

Spring 2019

### **Introduction:**

Fisheries management is a dynamic process and continued monitoring and analysis is needed to maintain a level of fishing that is desired by the community. Ongoing data collection assists biologists with evaluating trends in the fishery. This monitoring allows biologists to make changes, if needed, to the fishery to maintain the quality of fishing the membership has come to expect. JadEco, LLC was contacted to begin collecting data on the fishery for Goose Lake and Beaver Lake at the Goose Lake Association property.

To assess the fishery, we utilize several indices in fisheries management as tools to interpret the population structure and condition of the fishery. Data analysis tools such as Catch Per Unit Effort (CPUE) provide information on the abundance of species. The quantity of fish collected within a certain amount of time determines the CPUE. This is used for the collection as a whole, or per species comparisons. Proportional stock density (PSD) is also analyzed on important game species. This is a fisheries assessment tool used to determine the size distribution of the fish within a population. Relative weights ( $W_r$ ) are calculated to provide insight into the condition of the fish in a population or fish community. They also provide an understanding of the size structure of game species within the lake and provide information on length to weight relationships to better understand if your game fish are relatively fat, or relatively thin. Potential changes in the predator / prey relationships and available forage can be interpreted through these metrics. Combined, these metrics provide information on the game fish community, species density and potential trends in the fishery.

### **Habitat Enhancement:**

One of the most important things that can improve the bass fishery is improving habitat for young of the year survival and ambush for larger bass hunting grounds. The less energy a largemouth bass has to use to catch forage, and the bigger the forage base (or 'food packet') the more the bass can put into growth and less energy into hunting. Strategic placement of quality structure throughout the lake will improve the fishery. With this being a multi-use lake for more than fishing (ie swimming, boating, skiing), care should be taken to ensure any structures placed are placed safely for these multi uses. I cannot stress enough the importance of fish structure and habitat within your lake.

To my knowledge, the Association currently maintains an aggressive aquatic plant and algae management program. This program is likely needed due to non-native

invasive species control as well as algae control. However, there is a need native aquatic plants in the lake.

The management of a quality native plant community would provide food and cover as well as water quality benefits to the lake and members. Native aquatic plants can help balance the use of nutrients, such as phosphorus and nitrogen, which would otherwise be available only to the planktonic algae.

It is important that Goose Lake Association work to reduce non-native plants while managing natives, not eradicating them, to allow for other recreational opportunities on the lake. These plant communities are nurseries for young of the year bass, bluegill, and crappie.

#### *Goose Lake:*

Daytime DC Electrofishing was conducted for a total of 50 minutes throughout much of the lake on May 18, 2019. A total of 11 species were represented during the survey, all of which were considered important game species except carp and gizzard shad. A total of 333 fish were collected. The collection consisted of largemouth bass, bluegill, black and white crappie, white bass, hybrid sunfish, rock bass, warmouth, walleye, carp and gizzard shad.

Water clarity was approximately 5 feet the day of the survey. Air temperature was at 66°F and water temperature was at 62.8°F and the sampling gear was functioning well.

#### **Summary of Fisheries Data Collected - Spring 2019:**

The following is a summary and interpretation of the data from the Spring 2019 fish survey. Over all, the health and condition of the fish collected during the survey was good. We collected a total of 75 largemouth bass that comprised 22.5% of the overall collection. Bluegill comprised 56.5% of the collection with 188 fish collected. Walleye (9) represented 2.7% of the collection. Black (3) and White (7) Crappie comprised 3% of the collection with 10 fish captured.

The remaining game fish (warmouth, rock bass, hybrid bluegill, and white bass) represented 3.9% of the total fish collected. Game species represented nearly 89% of the sample with gizzard shad representing 9.3% and carp representing 2.1%.

Average relative weight ( $W_r$ ) for the game species of concern were all within objective ranges with the exception of walleye, which were slightly under weight for their length.

#### **Largemouth Bass:**

The collection rate for largemouth bass was within our objective collection rate at 1.5 fish per minute. The average relative weight (Wr) of bass collected was 91, and at the lower end of our objective range of 90-110. Bass Wr ranged from 75 to 104. The average length bass collected was 10" with a range from 3.3" to 20.7". The one bass collected at 20.7" was an outlier with the rest of the bass 16.6" or less. The one bass at 20.7" was under weight for its length with a relative weight at 89. The bass weighed in at 4.65 pounds.

The PSD or 'proportional stock density' metric to analyze the size structure of the bass population was used. This is a comparison of the stock (>8") to quality (>12") size bass in the sample. The objective range for largemouth bass PSD is 40-70. The PSD for Goose Lake was at 36 and was below our objective range. The RSD14 is an evaluator of how many bass are over 14" in proportion to the total number over stock size at 8". Eight (8) largemouth bass were collected over 14" in length. The RSD14 for largemouth bass was at 14 and falls within our objective range (10 to 20). The only bass collected over the 15" range was the 20.7" bass. There was no representation of bass between 15" and 20".

Over all, the bass fishery at Goose Lake appears to be doing well with the exception of the large size classes of bass.

### **Bluegill:**

Bluegill comprised 56.5% of the total fish collected during the survey. The objective range for bluegill CPUE is between 2 and 4.5 fish per minute. We collected 188 bluegills with a CPUE of 3.76 fish per minute. This is within our objective range.

The bluegill PSD was at 76 for this survey and is well above our objective range (20-60). This would indicate that of the fish greater than 3" in length (stock size), 76% were larger than 6" in length (quality size). We collected 62 bluegills over 8" in length which represented nearly 33% of the bluegill collection. This indicates an excellent bluegill fishery for the angler. However, we need the forage base of the smaller year classes for our other predator populations. Bluegill relative weights averaged at 110, which is excellent, with a range from 91 to 137. The average bluegill length was 6.7" with a range from 2.2" to 9.8". Bluegill over 8" had an average weight over ½ pound (.57 pound) and ranged from .45 to .92 pounds.

### **Black and White Crappie:**

Ten (10) crappie were collected with an average length of 9.4" for black crappie and 10.5" for white crappie. Crappie ranged from 7" to 12.4". The CPUE for crappie was at 0.22 fish per minute and was at our objective range. Black crappie CPUE was at 0.06 and white crappie was at 0.14 fish per minute. The average Wr for black crappie was at 93 (range: 88-100) and white crappie was at 99 with a range from 88

to 111. Compared to other lakes in the northern to central Illinois area, these are good relative weights and indicate crappie are doing well at Goose Lake.

**Walleye:**

Walleye comprised 2.7% of the overall collection at Goose Lake. A total of 9 walleye were collected for a CPUE of 0.18 fish per minute. Average relative weight for walleye were below our objective at 89 and were with a range of 80 to 95. Walleye were collected from 13.7" to 17.3" with an average length of 15.2".

**Other desirable species:**

The remaining fish were represented by white bass (2), hybrid sunfish (2), rock bass (1), and warmouth (8). White bass ranged from 9.8" to 17" (average 13.4"). Hybrid sunfish ranged from 5.3" to 8.7" with an average length of 7". The one rock bass collected was 9.2" in length, and the warmouth averaged 5.9" with a range from 2.8" to 8.9".

**Undesirable species:**

Undesirable species, such as gizzard shad and common carp represented over 11% of the collection with gizzard shad representing 9.3% and carp at 2.1%. Gizzard shad averaged a very large 17.2" with a range from 15.9" to 18.5". These sizes are much too large for our average predators to be able to utilize for forage. This biomass of shad needs to be converted into another fish species.

Seven (7) Common carp were collected ranging in size from 12" to 33.5" with an average of 25.1". The CPUE for carp was at 0.14 with is within our management goals of under 0.25 fish per minute. The concern with the carp is the recruitment of young carp. When carp are observed at 12", it indicates spawning and recruitment success. Dense bass fisheries usually control carp recruitment.

**Recommendations:**

**Size and creel limits:**

Currently, Goose Lake Association is managing their lakes with individual limits for each lake, according to the Goose Lake Association website. It is important to manage each lake on its own because each body of water is unique.

Currently, largemouth bass are listed as a slot limit with 2 under 12" and 1 over 18" allowed. At this time, we should remove the under 12" limit and allow one bass over 18" as a trophy. This regulation change should be monitored closely using electrofishing surveys to determine if any other changes are necessary.

- 1) At this time, I suggest you remove the slot limit temporarily to allow a larger age structure of bass. I don't believe your bass are stunting in size due to

high numbers of bass, but rather forage availability. This should only be reinstated after further electrofishing surveys.

- 2) Due to the numbers and sizes of gizzard shad, this biomass needs to be converted into a desirable sport species, such as muskie. Muskie are in the lake as a tool to control and convert shad biomass and should be catch and release. The 40" size limit allows muskie to be harvested when they are getting to the size range needed to control the big gizzard shad biomass.
- 3) The bag limit for panfish (crappie and bluegill combined) appears to be working. However, placing a size limit on bluegill allowing the harvest of only 5 over 8" of the 25 allowed would help to maintain the excellent bluegill size structure currently in place. There is currently no size limits on crappie, and placing a size limit of 9" would allow for better angling as the size structure improves. This needs to be monitored in the event large numbers of crappie are stunting at the 7" size class. At this time, this does not appear to be an issue. If this is an issue later, the length and creel limit will need to be adjusted.

Enforcement of creel limits can be a difficult task for Lake Associations. It is important to provide educational material to your membership to educate them on the need for limits to manage a fishery. I can provide you with an article for your paper to educate on why you should reduce the harvest on bluegill over 8".

Continue to monitor the fish community and population structure through electrofishing data collection to make changes to the creel and size limits as needed. It is critical to monitor the bass numbers and community changes with these harvest regulations.

### **Stocking:**

Stocking is always subjective to budgetary constraints, and all recommendations may not be able to be met. Stocking recommendations should always be re-evaluated based on subsequent fish population sampling. Stocking should be done based on individual lake size. It is my understanding that the total fish are separated into each stocking based on numbers purchased instead of the size of the water body. Each water body needs to be managed separately, by lake size.

- 1) Walleye stocking can still be done yearly to ensure no large gaps in size structure for the anglers that desire walleye. Stock no more than 10 walleye (6"-8") per lake surface acre. If budgets are an issue, walleye could be stocked every other year. Keeping in mind that large gaps (more than two years) in stocking could show later in the angler creel survey as these size gaps begin to show.

- 2) If smallmouth bass are desired by your anglers, periodic smallmouth bass stockings can be done in an attempt to create a self-sustaining, spawning smallmouth bass fishery. No smallmouth bass were observed during this survey. Stocking up to 5 per acre (5"-8") for a few years might be enough to get the fishery started. However, it is difficult to get smallmouth to thrive in an environment with largemouth bass. Largemouth bass have a tendency to out compete the smallmouth.
  
- 3) With the presence of large gizzard shad, stocking of keystone predators that can convert the biomass of shad into a desired sport species is important. According to your stocking records, muskie have not been stocked at Goose Lake Association since 2004. Stocking of .25 to .3 fish per surface acre annually would begin to establish this fishery. \*\*\*NOTE: Muskie stocking can be controversial to anglers (especially pan fishermen and bass anglers) because they believe the muskie will eat all of their gamefish. However, the scientific studies done in Illinois provide insight into the benefits of stocking muskie and their dietary habits. This stocking rate is a low rate and stocking numbers should not exceed 1 fish per surface acre.

Table 1: Catch Per Unit Effort (CPUE) by species on Goose Lake, Spring 2019

<b><u>Species:</u></b>	<b><u>Number</u></b>	<b><u>Fish/Minute</u></b>	<b><u>Objective</u></b>
	<u>2019 Spring</u>	<u>2019 Spring</u>	
Largemouth Bass:	75	1.5	1.0 – 2.5
Bluegill:	188	3.76	2.0 – 4.5
Black Crappie:	3	0.06	0.2 -0.8
White Crappie:	7	0.14	0.2 -0.8
Walleye:	9	0.18	-----
White Bass:	1	0.02	-----
Hyb BLGX RES:	2	0.04	-----
Rock Bass:	1	0.02	-----
Warmouth:	8	0.16	-----
Gizzard Shad:	31	0.62	-----
<b>Carp:</b>	<b>7</b>	<b>0.14</b>	<b>&gt; 0.25</b>
<b>Total</b>	<b>332</b>	<b>6.68</b>	<b>6.00 +</b>

Table 2: Proportional Stock Density (PSD) – Goose Lake, Spring 2019

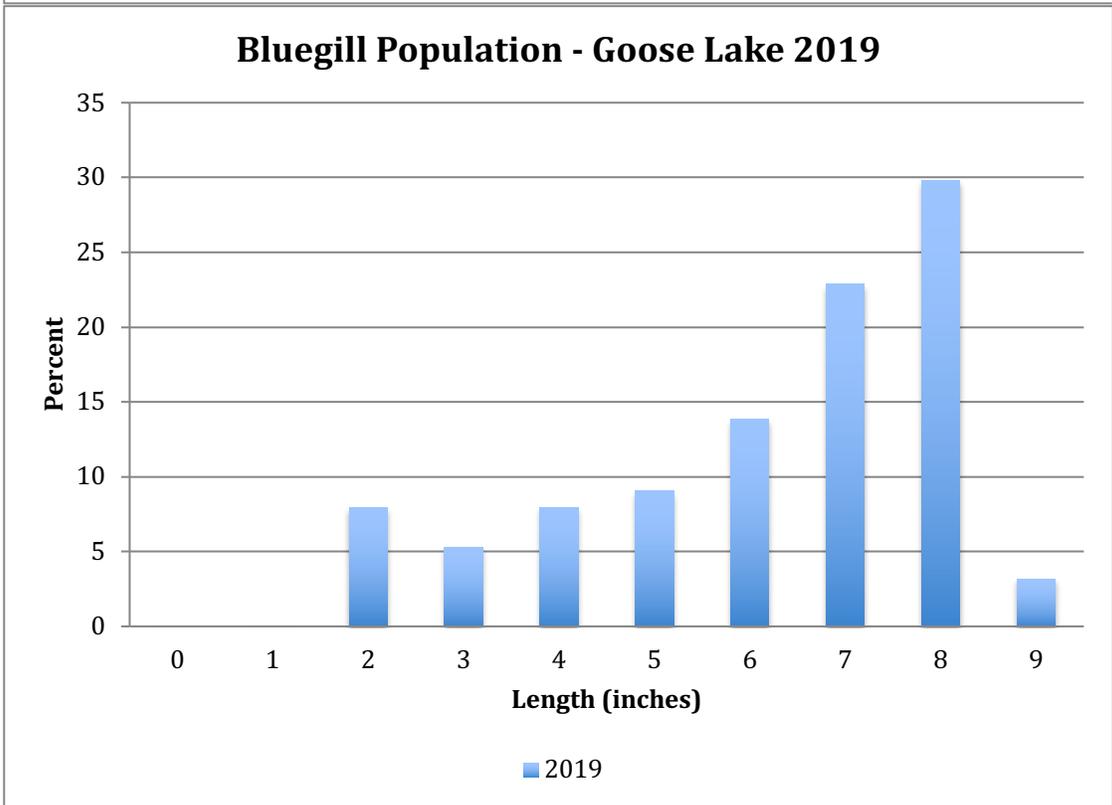
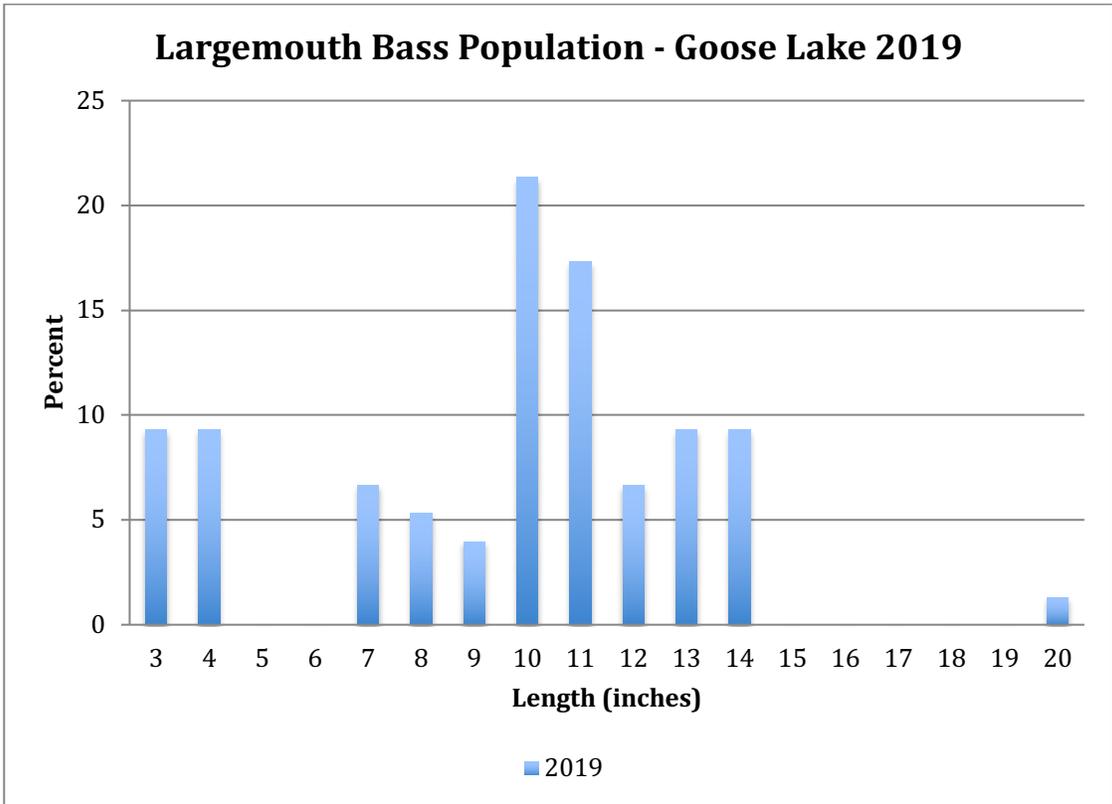
<b><u>Species:</u></b>	<b><u>2019 Spring</u></b>	<b><u>Objective</u></b>
Largemouth Bass:	36	40-70
Bluegill:	76	20-60

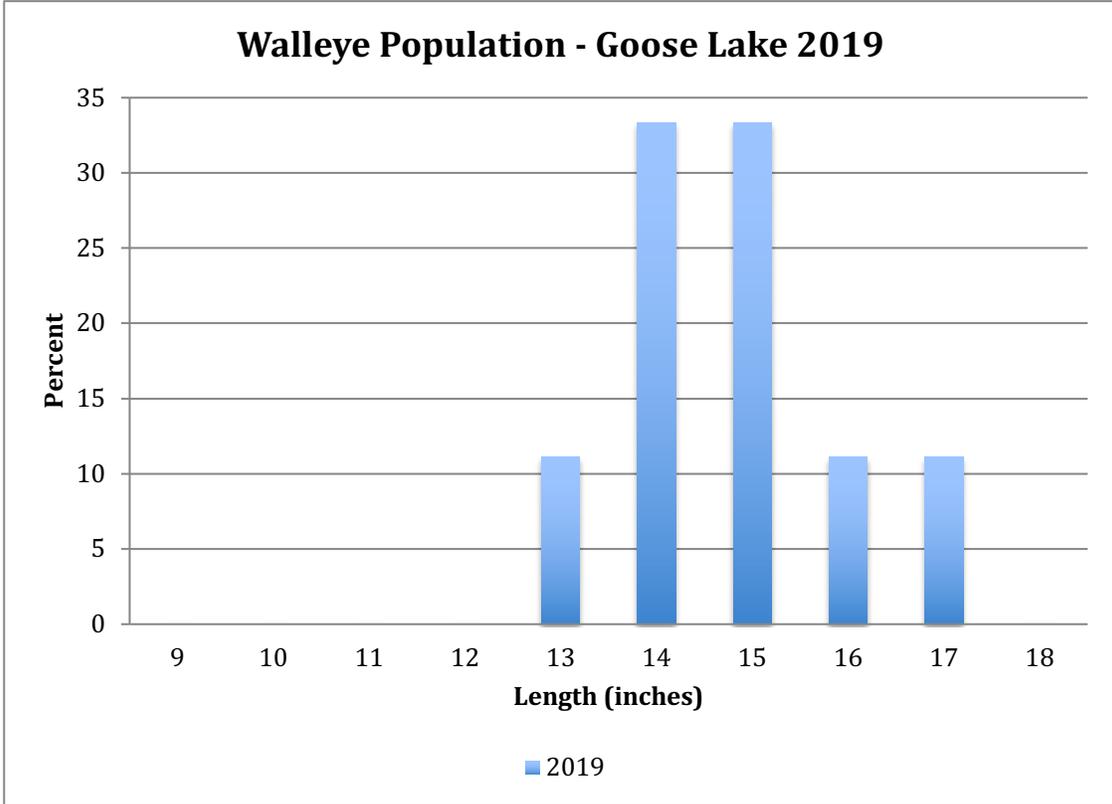
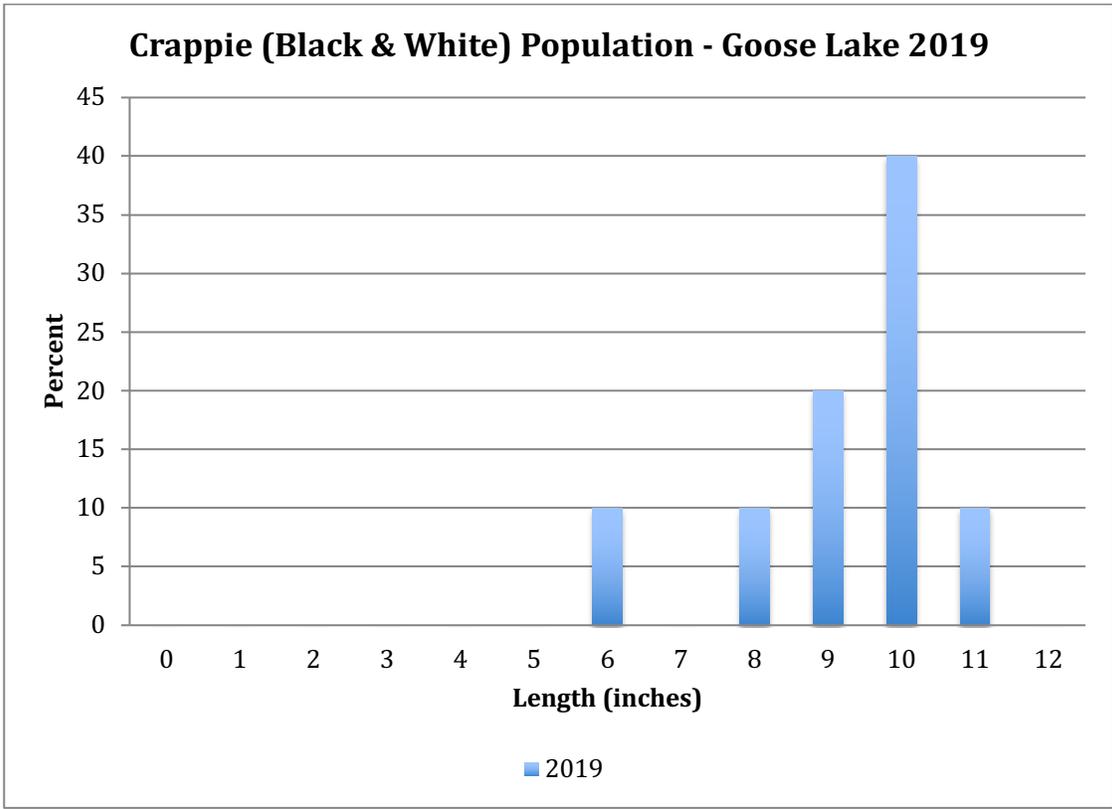
Table 3: Relative Weight (Wr) – Goose Lake, Spring 2019

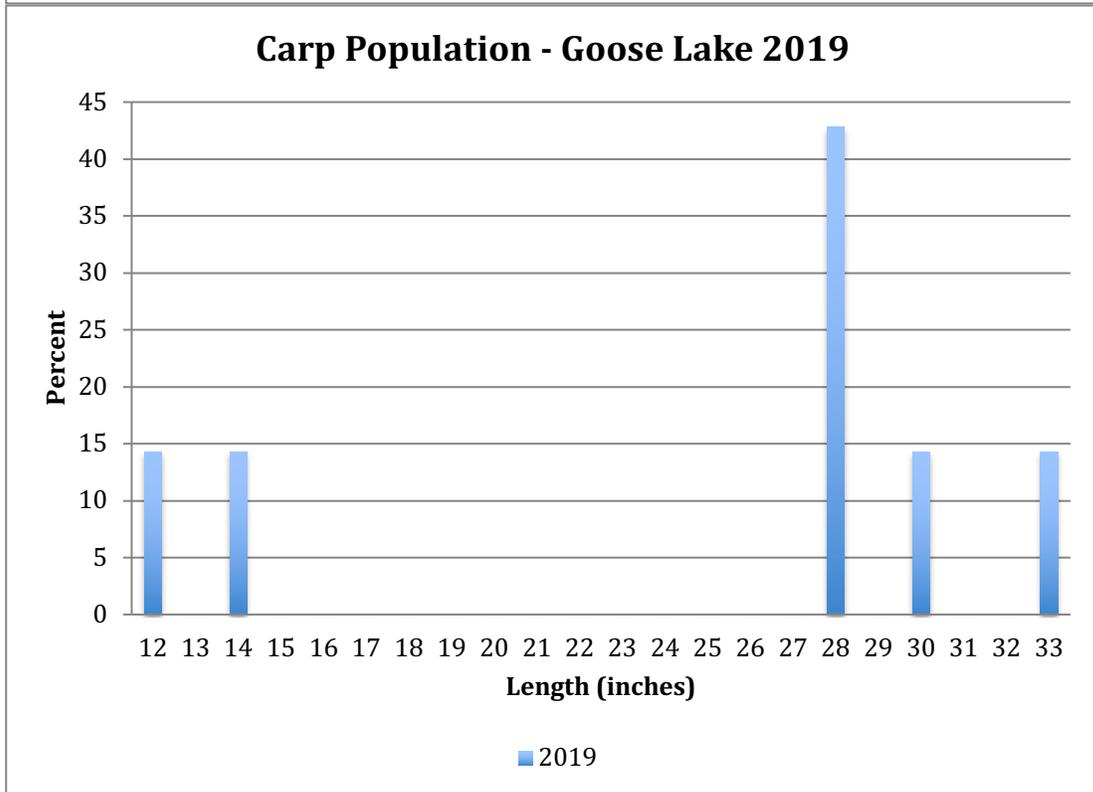
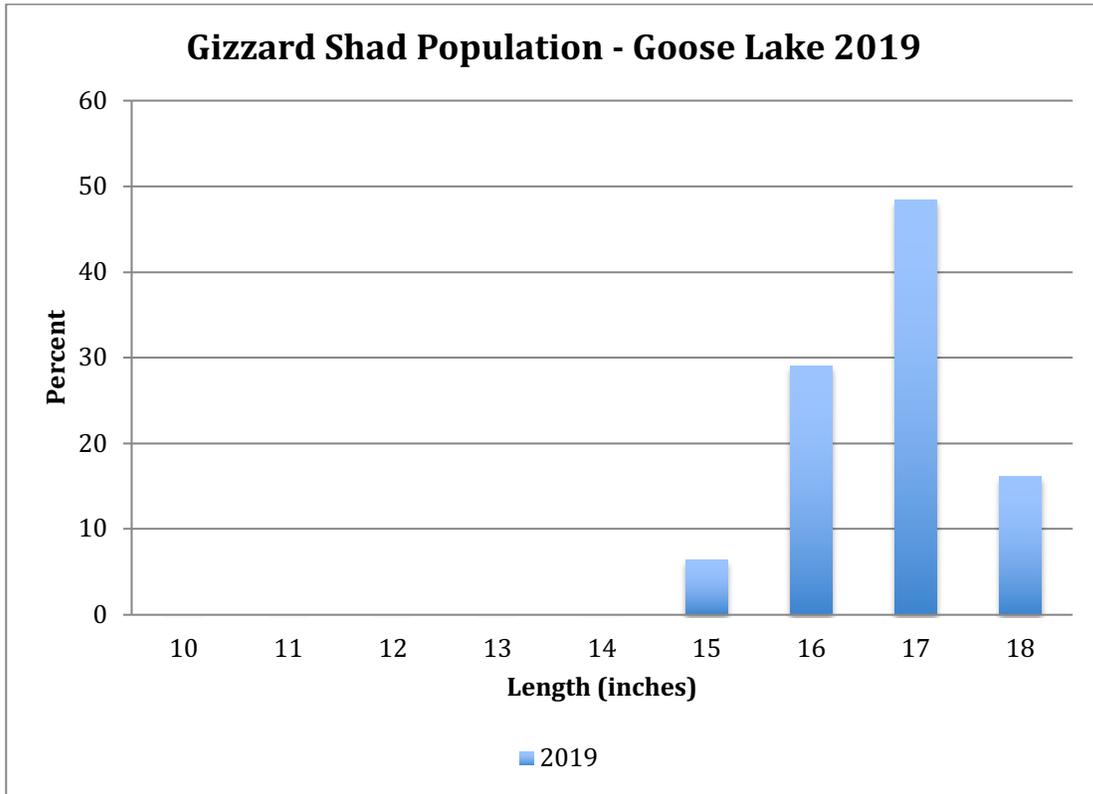
<b><u>Species:</u></b>	<b><u>Wr (Ave)</u></b>	<b><u>Range</u></b>	<b><u>Objective</u></b>
	<u>2019 Spring</u>	<u>Spring 2019</u>	
Largemouth Bass:	91	75-104	90-110
Bluegill:	110	91-137	90-110
Black Crappie:	93	88-100	90-110
White Crappie:	99	88-111	90-110
Walleye:	89	80-95	90-110

Table 4: Length Ranges by Species – Goose Lake, Spring 2019

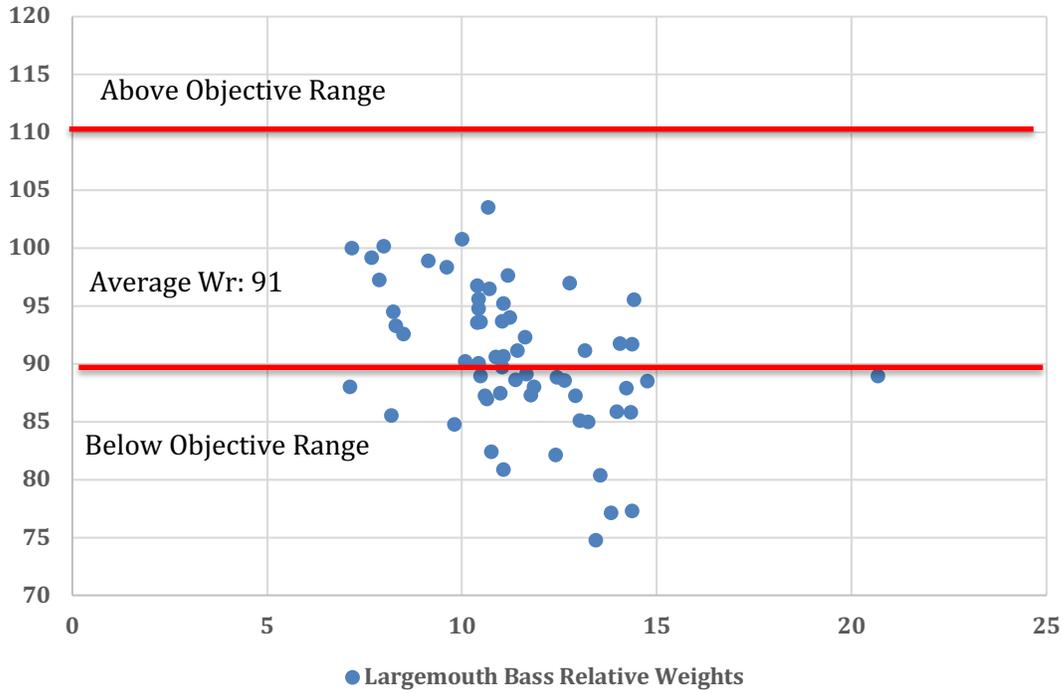
<b><u>Species:</u></b>	<b><u>Length:</u></b>	<b><u>Average</u></b>
	<u>2019 Spring</u>	<u>2019 Spring</u>
Largemouth Bass:	3.3-20.7"	10"
Bluegill:	2.2-9.8"	6.7"
Black Crappie:	7-10.7"	9.4"
White Crappie:	8.9-12.4"	10.5"
Walleye:	13.7-17.3"	15.2"
White Bass:	9.8-17.0"	13.4"
Hyb BLG X RES:	5.3-8.7"	7.0"
Rock Bass:	9.2"	9.2"
Warmouth:	2.8-8.9"	5.9"
Gizzard Shad:	15.9-18.5"	17.2"
Carp:	12-33.5"	25.1"



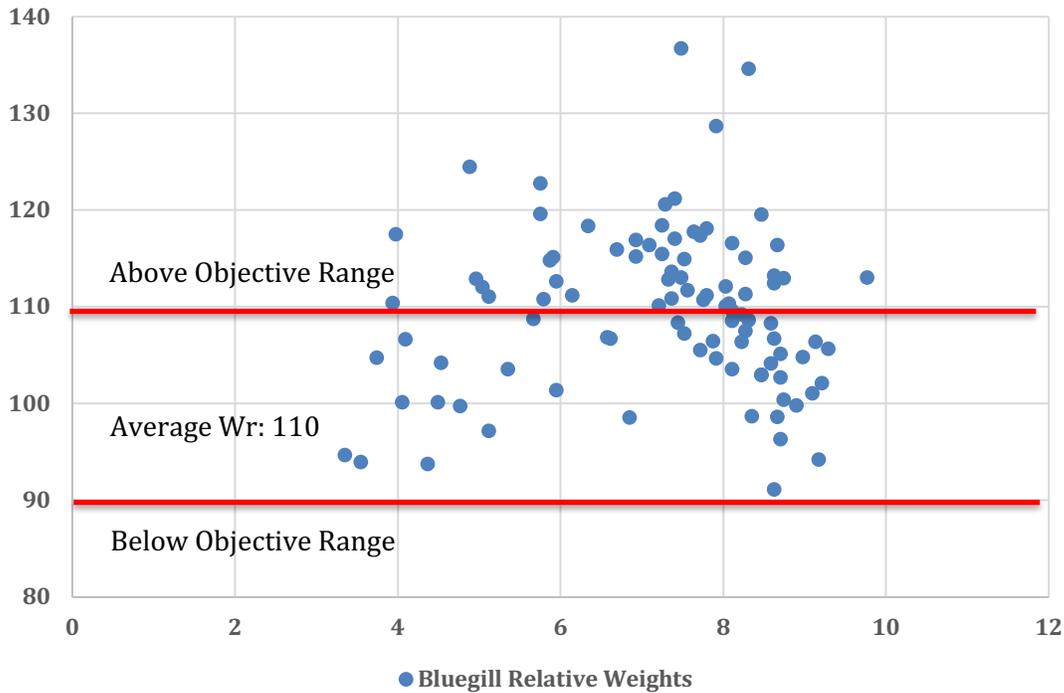


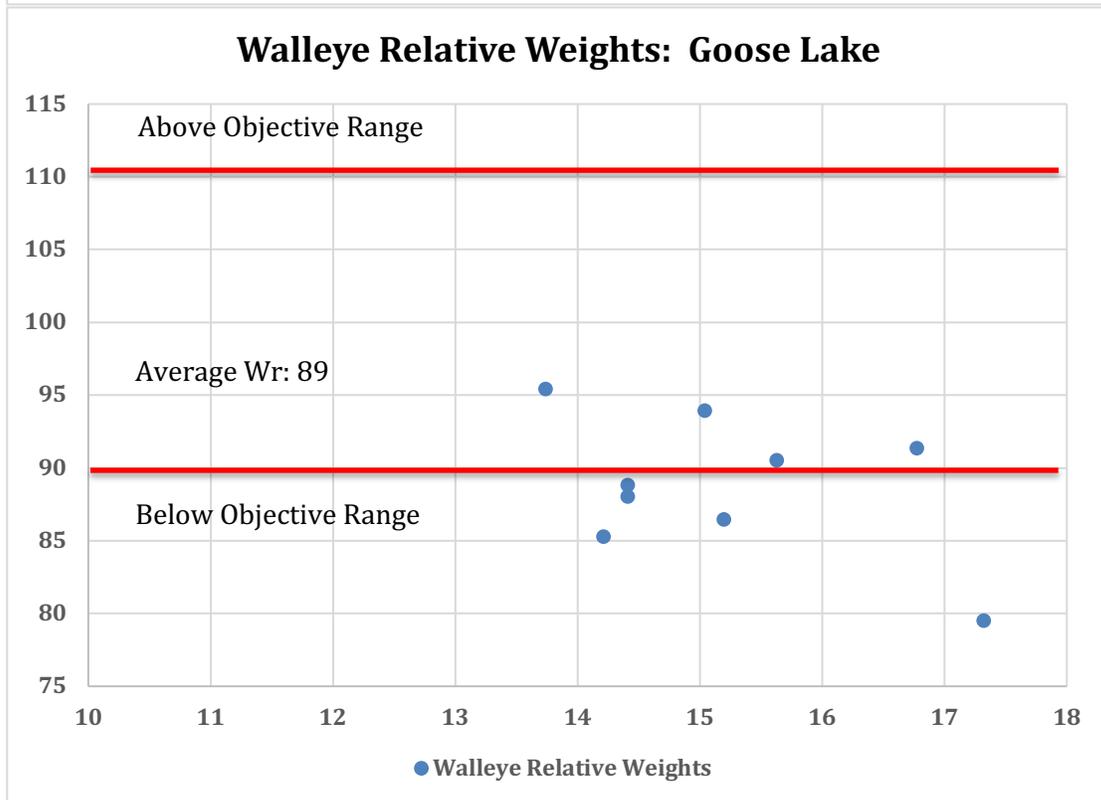
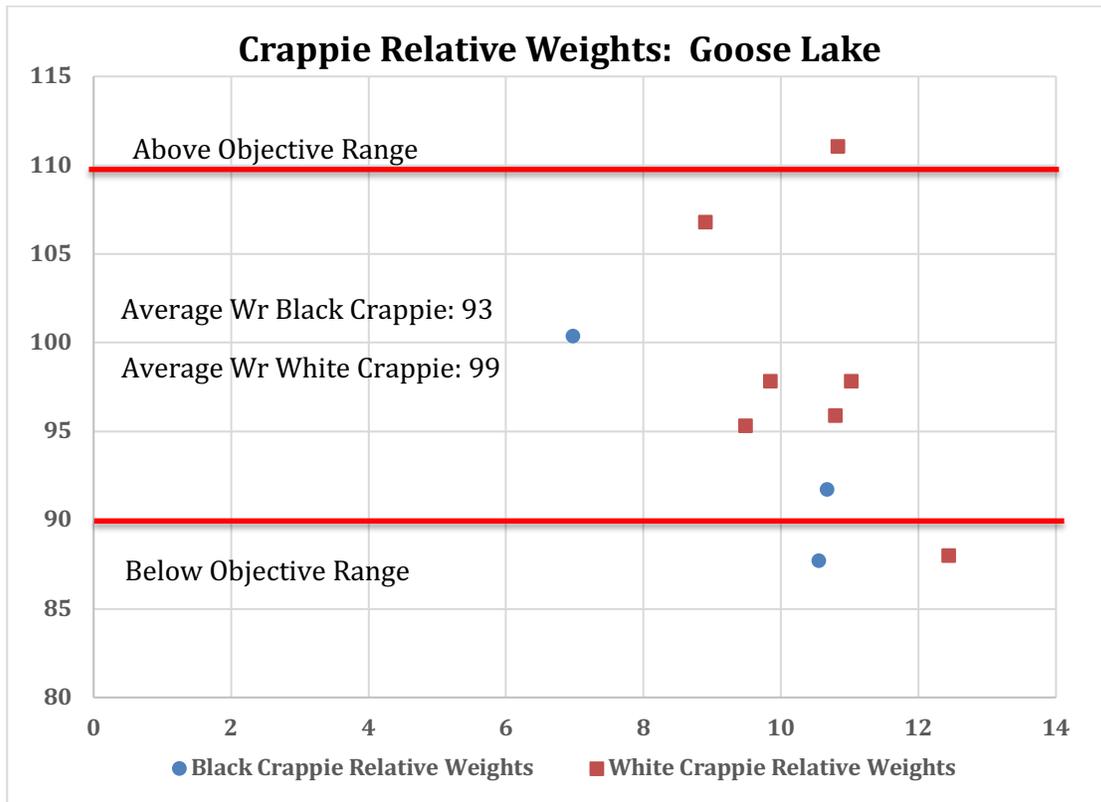


### Largemouth Relative Weights: Goose Lake



### Bluegill Relative Weights: Goose Lake







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*Beaver Lake:*

Daytime DC Electrofishing was conducted for a total of 45 minutes throughout much of the lake on May 18, 2019. A total of 10 species were represented during the survey of which 7 were considered important game species, and three of the other species were considered non-desirable (bullhead, gizzard shad, and carp). A total of 193 fish were collected with over 95% of the collection comprised of desirable sport species.

Water clarity readings were high during the survey, with visibility over 6 feet deep. Water temperature was at 72°F and this survey was conducted in the afternoon after Goose Lake. Some locations sampled were close to deeper water drop offs and may have negatively impacted the fish collection.

**Summary of Fisheries Data Collected – Spring 2019:**

The following is a summary and interpretation of the data from the spring 2019 fish survey on Beaver Lake.

The overall collection was low with a total CPUE of 4.29 fish per minute (objective is 6 fish per minute or more). The low collection rate over all can be attributed to the collection rate of bluegill (1.8 fish per minute and below the objective of 2 to 4.5 fish per minute). We collected largemouth bass (70), bluegill (83), black crappie (1), red ear sunfish (13), walleye (11), channel catfish (1), and warmouth (5). Non-desirables collected were gizzard shad (2), carp (6), and bullhead (1). As a side note, the low collection rate for bluegills may be attributed to the locations of some of the sample sites at deep drop-offs on the shoreline.

Based on actual collection numbers, bluegill represented 43% of the collection. Largemouth bass comprised over 36% of the overall collection. Red ear sunfish represented 6.7% of the collection, walleye represented 5.7%, and carp represented 3.1% of the total fish collected. Black crappie, bullhead, warmouth, channel catfish, and gizzard shad represent the remaining percentage.

Average relative weight ( $W_r$ ) for the game species of concern were variable but the main concern was the low average relative weights of the largemouth bass. Objective ranges are 90-110 and the average for largemouth during this survey was at 88 (range 72-107 with a 16" bass outlier at 142). With the exception of largemouth bass and channel catfish, all other sport species were within our objective range, but at the lower spectrum.

### **Largemouth Bass:**

The collection rate for largemouth bass was within our objective collection rate at 1.6 fish per minute. The average relative weight of bass collected was below our objective range at 88 and ranged from 70 to 107 with a 16" bass outlier at 142. This would indicate relatively thin bass collected during this survey. In an attempt to better understand this, we separated the bass into size ranges from 6"-10.9", 11"-13.9", 14"-14.9", and 15"+. I omitted the outlier on this calculation for the 15"+ category. The average relative weights dropped as the size range increased. Relative weights for the lowest range was at 90 and dropped to 86, 82, and 82 up to the 15"+ range.

The PSD or 'proportional stock density' metric to analyze the size structure of the bass population was used. This is a comparison of the stock (>8") to quality (>12") size bass in the sample. The objective range for largemouth bass PSD is 40-70. The PSD for Beaver Lake was at 38, slightly under our objective. This means that of bass collected over 8" in length, only 38% of them were larger than 12". Relative weights of bass of all size classes were low.

The RSD14 is an evaluator of how many bass are over 14" in proportion to the total number over stock size at 8". Twelve (12) largemouth bass were collected over 14" in length. The RSD14 for largemouth bass was at 22 and falls above our objective range (10 to 20). This would indicate a decent number of bass greater than 14" in the fishery. Average largemouth length in the survey was 10.6" with a range of 3.9" to 16.6".

### **Bluegill:**

Bluegill comprised 43% of the total fish collected during the survey. We collected only 83 bluegills with a CPUE of 1.8 fish per minute, which is below our objective range for bluegill (2 to 4.5 fish per minute). As a side note, some areas we spent electrofishing were in areas that may have been too deep to collect a good representative sample. The three separate sampling runs performed had CPUEs at 1.6, 1.3, and 2.8. The last site was the better habitat for bluegill sampling. This trend will need to be further investigated during the next scheduled survey.

The bluegill PSD was at 76 for this survey and is above our objective range (20-60). This would indicate that of the fish greater than 3" in length (stock size), 76% were larger than 6" in length (quality size). We collected 52 bluegill over 6" in length. The Wr for bluegill averaged 102 with a range from 78 to 133. This is within our objective range (90 -110), and it is at the upper end of the range. Bluegill collected ranged from 1.8" to 9.1" with an average size at 6.3". This indicates a good bluegill fishery representing a desirable size structure for the anglers at Beaver Lake.

**Redear Sunfish:**

The redear sunfish comprised only 6.7% of the overall collection at Beaver Lake. A total of 13 redear were collected for a CPUE of 0.29 fish per minute. Average relative weight for redear was high at 106 with a range of 100 to 115. Redear were collected from 8.6" to 9.5" with an average length of 9.1". No red ear were collected under 6" in length. While redear can be more difficult to catch, there appears to be a decent redear sunfish population at Beaver lake.

**Black Crappie:**

Only one black crappie was collected with a length of 7.5". The Wr for the crappie collected was 93 and was above our objective range. A low collection of crappie electrofishing is not a direct indicator of a poor crappie fishery.

**Walleye:**

Eleven walleyes were collected with an average length of 12.7" and ranged from 7.5" to 23". The average Wr for the walleye collected was 91 and was within our objective range. Relative weights ranged from 83 to 101. This is a good collection of walleye for daytime electrofishing and may be an indicator that the walleye population is quite large in Beaver Lake.

**Channel Catfish:**

Only one channel catfish was collected with a length of 26.1". Catfish relative weight was low at 87, below our objective range. As with crappie, daytime electrofishing is not the best indicator of a catfish fishery. Looking at previous stocking records, it appears the channel catfish are self-sustaining through natural recruitment, but numbers of catfish are likely low.

**Warmouth:**

We also collected warmouth (5) ranging in size from 4.8" to 8.5" and averaged 6.8".

**Non-desirable species:**

We collected bullhead (1), gizzard shad (2), and common carp (6). The bullhead was 10.2" in length. The gizzard shad collected were very large with an average of 19.1" and ranged from 18.9" to 19.3". No smaller shad that would be acceptable forage for the bass fishery were collected. Carp were collected with an average length of 24.1". However, the range of carp were from 13.8" to 28". The concern is the small carp collected indicate successful spawning and recruitment. The carp CPUE is desired to be less than 0.25 fish per minute and this survey was at 0.13 fish per minute, and within our management objective.

**Recommendations:**

**Size and creel limits:**

Beaver Lake is regulated with its own limits according to the Goose Lake Association website. Current limits allow for selective harvest of bass under 12" and over 18". Two bass may be harvested under 12" and 1 over 18".

- 4) At this time, I suggest you remove the slot limit temporarily to allow a larger age structure of bass. I don't believe your bass are stunting in size due to high numbers of bass, but rather forage availability.
- 5) Muskie should be catch and release. The 40" size limit allows muskie to be harvested when they are getting to the size range needed to control the big gizzard shad biomass.
- 6) The bag limit for panfish (crappie and bluegill combined) appears to be working. However, placing a size limit on bluegill allowing the harvest of only 5 over 8" of the 25 allowed would help to maintain the excellent bluegill size structure currently in place. There is currently no size limits on crappie, and placing a size limit of 9" would allow for better angling as the size structure improves.

Enforcement of creel limits can be a difficult task for Lake Associations. It is important to provide educational material to your membership to educate them on the need for limits to manage a fishery. I can provide you with an article for your paper to educate on why you should reduce the harvest on bluegill over 8".

**Stocking:**

Stocking is always subjective to budgetary constraints, and all recommendations may not be able to be met. Stocking recommendations should always be re-evaluated based on subsequent fish population sampling. Stocking should be done based on individual lake size. It is my understanding that the total fish are separated into each stocking based on numbers purchased instead of the size of the water body. Each water body needs to be managed separately.

- 4) Walleye stockings should be reduced at Beaver Lake until we are able to get the largemouth bass fishery back in balance (higher average relative weights). Walleye stocking can still be done every other year to ensure no large gaps in size structure for the anglers that desire walleye. Stock no more than 10 walleye (6"-8") per surface acre every other year.
- 5) Redear were last stocked in 2010. The size structure of the fish collected indicate that it is possible no recruitment is occurring. Future electrofishing would help to better understand this, but if redear are a desired species by anglers, periodic stocking may be necessary to maintain this fishery.

- 6) If smallmouth bass are desired by your anglers, periodic smallmouth bass stockings can be done in an attempt to create a self-sustaining, spawning smallmouth bass fishery. No smallmouth bass were observed during this survey. Stocking up to 5 per acre (5"-8") for a few years might be enough to get the fishery started. However, it is difficult to get smallmouth to thrive in an environment with largemouth bass. Largemouth bass have a tendency to out compete the smallmouth.
  
- 7) With the presence of large gizzard shad, stocking of keystone predators that can convert the biomass of shad into a desired sport species is important. According to your stocking records, muskie have not been stocked at Goose Lake Association since 2004. Stocking of .25 to .3 fish per surface acre annually would begin to establish this fishery. \*\*\*NOTE: Muskie stocking can be controversial to anglers (especially pan fishermen and bass anglers) because they believe the muskie will eat all of their gamefish. However, the scientific studies done in Illinois provide insight into the benefits of stocking muskie and the dietary habits. This stocking rate is a low rate.

If budgetary constraints are a problem, working on a rotational stocking every other year may be an option, keeping in mind limited year-class strength and size gaps in the fish that may be observed by fisherman and their creel.

Lastly, continue to monitor the bass and bluegill population structure through electrofishing data collection to make changes to the creel and size limits as needed. This fishery is not currently well balanced and collection of more data will provide better insight into changes that need to occur.

Also, conducting age and growth studies on the bass would provide better insight into the population and whether it is stunting or just slow growth. It may be more important to reallocate funds towards more fish sampling to understand the trends and track the changes than to stock. I would recommend annual electrofishing efforts temporarily until this bass fishery improves.

Table 1: Catch Per Unit Effort (CPUE) by species on Beaver Lake, Spring 2019

<b><u>Species:</u></b>	<b><u>Number</u></b>	<b><u>Fish/Minute</u></b>	<b><u>Objective</u></b>
	<u>2019 Spring</u>	<u>2019 Spring</u>	
Largemouth Bass:	70	1.6	1.0 – 2.5
Bluegill:	83	1.8	2.0 – 4.5
Black Crappie:	1	0.07	0.2 -0.8
Red Ear Sunfish:	13	0.29	-----
Walleye:	11	0.24	-----
Channel Catfish:	1	0.02	-----
Warmouth:	5	0.11	-----
Gizzard Shad:	2	0.04	-----
Carp:	6	0.13	> 0.25
Bullhead:	1	0.04	-----
Total	193	4.29	6.00 +

Table 2: Proportional Stock Density (PSD) – Beaver Lake, Spring 2019

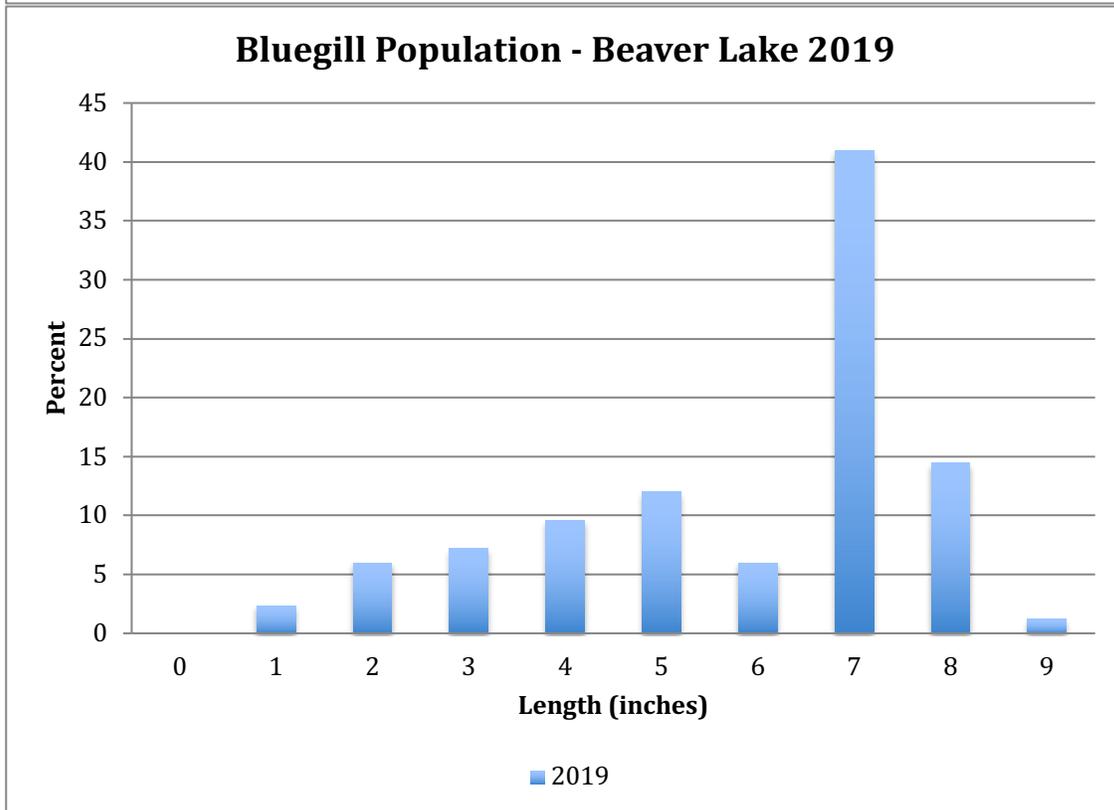
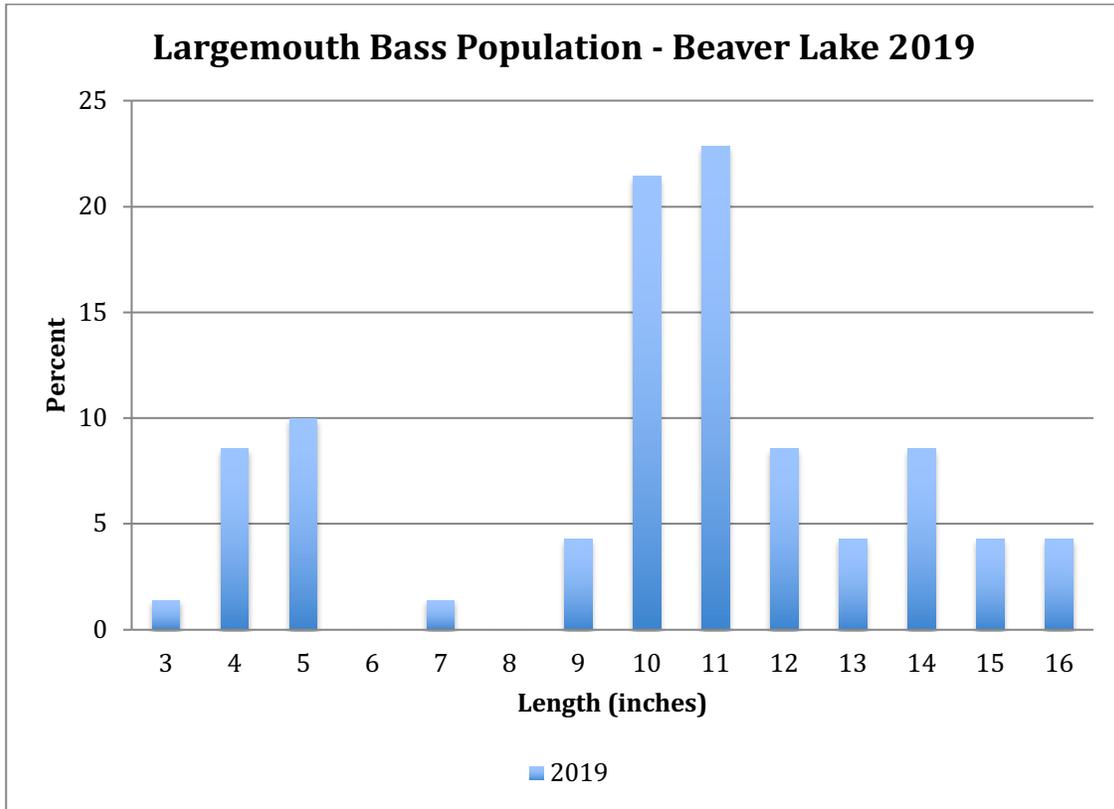
<b><u>Species:</u></b>	<b><u>2019 Spring</u></b>	<b><u>Objective</u></b>
Largemouth Bass:	38	40-70
Bluegill:	68	20-60

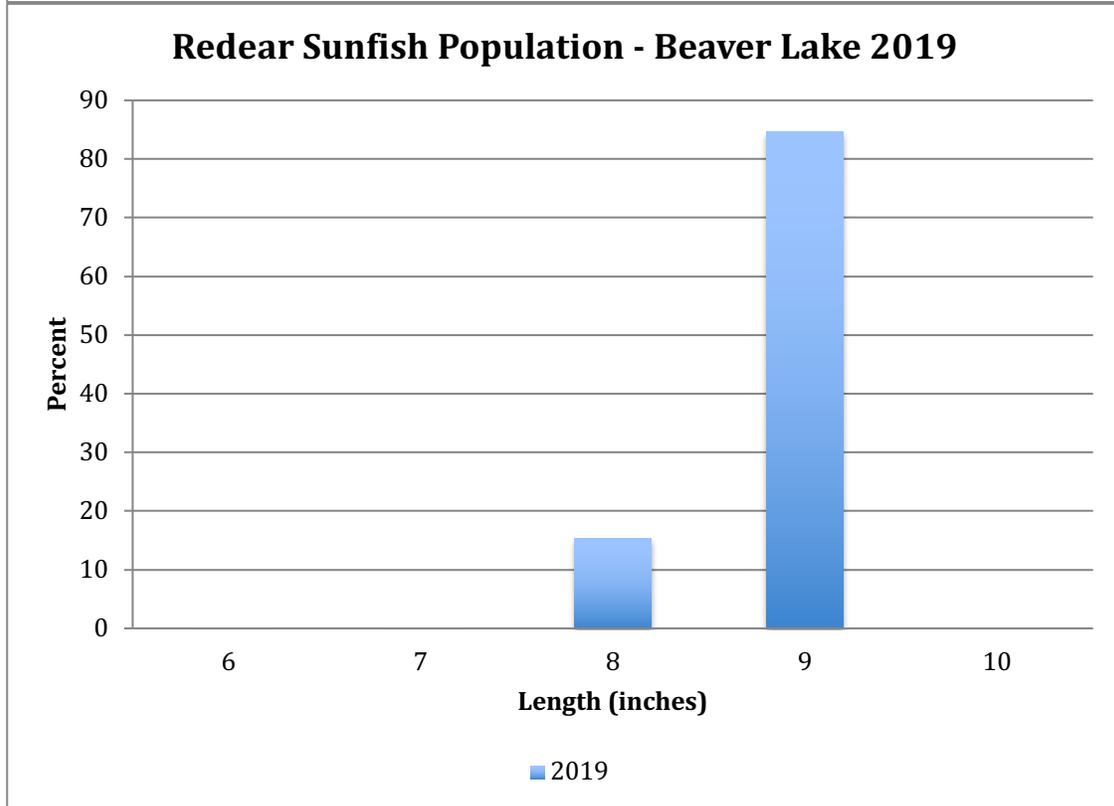
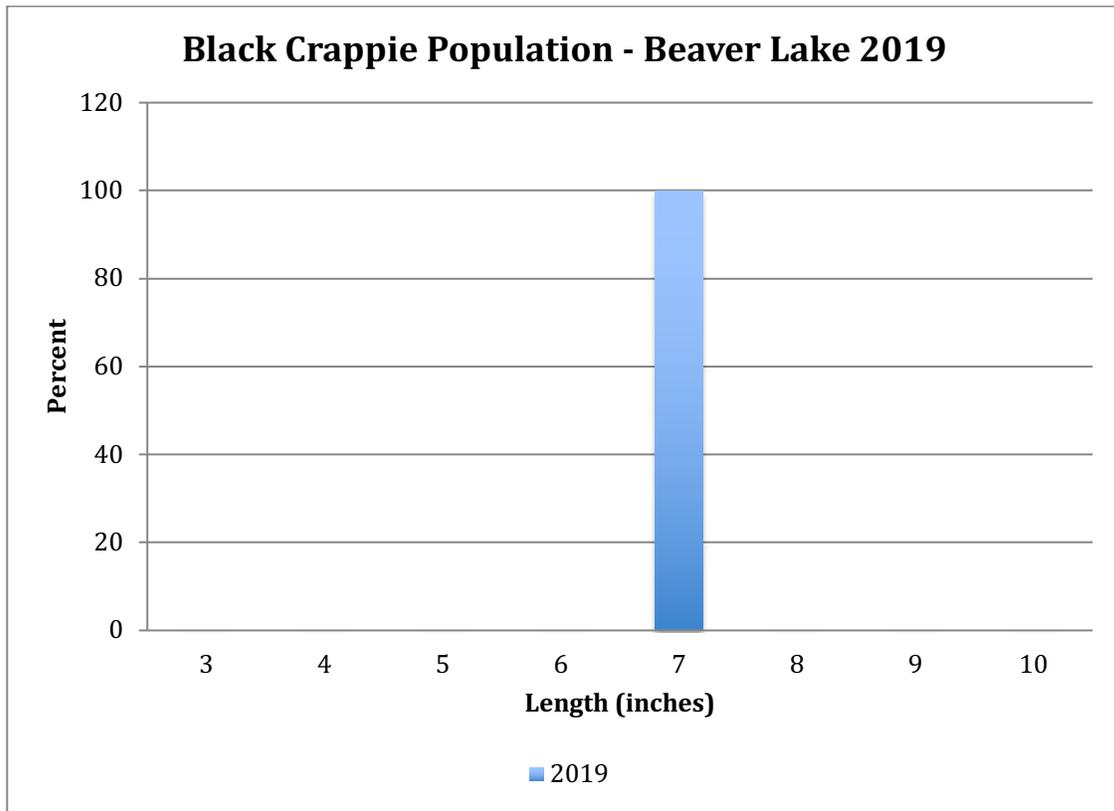
Table 3: Relative Weight (Wr) – Beaver Lake, Spring 2019

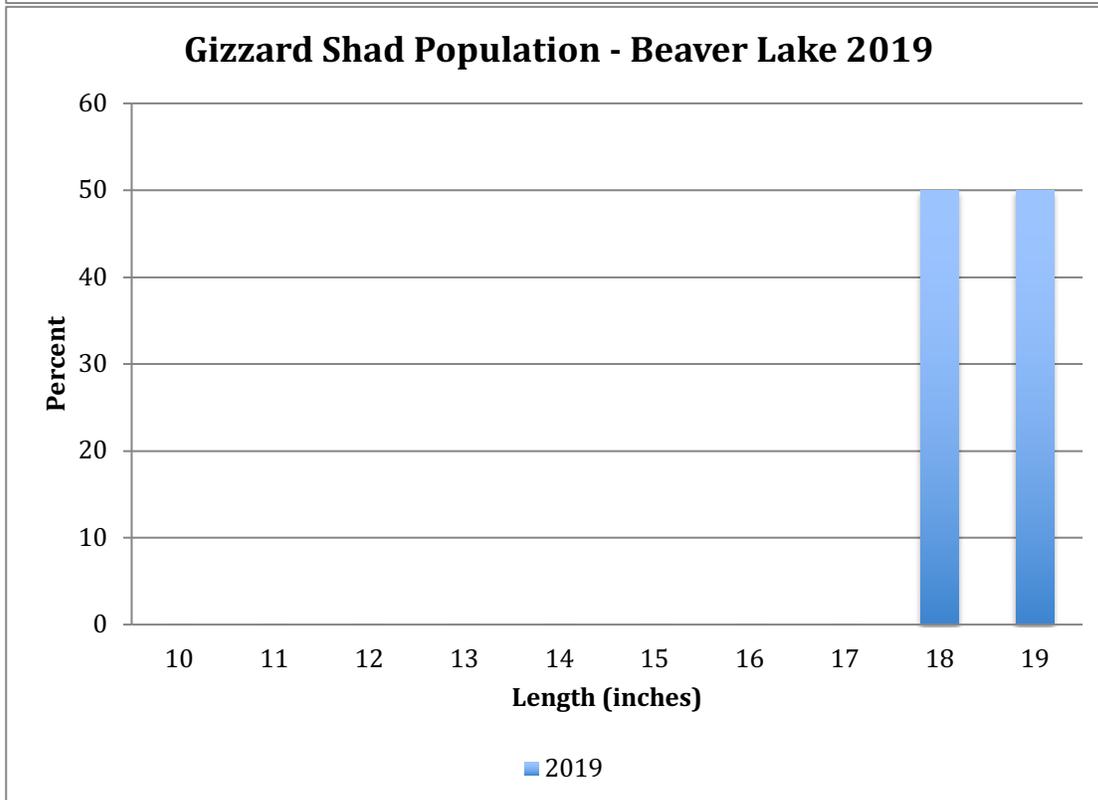
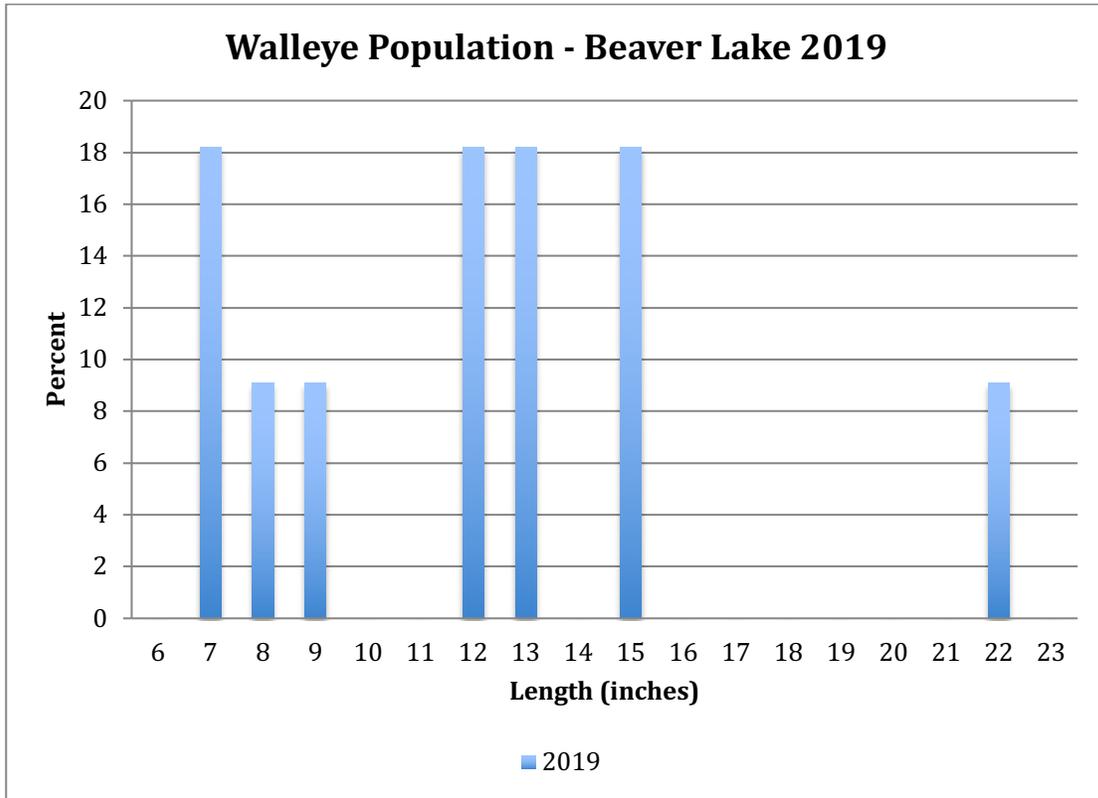
<b><u>Species:</u></b>	<b><u>Wr (Ave)</u></b>	<b><u>Range</u></b>	<b><u>Objective</u></b>
	<u>2019 Spring</u>	<u>Spring 2019</u>	
Largemouth Bass:	88	72-142	90-110
Bluegill:	102	78-133	90-110
Black Crappie:	93	93	90-110
Redear:	106	100-115	90-100
Walleye:	91	83-101	90-100
Channel Catfish:	87	87	90-100

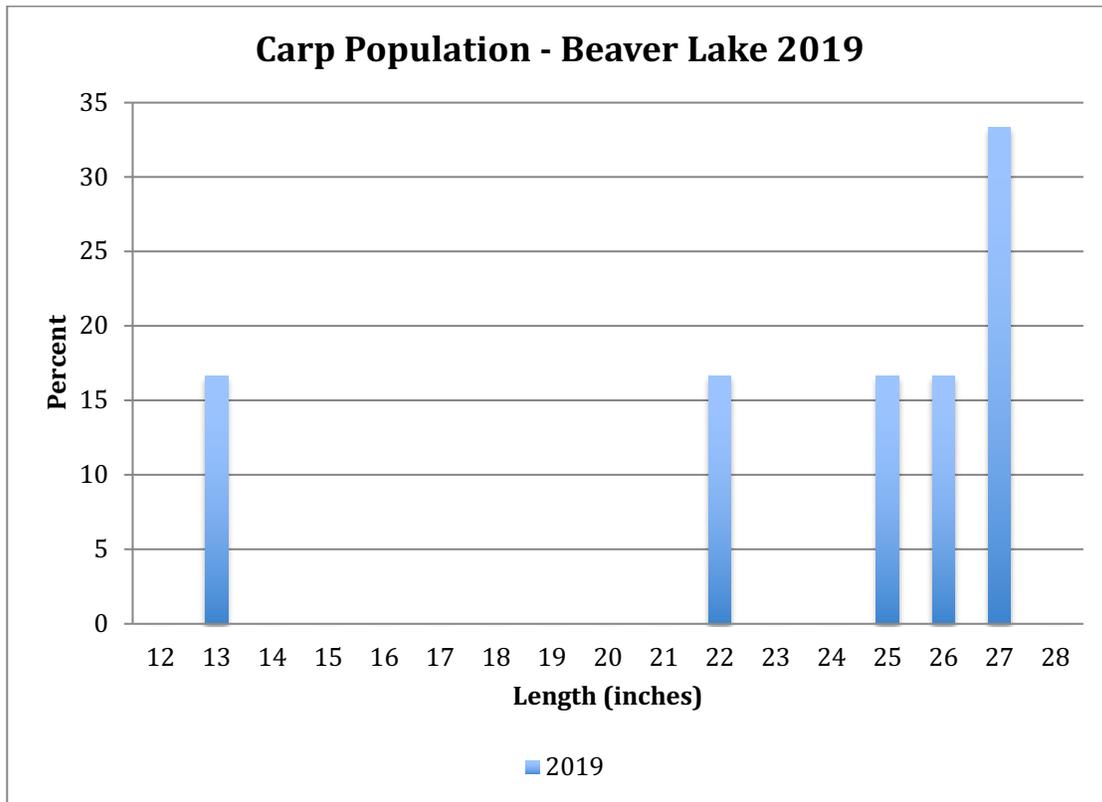
Table 4: Length Ranges by Species – Beaver Lake, Spring 2019

<b><u>Species:</u></b>	<b><u>Length:</u></b>	<b><u>Average</u></b>
	<u>2019 Spring</u>	<u>2019 Spring</u>
Largemouth Bass:	3.9-16.6"	10.6"
Bluegill:	1.8-9.1"	6.3"
Black Crappie:	7.5"	7.5"
Redear Sunfish:	8.6-9.5"	9.1"
Walleye:	7.5-23"	12.7"
Channel Catfish:	26.1"	26.1"
Warmouth:	4.8-8.5"	6.8"
Gizzard Shad:	18.9-19.3"	19.1"
Carp:	13.8-28"	24.1"
Bullhead:	10.2"	10.2"

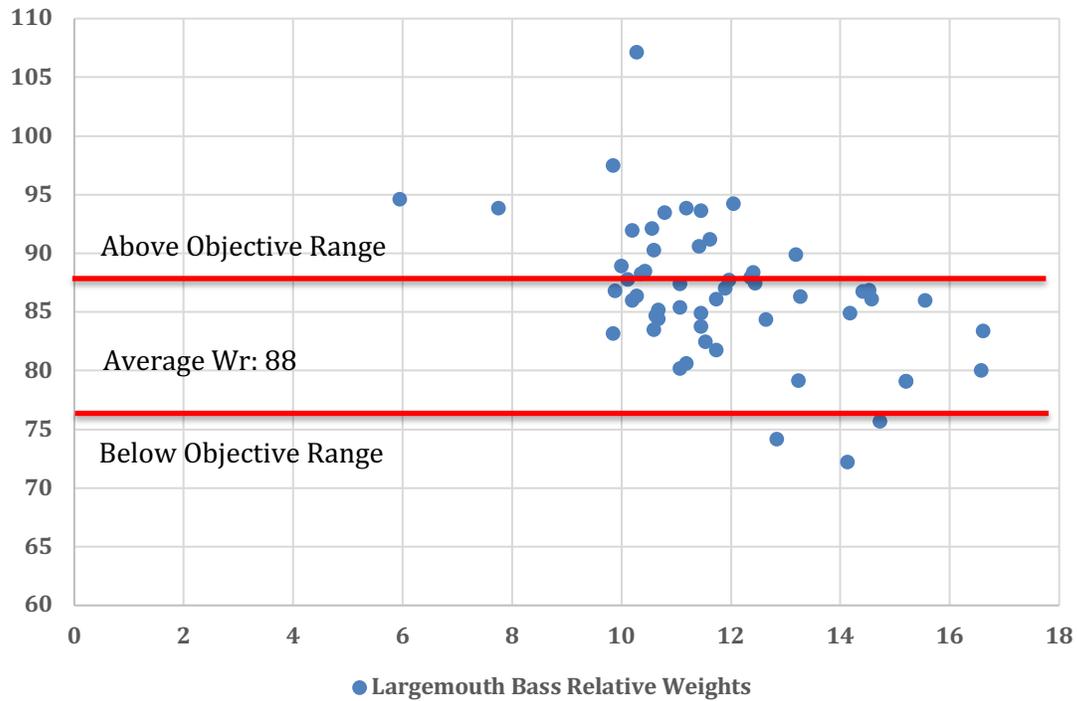




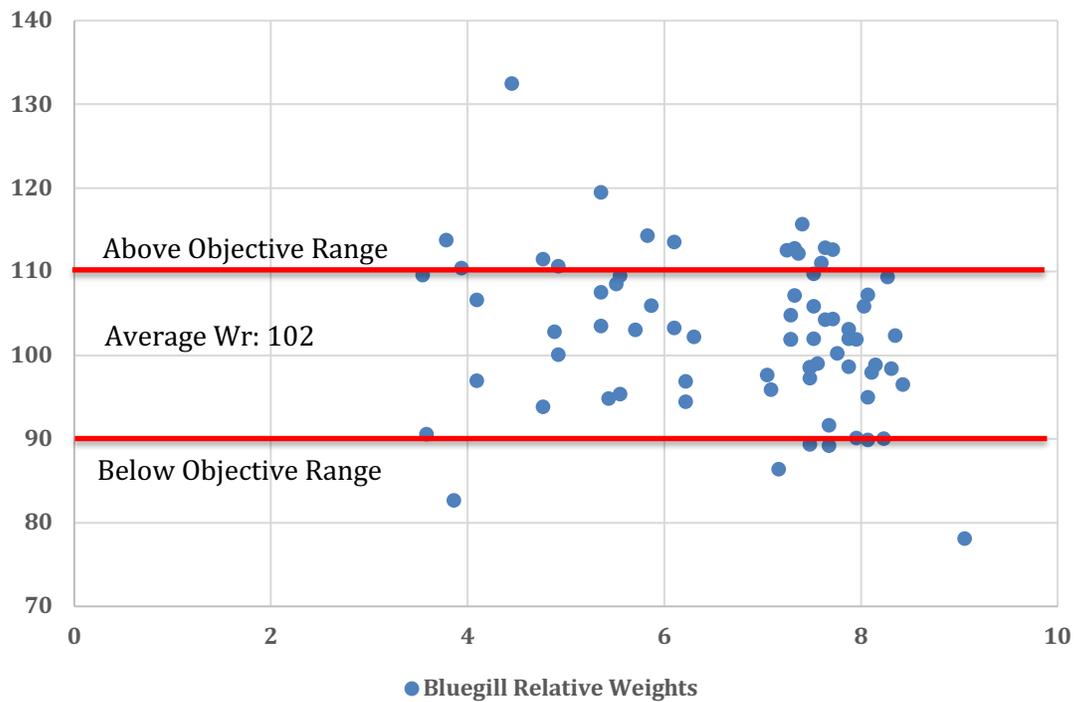




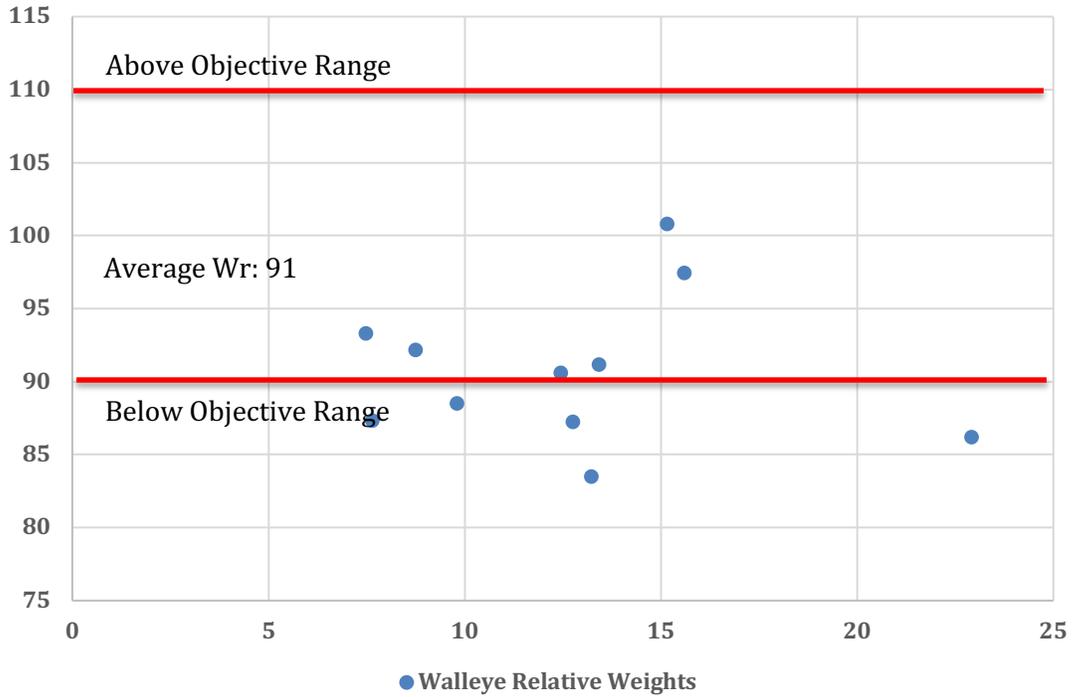
### Largemouth Relative Weights: Beaver Lake



### Bluegill Relative Weights: Beaver Lake



### Walleye Relative Weights: Beaver Lake



### Redear Relative Weights: Beaver Lake

