 5" range). Bluegill in the 1 to 3-inch range are the main source of prey for smaller bass and adult Black Crappie. The decreased presence of Bluegill less than 3 inches in length is to be expected based on the timing of the survey. Any YOY (Young of Year) Bluegill may not have recruited to the electrofishing gear or were in the early stages of development. The survey did not reveal any Bluegill greater than 8 inches so the trophy sunfish potential within Queens Lake will be based around the Redear Sunfish population. Anglers should not expect much action from larger Bluegill. A stunted Bluegill population is typically observed in small impoundments that have a large Gizzard Shad population. Gizzard shad can provide a good forage base for bass, but their presence can put a strain on the overall productivity of the system. The fact that not a single Gizzard Shad was collected during the 2023 survey came as quite a surprise. Pelagic shocking runs were not conducted to verify if any schools of shad were holding off the shorelines that were surveyed.

The abundance of juvenile Bluegill detected during the 2016 survey yielded a mean total length of 3.81 inches. The 2023 survey showed a slight improvement with the mean total length at 4.17 inches. A tally of 28 Bluegill were greater than 6 inches in length (16%). The decline in overall abundance of Bluegill is an area of concern and may merit supplemental Bluegill stockings in the near future.



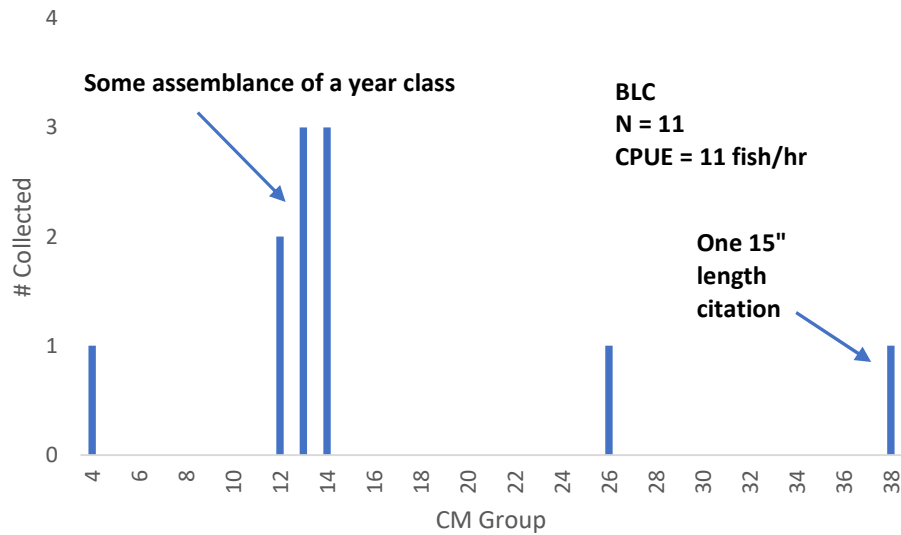
**Figure 7.** Length frequency distribution of Bluegill collected from Queens Lake on June 12<sup>th</sup>, 2023

## Black Crappie

The survey encountered a limited abundance of Black Crappie with 11 collected (CPUE = 11 fish/hr). The catch rate showed a large decline from the 2016 survey which collected 52 fish (CPUE = 78 fish/hr). An accurate assessment of the Black Crappie fishery can be difficult based on an electrofishing survey. Black crappie tend to school in deeper water and may not be near the shoreline. Spring electrofishing surveys may encounter Black Crappie congregated in the shallows

during the spring spawn. The June 2023 survey was well past the Black Crappie spawn and collected one YOY (Young of Year) crappie of 47 mm (1.85”). The size distribution consisted primarily of juvenile fish with the average total length of 6.38”, blowing away the 2016 mean total length of 4.22 inches. Dedicated Queens Lake anglers may catch a few larger fish in the 12 to 15-inch range but from all indications their abundance is quite limited.

Based upon the crappie that were collected, it appears that the 2022-year class is aligned with the 5 to 6-inch range of fish. Otoliths were not taken on any of the crappie. Length at age data by way of reading otoliths would clear up any confusion on what year class was represented. Variability in Black Crappie recruitment can naturally occur in which any brood stock in the lake can go 4 to 5 years without a banner year class of juvenile fish produced. Loss of spawning habitat to excessive siltation can also limit the overall success of Black Crappie recruitment. Anglers interested in the overall health of the crappie population should not harvest brood stock (10 – 15 inch) during the heart of the spring spawn.

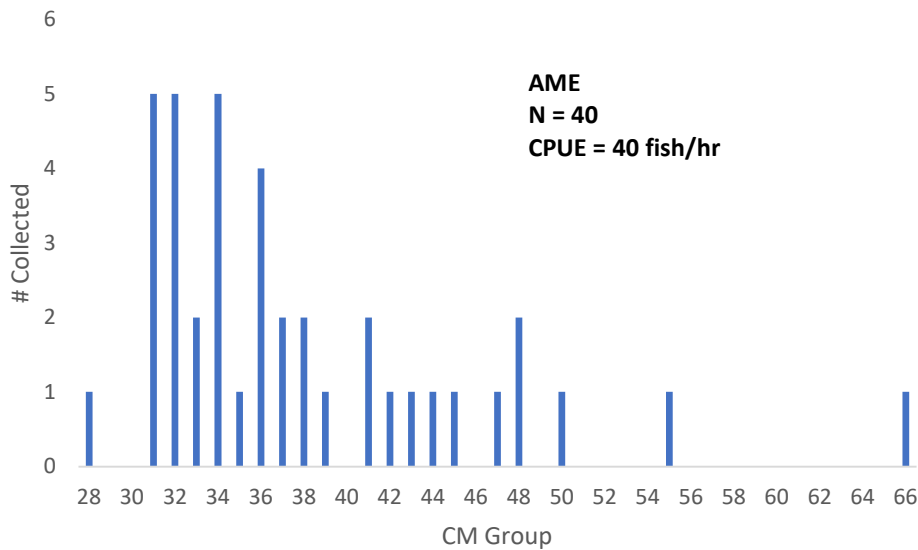


**Figure 8.** Length frequency distribution of Black Crappie collected from Queens Lake on June 12<sup>th</sup>, 2023

### American Eel

The 2023 electrofishing survey revealed an increased presence of American Eels within Queens Lake. The catch of 40 American Eels (CPUE = 40 fish/hr) showed a large increase from the 2016 survey (CPUE = 9 fish/hr). Based on the % of catch, American Eel presence went from 0.5% of the total catch in 2016 up to 10.13% of the total catch in 2023. American Eels can be extremely elusive when hit with electricity. The netting crew of 2023 collected what they could, as many additional eels were missed during the survey. Eels have the capacity to hide within deposited organic matter on the lake bottom or bury themselves, to a certain degree, within silt depositions. The length distribution of collected eels was similar to 2016 with fish in the 28 to 66 cm range (11 – 26 inches). The majority of collected eels were in the 12 to 16” range. This size range of eels make a perfect bait size for Cobia in the Bay or for Blue Catfish in any of the tidal rivers.

American Eels are a native fish species to Virginia that are catadromous and have a detailed life cycle. American Eels find their way from the Sargasso Sea to the shoreline currents of the Atlantic Ocean on up into the Chesapeake Bay to the York River and then into Queens Creek. Their migration to the base of the dam at Queens Lake does not stop there as these juvenile eels, most likely in the elver stage at around 4 inches in length, will find a way to slither their way into lake by either making their way up wet vegetation or any outfall water being released at high flow. American Eels can live from 5 to 20 years in a freshwater environment. This yellow phase of their life will eventually transition over to a silver phase in which their bodies go through a series of changes in preparation for their final step in life, the migration back to the Sargasso Sea to spawn. How many years eels will spend within Queens Lake is anybody's guess. Eels will make themselves at home and feed upon a wide range of food items from macroinvertebrates, fish eggs, and juvenile fish of various species. The majority of eel feeding will be nocturnal which can cause problems if they are raiding spawning nest of various species. Having a large concentration of American Eels within a small impoundment/lake is not always a good thing as eels can forage heavily on more desired fish species of juvenile bass and sunfish. The extremely poor recruitment level of Redear Sunfish may have been impacted by the increased concentration of eels in Queens Lake. Roughly 35 of the 40 collected American Eels were removed from the lake. The 5 eels that were released were accidentally dropped at the access area by a volunteer assisting to offload gear.



**Figure 9.** Length frequency distribution of American Eel collected from Queens Lake on June 12<sup>th</sup>, 2023

### Additional Species

The electrofishing survey revealed limited species diversity with the collection of only 6 fish species. The 2023 survey showed a decline in diversity from the 7 species collected in 2016. The 2023 survey failed to encounter any Gizzard Shad or Golden Shiners but was successful in finding a large Grass Carp that measured 922 mm (36.29”) with an estimated weight of 20 plus pounds. This Grass Carp has been within Queens Lake for quite some time and has most likely been foraging on filamentous algae and any submerged aquatic vegetation (SAV) it could find. The high levels of turbidity within Queens Lake restrict any substantial concentration of SAV

growth. No additional Grass Carp are needed within Queens Lake. The lack of any Channel Catfish or Brown Bullhead came as quite a surprise. Supplemental stockings of Channel Catfish in the future is something that Lake Committee might want to look into if there was any level of interest in adding species diversity to the lake.

### **Summary and Management Recommendations:**

The 2023 electrofishing survey of Queens Lake provided limited species diversity with 6 fish species collected. When it comes to the fishery within Queens Lake, the Redear Sunfish are phenomenal. The trophy potential that exists within the Redear Sunfish is nothing short of amazing. The Catch and Release Regulation and the ability of these fish to live long lives has allowed these fish to put on serious mass over the years. Continued success of this trophy fishery will need assistance with extremely poor recruitment observed during the 2023 survey. **A supplemental stocking of juvenile Redear Sunfish is recommended for the fall of 2023 to assist in creating a stronger year class to make up for the lack of recent success.** Perry Minnow Farm in Windsor, VA (757-539-1709) is a possible option for the purchase of Redear Sunfish fingerlings. A stocking rate in the 50 to 75 Redear Sunfish fingerlings/acre would be recommended to help bolster the 2023-year class. Additional private hatcheries can be found on the DWR website under the private pond management section of the Fishing page.

Similar to the 2016 survey, the Bluegill catch was the most abundant of the species encountered. The late spring survey failed to tap into the production of juvenile Bluegill that were discovered during the fall survey of 2016. The catch rate of 175 Bluegill/hr does not match up well with the CPUE of Largemouth Bass considering no real mass of additional forage base encountered. The majority of collected Bluegill ranged in size from 3 to 5 inches with a limited tally of fish greater than 6 inches. The survey revealed a decline in Black Crappie abundance with only a couple of fish of noteworthy size detected.

The 2016 survey found the Largemouth Bass population within Queens Lake to be abundant with an impressive collection of 14 to 18-inch fish. The 2023 catch rate of 116 bass/hr failed to match the 2016 survey (CPUE = 283 bass/hr). The 2016 catch rate of 112 preferred-sized bass ( $\geq 15''$ ) was an amazing rate that well surpassed the best public waters in Virginia. The harsh reality hit in 2023 with the collection of 21 bass greater than 15 inches leaving something to be desired. The bass were in a post-spawn pattern, so the bass fishery might not be complete doom and gloom. A certain segment of the bass population may have been staging in pelagic zones in an attempt to ambush Gizzard Shad. With the amount of shoreline cover that was surveyed, we would have hoped to encounter a few bass that cracked into the 4-pound range. The survey did reveal an abundance of juvenile Largemouth Bass coming through from the 2022 and 2023 spawns. Not much can be said about the 2020 and 2021 bass spawns other than they were extremely weak and provided a large gap in the length frequency distribution.

Queens Lake still has some decent fishing opportunities. The bass population has shown a decline as it relates to overall abundance and size structure. The two latest year classes of bass recruitment will be called upon for future fishing success. Anglers are encouraged to focus their attention on the trophy Redear Sunfish population while making as much effort as possible to protect these valuable fish. A supplemental stocking of Redear Sunfish is highly recommended for early October 2023. The Black Crappie provide some additional species diversity.

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