

# Aquatic Environmental Services, Inc.

PROVIDENCE LAKE

ELECTROFISHING REPORT

# Electrofishing Report

- ▶ On June 20<sup>th</sup>, 2019 a fish population analysis was conducted using standard electrofishing procedures.
- ▶ Data collected during this study was analyzed to describe the current conditions of the fishery. Based on the data collected, management recommendations have been made to improve the fishery in order to reach your goals.

# Water Quality Analysis

3

Parameters	Results	Desired Range
Environmental Temperature (°F)	77	-
Water Temperature (°F)	74	-
Dissolved Oxygen (mg/L)	5.7	5-10
pH	7.2	6.5-9.0
Visibility (inches)	68	18-24
Alkalinity (mg/L as CaCO <sub>3</sub> )	8	>20
Conductivity (μS)	92	>50

# Water Quality Evaluation

- ▶ The water quality and pH were normal. Most of the waters in Georgia are indicative of our poor soils. This means low alkalinity and pH.
- ▶ Alkalinity was low, which is an indicator that the water has a limited ability to buffer sudden pH changes. High alkalinity creates a healthy environment for the fish and aids in success of fertilization program.

# Lake Conditions

- ▶ Using satellite imagery, the lake is approximately 15 acres in size with a functioning concrete spillway.
- ▶ The lake has a limited amount of dense structure to provide protective habitat for small fish. Also, the lake has limited larger structure to provide fishing “hotspots” and orientation points for larger fish (i.e. Bass).
- ▶ No aquatic vegetation was seen at the time of the shock.

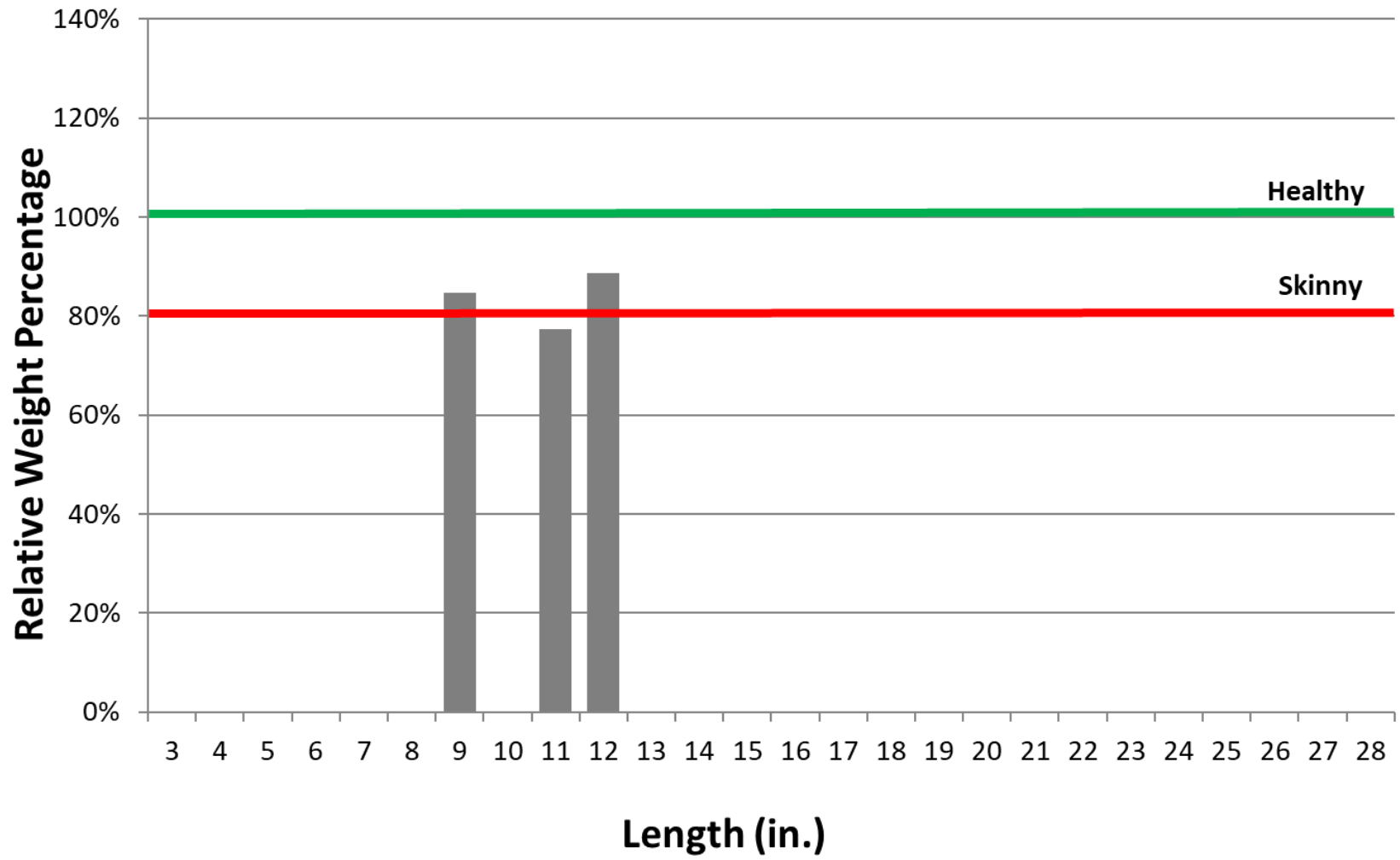
# Electrofishing Results

# Electrofishing Results

7

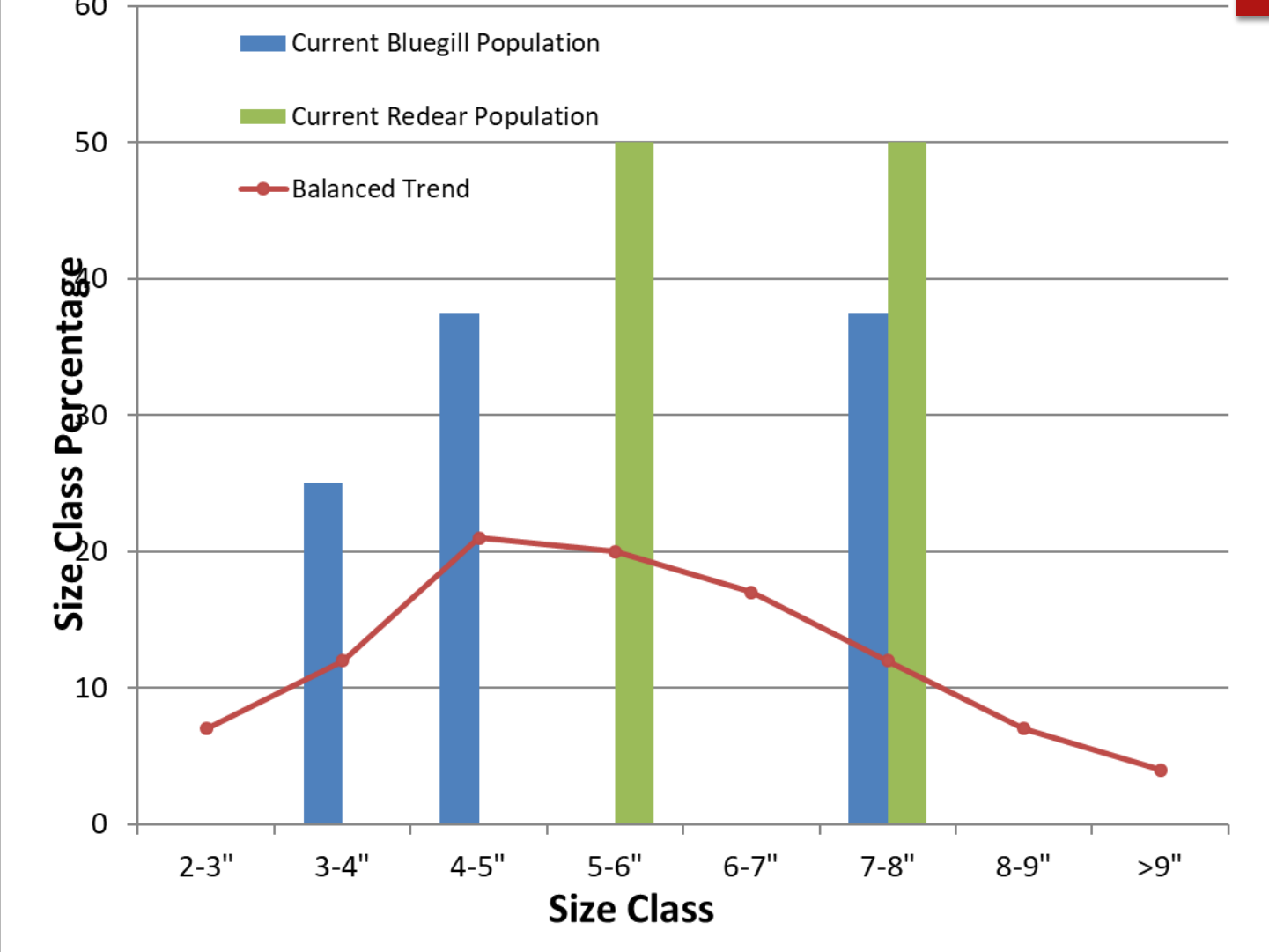
Species Sampled	Size Class (in.)	Quantity	CPUE (Number/Hour)
<b>Bluegill</b>	Reproduction (<3)	Poor	-
<b>Bluegill</b>	3-5	5	9
<b>Bluegill</b>	5-7	0	0
<b>Bluegill</b>	7-9	3	5
<b>Bluegill</b>	>9	0	0
<b>TOTAL CPUE</b>	-	-	14
<b>Redear Sunfish</b>	Reproduction (<3)	Poor	-
<b>Redear Sunfish</b>	3-5	0	0
<b>Redear Sunfish</b>	5-7	2	3
<b>Redear Sunfish</b>	7-9	2	3
<b>Redear Sunfish</b>	>9	0	0
<b>TOTAL CPUE</b>	-	-	7
<b>Largemouth Bass</b>	Reproduction (<4)	Poor	-
<b>Largemouth Bass</b>	4-8	0	0
<b>Largemouth Bass</b>	8-10	1	2
<b>Largemouth Bass</b>	10-12	7	12
<b>Largemouth Bass</b>	12-14	1	2
<b>Largemouth Bass</b>	14-16	0	0
<b>Largemouth Bass</b>	16-18	0	0
<b>Largemouth Bass</b>	>18	0	0
<b>TOTAL CPUE</b>	-	-	15

### Largemouth Bass Average Relative Weight By Length Class





### Size Class Distribution of Bluegill and Redear Sunfish



# Evaluation

10

- ▶ The pond is slightly bass heavy. The average size of the bass is 11" weighing half of a pound. The relative weight of the bass was 80%. These small bass are stunted at this size due to competition and lack of preferred sizes of bluegill.
- ▶ Many anglers are taught catch and release in the sport of bass fishing. However, bass still need to be harvested to get the prey (bluegill) and predator (bass) ratio in balance.
- ▶ The forage base of the pond has been crippled not only by the bass population, but also by habitat and water quality. Bluegill will reproduce many times a year, but without proper protection all their offspring are being consumed by the bass. This is what's happening right now. To avoid this dense habitat needs to be deployed. The water quality is classic Southeastern characteristics. This means that the water doesn't support much phytoplankton which is the base of the food chain. To mitigate the poor water quality fish feeders should be considered to support the bluegill.

# Management Recommendations

# Habitat Enhancement

## (Moss Back Fish Rack)

- ▶ The Moss Back Fish Rack is a long-lasting structure with a surface area resembling the look and feel of natural cover while providing great habitat for baitfish and all types of game fish. Algae growth occurs quickly due to the realistic bark like texture of the Fish Rack. This product not only gives you virtually undetected favorite fishing spots, but it also provides the opportunity for different placement configurations. Extreme ease of assembly allows you to quickly install the fish rack. You will enjoy greater fishing time and less frustration which can be associated with placing natural cover.
- ▶ Features:
  - ▶ Easily assembled
  - ▶ No mess/scratches associated with installing natural cover
  - ▶ Not easily detected on a graph
  - ▶ Fish are immediately attracted
  - ▶ Long lasting rugged product
  - ▶ Easily moved to different fishing locations
  - ▶ Multiple variations of structure (lengths, vertical/horizontal)
  - ▶ Will not snag hooks
  - ▶ Flexibility of structure limbs allow bait to bounce off
  - ▶ Holes for attracting and holding baitfish
  - ▶ Rough texture of limbs allows for quick growth of algae
  - ▶ All hardware for installation is included
  - ▶ Structure sinks by itself. Only a small amount of weight is suggested to keep in place.



# Habitat Enhancement (Fish Habitat Benefits)

- ▶ A bass has to eat 10 lbs of fish in order to gain one pound in weight. Small one inch bluegill generally weigh 5 lbs per 1,000 fish thus the bass would have to eat 2,000 bluegill to gain one pound. Adding protective cover will allow the young bluegill to grow for an additional month or more. In just one month, bluegill can quickly grow to 20 lbs per 1,000 fish so now a bass only has to eat 500 bluegill to gain a pound. This means much less energy is expended allowing energy for growth. This is a simplified example but indicates how protecting the small bluegill promotes and is essential for good bass growth.
- ▶ The attractors when placed in proper locations provide areas for fish hangouts/ambush points which also allows less loss of energy and improved weight gain.

# Crawfish Stocking

14

- ▶ An instant high protein source at a fraction of the cost. Most fish we stock for bass growth like bluegill, fathead minnows, and shad are to establish a viable population. This means populations that reproduce to create more bass food. Plus, in new ponds or those with good cover they will establish populations as well.
- ▶ The benefits are quick. We have been very impressed as to how fat bass have gotten after stocking crawfish. Bass love crawfish and studies have shown that they prefer them over bluegill 9 to 1 which means your bluegill survival rate will increase during this time. With more bluegill surviving in the spring means potentially higher spawning rates.
- ▶ Since bass love crawfish, they will chase any lure resembling a crawfish. The fishing catch rates improve for a month or more. The protein ranks up there with trout. Stocking rates vary from 40-100 lbs. per acre.



# Management (Harvesting)

- ▶ Limit the harvest of forage fish such as bluegill and shellcracker. It doesn't hurt to take out bluegill here and there but the bluegill are the backbone forage species for largemouth bass. So the more bluegill you harvest the more food you are taking away from the largemouth bass.
- ▶ Harvest 800 bass measuring 12" or less within the year. We realize this is difficult to do but all bass removed that are stunted will help alleviate pressure on the limited food source.

# Recommendation Table 16

Recommendation	Quantity	Price	Timeframe
Moss Back Trophy Tree Fish Attractors	TBD	\$3,000 budget	Annually
Crawfish Stocking	450 lbs.	\$1750	May

AES recommends doing management steps in small steps. For example install mossbacks over time, ultimately you have the proper amount of habitat the lake needs to support a better fishery.

Stocking crawfish will not only feed the bass but also allow more bluegill to survive for long-term benefits.



# Conclusions

- ▶ The lake continues to provide a fun fishery for smaller bass and big bluegill. Also we suspect the lake still has a crappie population. If you wish to grow better bass then please consider some of these recommendations.
- ▶ A harvest plan needs to be implemented to knock down the number of bass and allow the smaller bluegill to have successful reproduction. This is something that has vast benefits at no cost.
- ▶ The lake needs some more dense habitat for bluegill protection. The fish will benefit from the structure as well as anglers.
- ▶ AES will work with budgets and recommends small improvements each year.

# Water Quality Parameters

18

## ▶ Dissolved Oxygen:

- ▶ Dissolved oxygen (DO) is a measure of the amount of oxygen available to aquatic organisms, and is reported as mg/l or percent saturation. Percent saturation is a representation of how much oxygen is dissolved in the water relative to the amount of oxygen that can be held at a specific temperature. Colder water can hold more oxygen than warm water. Dissolved oxygen fluctuates daily with it being at its lowest levels in the early morning hours. DO does not pose a problem for most fish until levels fall below 4 mg/l. Dissolved oxygen profile shows how stratification affects DO levels as depth changes.

## ▶ Conductivity:

- ▶ Conductivity is a measure of the ability of water to pass an electrical current. Conductivity in water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron, and aluminum cations (ions that carry a positive charge). Organic compounds like oil, phenol, alcohol, and sugar do not conduct electrical current very well and therefore have a low conductivity when in water. Conductivity is also affected by temperature: the warmer the water, the higher the conductivity.

# Water Quality Parameters

19

## ▶ pH:

- ▶ The pH measures the concentration of the hydrogen ions present in the water, and is usually thought of as the measurement of acidic or alkaline conditions. A pH of 7 is neutral with lower values being acidic and higher values being alkaline. Most organisms in a lake prosper when the pH is maintained between 6.5 and 9. The pH cycles daily due to a complex interaction of alkalinity, hardness, carbon dioxide, and photosynthesis and respiration. The lake is more acidic in the mornings, and will also vary according to depth. When pH levels are out of the desired range for long periods, detrimental affects may occur.

## ▶ Hardness:

- ▶ Hardness is a measure of the quantity of divalent ions in water. Generally in Georgia, calcium and magnesium carbonate account for the majority of the hardness. Hardness levels affect the toxicity of some algaecides, limit phytoplankton formation, and play a role in fish growth. Levels below 20 mg/l should be increased with the addition of 4-6 tons per acre of agricultural lime.

# Water Quality Parameters

20

## ▶ Alkalinity:

- ▶ Alkalinity is defined as the quantity of base present in water. The most common bases include carbonates, bicarbonates, hydroxides, and phosphates. Total alkalinity is closely related to hardness with both being reported as mg/l  $\text{CaCO}_3$ . Alkalinity basically determines the buffering capacity of a lake. A good buffering capacity will absorb introductions of acids and bases with little change in pH levels. By maintaining the desired pH levels nutrients are more available to phytoplankton resulting in a lake that has an increased carrying capacity.

## ▶ Visibility:

- ▶ Visibility is measured with the use of a secchi disc. The white/black disc 20 cm in diameter is lowered vertically through the water until it can no longer be seen. Suspended particles reduce this visibility level. Therefore, in the absence of turbidity from silt or mud the secchi disc serves as a international standard to indicate phytoplankton. We recommend keeping a phytoplankton bloom with a visibility between 18-24 inches via fertilization.

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