



## COMMONWEALTH of VIRGINIA

Molly J. Ward  
Secretary of Natural Resources

Department of Game and Inland Fisheries

Robert W. Duncan  
Executive Director

February 16, 2017

Mr. Rick Toth  
241 East Queens Drive  
Williamsburg, VA 23185

Dear Rick,

I hope that 2017 has been off to great start for you and family. I was able to find some time to write the management report for Queens Lake based on the electrofishing survey that was conducted back on October 26<sup>th</sup>, 2016. The survey provided some great insight into the strength of the fishery which is based around a healthy bass population. The survey provided an amazing abundance of preferred-sized bass that are equal to or greater than 15 inches in length. The collection of five bass greater than 5 pounds in weight was another plus with the largest bass weighed at 8.08 pounds.

The highlight of the survey for me came in the collection of 21 length citation redear sunfish. It was amazing to see 1 or 2 of these fish in any given survey, but to collect 21 of them is unheard of for waters within Region 1, District 1. Hopefully these trophy fish can be protected to allow numerous anglers the excitement of catching them. The survey collected a total of 7 fish species which is rather light in terms of overall diversity. This is not a problem as long as populations are reasonably balanced. The addition of white perch and/or yellow perch would complicate the food web dynamics and possibly put pressure on the bass and crappie populations.

I hope that this report and the attached data aide in the management of the current fishery. If you have any questions or concerns, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Scott Herrmann".

Scott Herrmann  
Aquatic Biologist  
Virginia Department of Game and Inland Fisheries  
(804) 829-6580 ext. 126 or (804) 317-2650



## Virginia Department of Game and Inland Fisheries 2017 Queens Lake Management Report

The Department of Game and Inland Fisheries conducted an electrofishing survey of Queens Lake on October 26<sup>th</sup>, 2016 after communicating with Rick Toth on behalf of the Lake Committee of Queens Lake. There are various ways to sample a fishery. An electrofishing survey is typically the fastest and most efficient way to get a full community assessment. An 18.5 foot electrofishing boat with the 7.5 GPP electrofishing unit was used to conduct the survey. The electrofishing box's setting were 720/1000 volts, 30% output, 120 DC setting to place 8.5 amps of electricity into the water. The two electrofishing booms with 6 wire dropper cables served as the anodes to relay the electricity to temporarily stun the fish. The electric field typically reaches from about 6 feet outside of the booms to a depth of roughly 7 feet. Electrofishing efforts consisted of shocking along the shoreline habitat as close as possible, with the majority of the effort concentrated in the 2 to 4 foot depth range. The survey consisted of two 1,200 second runs for a combined effort of 40 minutes. The survey was able to provide insight into the health of the current fishery along with providing baseline data on the current population dynamics. Collected fish were placed inside a 150 gallon live well that was aerated. Total lengths were measured on all collected fish. Weights were measured on all bass, crappie and redear sunfish. Weights were taken on a sub-sample of the bluegill collection. The water temperature at the time of the survey was 18.4°C (65.1°F). This was an ideal temperature for a fall survey. Full community assessment of any given fishery by way of an electrofishing survey is best conducted with a spring survey (April) or a fall survey in October. The lake was rather turbid at the time of the survey. The conductivity was 256µS.

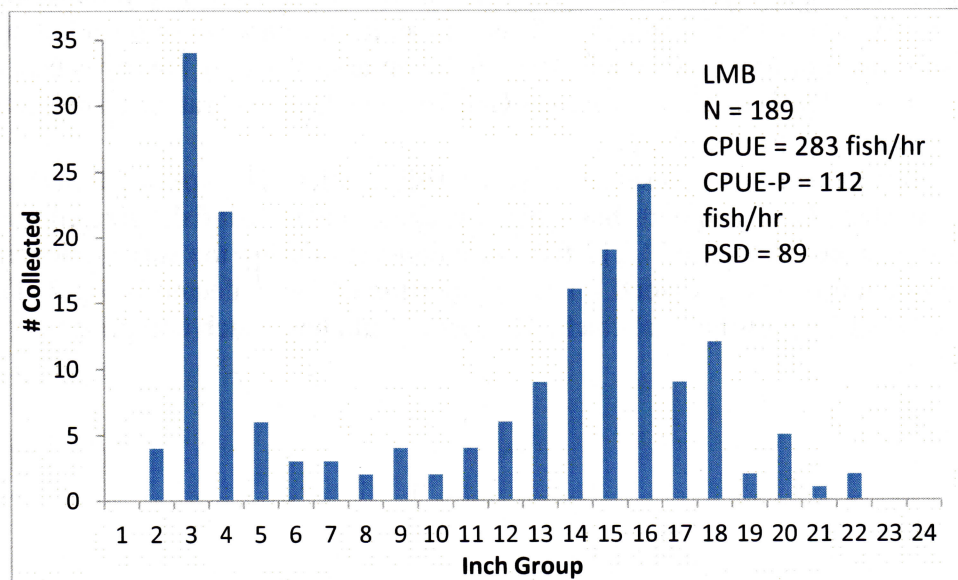
The survey revealed the presence of seven fish species. The species found in the most abundance were bluegill, largemouth bass, black crappie, redear sunfish, gizzard shad, golden shiner and American eel. A total of 1,212 fish were collected during the survey. Several downed trees and a beaver hut or two provided a large proportion of the collected bluegill. The bluegill catch comprised over 71% of the total catch. The largemouth bass catch comprised just over 15% of the total catch.

**Table 1.** Catch rates of game 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>					

### Largemouth Bass

The survey revealed an abundance of largemouth bass present. The collection of 189 largemouth bass yielded a CPUE (Catch Per Unit of Effort) of 283 fish/hr. This catch rate is expanded and is based upon the 40 minutes of sampling. This catch rate is much higher than most public impoundments, but rates similar to bass populations found in other private waters. The CPUE of juvenile bass (< 8 inches) was 103 fish/hr. The 2016 year class was well represented by the abundance of bass in 3 to 4 inch range. The CPUE of stock-sized bass (fish ≥ 8 inches) was 180 fish/hr. From all indications, there appears to be a stock pile of bass within the 14 to 18 inch range. The catch rate of quality bass (fish ≥ 12 inches) was an impressive 160 fish/hr. This high catch rate revealed the limited presence of bass within the 8 to 11 inch range. The survey revealed a respectable stock of bass in the 17 to 20 inch range.



**Figure 1.** Length frequency distribution of largemouth bass collected from Queens Lake on October 26<sup>th</sup>, 2016

The length frequency distribution revealed a large contribution of YOY (Young of Year) bass. The 2016 year class will hopefully survive long enough to make up for the fact that the 2014 and 2015 year classes were relatively weak. It is quite possible that the majority of the bass spawn occurred toward the early part of May and was not influenced by the cold weather that occurred during April. 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 abundance of juvenile bluegill should aid in the growth rate of bass that have not turned their attention to the gizzard shad population. Larger bass that are able to consume gizzard shad will have an increased potential for faster growth. The survey was successful in producing a few trophy bass that managed to bring some great excitement.

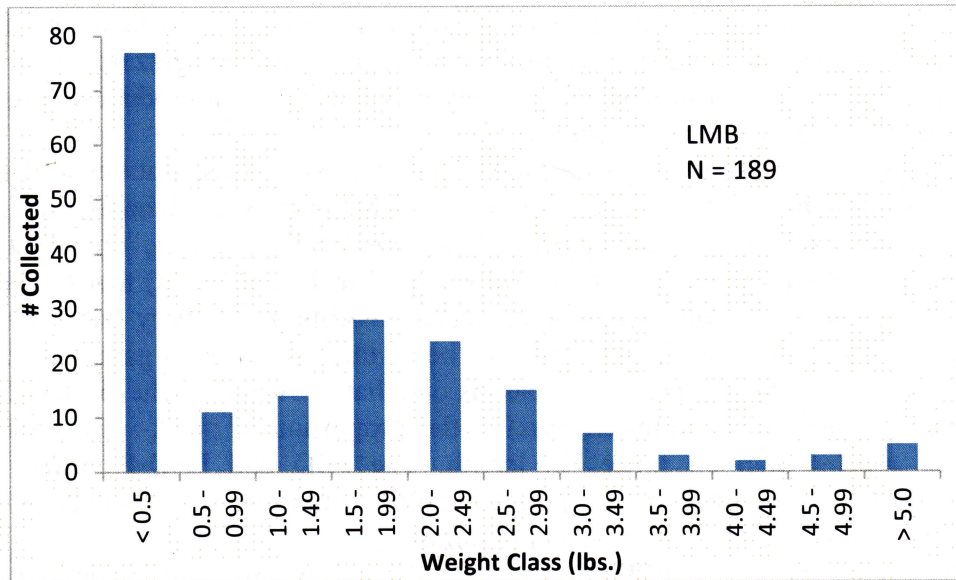
Fisheries biologists of the past established certain size classifications to describe the fish they collected. It is through these size classifications that population dynamics are analyzed. The size designations are stock, quality, preferred, memorable, and trophy. The PSD (Proportional Stock Density) 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 take into account the total number of bass collected along with the total of stock-sized bass in the sample.

The survey showed a PSD value of 89. This value is a direct reflection of the 120 stocked-sized bass ( $\geq 20$  cm) in which 107 of them were of quality-size ( $\geq 30$  cm). The PSD value falls well above the desired range of 40 – 60 that represents a balanced bass/bluegill fishery. The RSD-P value of 62 represents the collection of 75 preferred-size bass ( $\geq 38$  cm). The catch rate of 112 preferred bass/hr ranks higher than every public impoundment sampled in Region 1, District 1 during 2016. For the sake of comparison, the #1 public impoundment within Region 1, District 1 was Lake Chesdin in 2016. The CPUE of preferred-sized bass from Lake Chesdin was 47 preferred bass/hr. The catch rate of 112 preferred bass/hr sets the bar pretty high for Queens Lake. Due to time constraints, a third survey run was not conducted. It would have been ideal to have a third run completed to give a full hour of effort. There is no telling whether or not a third run would have increased the CPUE-Preferred or brought the catch rate down. The bass population within Queens Lake was very impressive based on what was observed. Rick Toth did a great job of assisting with the survey and I believe he was even surprised by the number of large bass that were collected. The survey provided a total of 7 memorable-sized bass ( $\geq 50$  cm).

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, preferred and memorable bass ( $\geq 8''$ ,  $\geq 12''$ ,  $\geq 15''$ ,  $\geq 20''$ ) were 97, 97, 97 and 105 respectfully. The relative weight value for stock, quality and preferred-sized bass were within the desired range. The relative weight value for the 7 memorable-sized bass was above the desired range and reflects their ability to forage on larger prey items primarily the gizzard shad. The relative weight

value for the largest bass (22.87' and 8.08 lbs) was a high value of 114. This female bass has used the gizzard shad forage base to her advantage over the years.

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 eating the trophy bass you have been produced. The 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 show some of the potential that the fishery can produce.



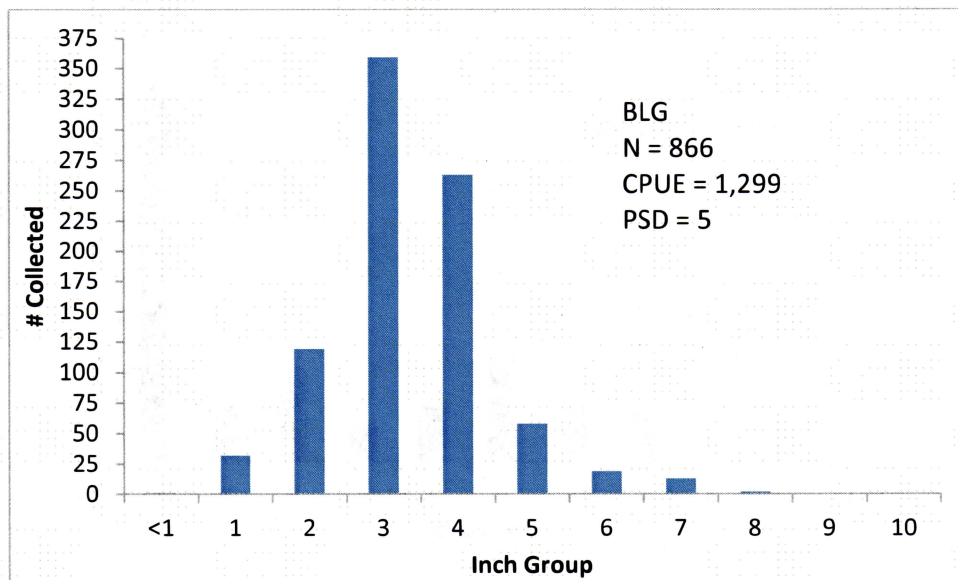
**Figure 2.** Weight distribution of largemouth bass collected from Queens Lake on October 26<sup>th</sup>, 2016

### Bluegill

Based upon what was observed during the survey, the fishery appears to have an abundance of bluegill. A total of 866 bluegill were collected, which yielded a CPUE of 1,299 fish/hr. The size distribution showed a large proportion of bluegill within the 3 to 4 inch range. The survey encountered the majority of the bluegill holding tight to a few beaver huts and several downed trees. Bluegill in the 1 to 3 inch range are the main source of prey for smaller bass and adult black crappie. The abundant largemouth bass population appears to have shifted the bulk of their attention to the gizzard shad population. The survey did not reveal many larger bluegill with only 34 fish in the 6 to 8 inch range. This low abundance comprised only 3.93% of the bluegill collected. 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.

Bluegill ranged in size from a minimum length of 0.83 inch to a very respectable 8.46 inches. The abundance of juvenile bluegill yielded a mean total length of 3.81 inches. A sub-sample of the collected bluegill were weighed to determine relative weight values. The relative weight values for stock, quality and preferred-sized bluegill were 104, 92 and 87 respectfully. The stock-sized bluegill had the highest relative weight indicating success in finding enough zooplankton and macroinvertebrates. The larger-sized bluegill, with their lower relative weight

value, represent a segment of the population that has to compete with other species for a limited amount of prey items. The adult bluegill are most likely having to compete with the black crappie population.



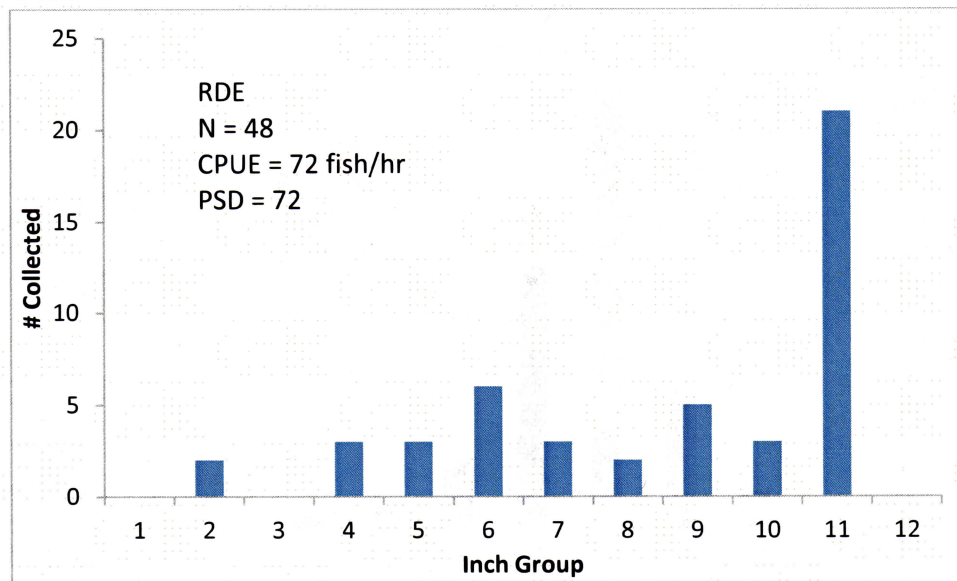
**Figure 3.** Length frequency distribution of bluegill collected from Queens Lake on October 26<sup>th</sup>, 2016

### Redear Sunfish

**Queens Lake has one of the best redear sunfish populations within Region 1, District 1.** The survey revealed a total of 48 redear sunfish (CPUE = 72 fish/hr). This catch rate is 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-summer time period. Collected redear sunfish ranged in size from 2 to 11 inches. The distribution revealed limited recruitment of juvenile redear sunfish with 8 fish less than 6 inches in length. The larger specimens were in great physical condition and appear to be finding plenty of forage. The largest redear sunfish by length measured 11.61 inches (1.09 lb.) and the largest redear by weight was an 11.49 inch fish that weighed 1.16 lbs. A Virginia trophy fish citation for sunfish has to measure 11 inches or weigh 1 pound. The survey collected an amazing number of 21 length citations. Of these 21 fish, 19 specimens also qualified as weight citations. **The trophy stock of redear sunfish is the most impressive part of the Queens Lake fishery.** Anglers should practice catch and release on these 10 to 11 inch fish to ensure that high quality genetics stays a part of the population.

The average size redear sunfish measured an impressive 8.99 inches. Weights were taken on all collected redear sunfish. The relative weight values for stock, quality, preferred and memorable-sized fish were 95, 98, 98 and 97. 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. A combination of limited recruitment success and the predation of bass on young redear sunfish may be the cause to the limited presence of juvenile

redeer sunfish. Protection of the redear sunfish population will hopefully allow many anglers to experience the thrill of catching these citation-sized fish.

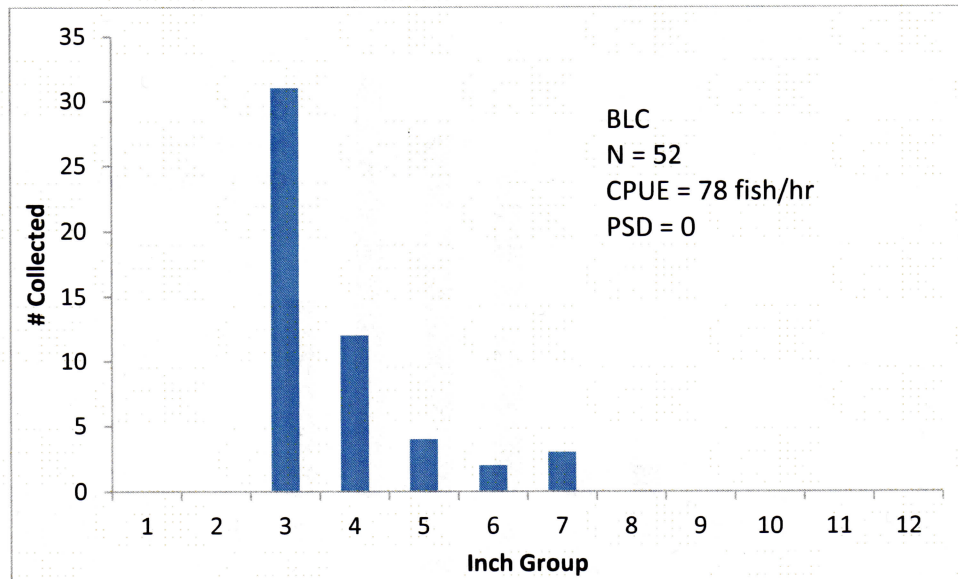


**Figure 4.** Length frequency distribution of redear sunfish collected from Queens Lake on October 26<sup>th</sup>, 2016

### **Black Crappie**

The survey encountered a fair abundance of black crappie with 52 collected (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 collection of crappie during fall surveys will depend on finding schools of fish within proximity to flooded timber. The size distribution consisted of small fish from 3.19 to 7.13 inches with the average length at only 4.22 inches. Anglers report larger crappie being caught in the 12 to 15 inch range. It is quite possible that the fishery has a limited stock of adult fish that represents the surviving members of an older year class.

Based upon the crappie that were collected, it appears that a large proportion of the population is based on one strong year class. The accumulation of 3 to 4 inch crappie are most likely fish from the 2016 spawn or slow growing fish from the 2015 year class. 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 along with the abundance of bass has most likely prevented the crappie population from being stock-piled with fish in the typical 7 to 9 inch range. The relative weight for the 7 stock-sized fish was a favorable value of 105. This small sample set showed these fish to be having success finding a sufficient amount of forage. The stock of juvenile fish will eventually support the bulk of the production for the next several years. Anglers interested in the overall health of the crappie population should not harvest brood stock (10 – 15 inch fish) during the heart of the spring spawn.



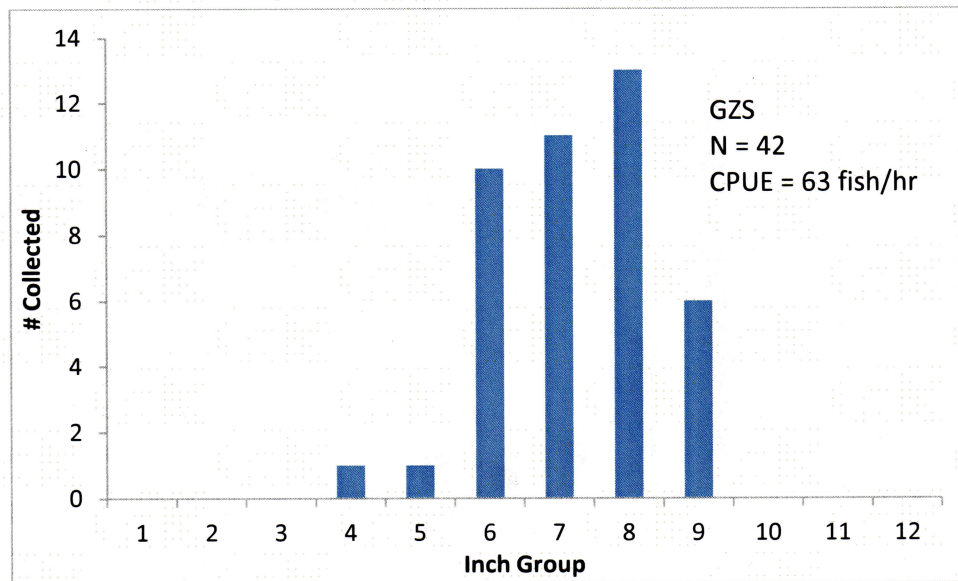
**Figure 5.** Length frequency distribution of black crappie collected from Queens Lake on October 26<sup>th</sup>, 2016

### Gizzard Shad

The survey collected a total of 42 gizzard shad over the course of 2 survey runs (CPUE = 63 fish/hr). Determining the strength of the gizzard shad population all depends on where the electrofishing surveys are conducted along with other variables such as what direction the wind is blowing. Gizzard shad are filter feeders that can consume free-floating zooplankton from the water column or they can sift through the substrate's organic matter for various aquatic insects. From initial indications from the survey, it appears that the population is abundant when it comes to larger-sized shad.

Gizzard shad can provide a high protein food source for largemouth bass and bass can attain large sizes when able to consume the correct size forage. The problem with gizzard shad is the fact that they can grow to large sizes in a rather quick time frame. The collected shad ranged in size from 4.13 to 9.84 inches with the mean total length of 7.77 inches. The majority of the collection consisted of shad in the 6 to 8 inch range. These shad are the ideal size that bass in the 3 to 6 pound range will forage upon. An overabundance of gizzard shad can complicate food web interactions with bluegill, juvenile bass and crappie. If anglers start to see large shad in the 12 to 15 inch range, special effort should be taken to remove these fish from fishery. The presence of the shad population can be a driving force behind the trophy aspect of the largemouth bass population as long as the shad are less than 11 inches in total length.





**Figure 6.** Length frequency distribution of gizzard shad collected from Queens Lake on October 26<sup>th</sup>, 2016

### **Additional Species**

The electrofishing survey revealed limited species diversity with the collection of only 7 fish species. Additional species not covered already in this report are golden shiner and American eels. A total of 9 golden shiners were collected. These fish ranged in size from 3.86 to 7.01 inches. The average length of 6.05 represents a solid prey item for the bass population to target. A total of 6 American eels were collected. These eels ranged in size from 11.22 to 25 inches with an average length of 14.17 inches. These eels, when in their juvenile elver stage, managed to swim from the York River up into Queens Creek before slithering their way over the dam or up through the spillway outfall. The population of eels appears to be limited, but it is a good practice to remove any eels from the lake. Eels are opportunistic feeders that will forage upon various fish eggs and juvenile fish if given the chance. All eels were removed from the lake.

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

The bass population within Queens Lake is abundant and represented by a high density of fish in the 14 to 18 inch range. The catch rate of 283 bass/hr is greater than the CPUE found at most public waters. The fall survey accounts for the large accumulation of YOY (Young of Year) bass. A spring survey would lose a fair number of these fish to natural mortality over the winter months. The catch rate of 112 preferred-sized bass ( $\geq 15$  inches) is an amazing rate that well surpasses the best public waters in all of Virginia. A third survey run of 20 minutes would have given a full hour of effort. This extra 20 minutes would have given the data some additional street credit to back up the high catch rate of preferred bass. Fall feeding patterns have bass schooling up tightly to put on energy reserves for the approaching winter. The two survey runs might have encountered the majority of the bass in the lake, thereby elevating the overall CPUE. DGIF staff would be interested in conducting additional surveys of Queens Lake in the future to track the status of this great bass population. The rate of harvest of bass from the fishery is not known at this time. Anglers, if interested in harvesting a few bass for dinner, would be advised to

remove fish in the 13 to 15 inch range. Based on the abundance of bass, the favorable relative weight values, and the presence of a strong forage base; it does not look like the bass population is suffering from a complete stock-pile of bass. The heavy accumulation of bass in the 14 to 18 inch range reflects the high productivity of the fishery along with some great recruitment of a couple year classes. Selective harvest of some 13 to 15 inch bass could improve the growth rate of the surviving fish to eventually slide these fish into the 16 to 18 inch range. The present stock of 16 to 18 inch bass will hopefully reach the desired 19 to 21 inch range. You can never have enough bass in the 19 to 21 inch range.

The catch rate of 1,299 bluegill/hr is extremely high and represents an abundant population. The survey did not reveal a high abundance of larger-sized bluegill. The stock-pile of 3 to 4 inch bluegill is typical of any impoundment that has a strong gizzard shad population. The survey revealed an incredible population of redear sunfish. Although not as popular to anglers as the largemouth bass and the black crappie, the presence of 21 length citation redear sunfish was the highlight of the survey. These trophy redear sunfish accounted for 19 weight citations. It is recommended that anglers practice catch and release on these trophy redear sunfish to keep them around as long as possible. Harvest of all redear sunfish should be put on hold during the spawning season which typically happens during early May. It takes many years for a redear sunfish to grow to 11+ inches and only a minute to get removed by an angler. Protecting the redear sunfish will hopefully allow the brood stock to have a successful spawn. The survey revealed a limited abundance of juvenile redear sunfish.

The survey indicated a fair abundance of small black crappie present. The majority of these crappie were from one year class. Black crappie can be difficult to find during an electrofishing survey if the schools of larger fish are holding in deeper water. The survey most likely underestimated the overall strength of the black crappie population. Most small impoundments will either have a strong bass population or a strong black crappie population. A strong population of both bass and crappie occurs every once in a while in a highly productive system that has enough forage available to support a high concentration of predators. At this time, it appears that the bass population has the upper hand on the black crappie population. Selective harvest of crappie during the spring or catch and release during the spawn will assist the crappie population in possibly producing additional recruitment. Crappie populations will typically have variable recruitment as a population can sometimes go several years without having a productive and successful spawn. The survey would have been great to reveal a few crappie in the 8 to 11 inch range, but unfortunately none were collected.

Property owners and fishermen that are able to visit Queens Lake should enjoy the fishing opportunities that are present. The bass population will account for the majority of the attraction and effort. Anglers should shift some of their attention to the trophy redear sunfish that are present.

**Report written by Scott Herrmann, DGIF Aquatics Biologist, Region 1, District 1**