FISH SURVEY REPORT

Lake Santee

Prepared For:

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13 Southwest Wrenn Parkway

Greensburg, IN 47240

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418 W. State Rd, 258
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Introduction

A survey of the fish community and other physical, biological, and chemical factors directly affecting the fish community was completed at Lake Santee on October 4, 2021. The major objectives of this survey and report are:

1. To provide a current status report on the fish community of the lake.
2. To compare the current characteristics of the fish community with established indices.
3. To provide recommendations for management strategies to enhance or sustain the sport fish community.

Water Chemistry

When managing an aquatic ecosystem the quality of water should always be considered first. If a lake or pond is perfectly constructed with abundant food and habitat, but has poor water quality, the fishery will ultimately suffer and never reach it's full potential. Although oxygen is typically not a year-round issue there are certain situations that can cause oxygen to drop to detrimental levels. If parameters such as pH or alkalinity are too low or too high it can put tremendous stress on the organisms living in it or even create a toxic environment all together. Other important parameters to consider are nitrogen and phosphorus levels. Nitrogen and phosphorus are two major nutrients that drive the plant growth in an aquatic ecosystem. If the ratio of nitrogen to phosphorus is below 17:1 there is potential for blue-green algae to become abundant. These species of algae can create a stressful environment for fish due to disruption of the food web.

Table 1. Selected lake and water quality parameters.

	Surface	Ideal Range
Acres	235	-
Temperature (F)	70.5	-
Dissolved Oxygen (ppm)	10.0	5.0+
pH	8.1	6-9
Alkalinity (ppm)	120	20+
Total Hardness (ppm)	144	20+
Total Phosphorus (ppm)	0.07	0.01-0.09
Total Nitrogen (ppm)	1.58	1.0-10.0

The results of selected physio-chemical parameters from Lake Santee are presented in Table 1. Dissolved oxygen, pH, alkalinity, and hardness levels were all in acceptable ranges. The lake was stratified with sufficient oxygen down to 15 feet in depth (Figure 1). The nitrogen to phosphorus ratio is 23:1 on the surface. This indicates there is a low potential for abundant blue-green algae growth during warmer months of the year. This ratio does not mean there won't be blue-green algae, but is a positive sign that the environment is suitable for green algae as well. Overall, water quality parameters indicate Lake Santee appears to be capable of supporting a healthy fish population.

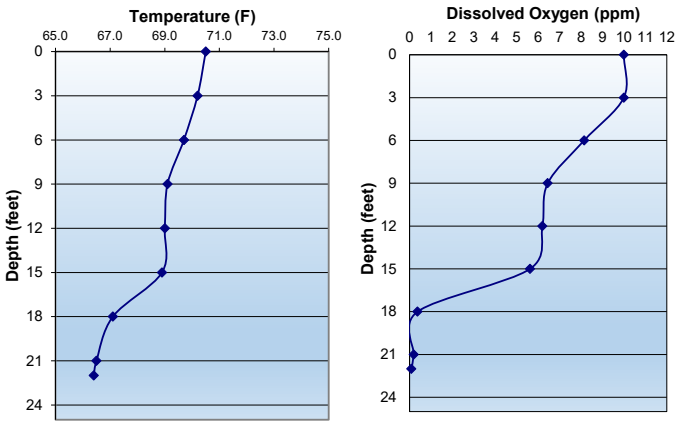

Figure 1. Temperature and Dissolved Oxygen profiles.

Lake Santee

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Fish Collection

Fish sampling was done with the use of an electrofishing boat. Electrofishing is simply the use of electricity to capture fish for the evaluation of population status. Electrofishing equipment used in this survey consisted of a 16-foot aluminum boat equipped with a Midwest Lake Electrofishing Systems Infinity Box powered by a 6500-watt portable generator and two booms mounted with Wisconsin style rings. Electrofishing was done in transects for 1 hour and 45 minutes.

All fish collected were placed in water filled containers aboard the sampling boat for processing. Each fish collected was measured to the nearest half-inch. Five fish in each half-inch group were weighed to determine average and relative weights. Relative weight is a condition factor used to determine the overall plumpness of an individual fish. Relative weight values from 90-100 indicate good condition while anything under 90 is considered in poor condition. It can be assumed that fish with higher relative weights are finding enough food and are growing at a higher rate than fish with a lower relative weight.

A total of 1,258 fish weighing 316.16 pounds and representing twelve species was collected from Lake Santee. The relative abundance of these species can be found in figure 2 and a full data table can be found at the end of this report. The data collected are adequate for management implications; however, there will be unanswered questions regarding aspects of the fish population and other related factors of the biological community in the lake. All fish numbers used in the report are based on the samples collected and should not be interpreted to be absolute or estimated numbers of fish in the lake.

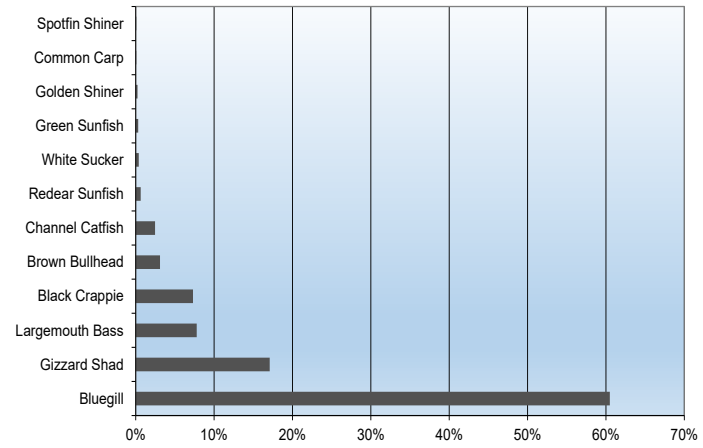

Figure 2. Relative abundance of species collected.

Largest Largemouth Bass caught during survey.

Largest Redear caught during survey.

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Predator-Prey Relationship

Even the most diverse systems can be broken down into predator-prey relationships. Often times the Largemouth Bass-Bluegill relationship is the most important. Bluegill are a great prey item for Largemouth Bass because they spawn multiple times a year and are continually creating food for Largemouth Bass. Managing for one species typically involves influencing both and as one of these populations change the other typically changes with it. In a balanced state both Largemouth Bass and Bluegill can experience proper growth rates.

Bluegill

Lake Santee—Bluegill

Bluegill ranged in size from less than 3.0 to 7.5 inches (Figure 3). Approximately 17% of Bluegill collected were 3.0 inches or less, indicating reproduction did occur in 2021. There was a large number of 6.0-7.0 inch Bluegill collected. This led to a proportional stock density (PSD) of 71, which is above the desired range of 20-40 for Bluegill (proportion of quality fish within a population). The relative weight values of Bluegill collected at Lake Santee ranged from 81 to 99 (Figure 4). A large degree of crowding in the 5.0-7.0 inch size classes and low top-end growth in Bluegill indicate that Bluegill are not finding enough resources to grow into larger size classes.

The size distribution of Bluegill indicates the population is suffering from overabundance and some level of stunting.

This is very common to see in lakes and ponds containing large Gizzard Shad populations. Gizzard Shad reproduce at a high level and can flood the ecosystem with forage fish. This takes predation pressure off of Bluegill, which leads to higher competition for resources and lower overall growth. Gizzard Shad can also reduce predation pressure on Bluegill by reducing recruitment in the Largemouth Bass population.

There appears to be a gap in the Bluegill population between 3-5 inches. This is commonly due to overabundance of predators, typically Largemouth Bass. This is not the case in Lake Santee. Black Crappie are likely the major culprit, along with Largemouth Bass, Channel Catfish, Brown Bullhead, and Common Carp. All of these species can impact the Bluegill population in different ways. Still, with a lack of mid-sized Bluegill, the Largemouth Bass population appears to be thriving. This can be credited to the abundance of other forage options in the system.

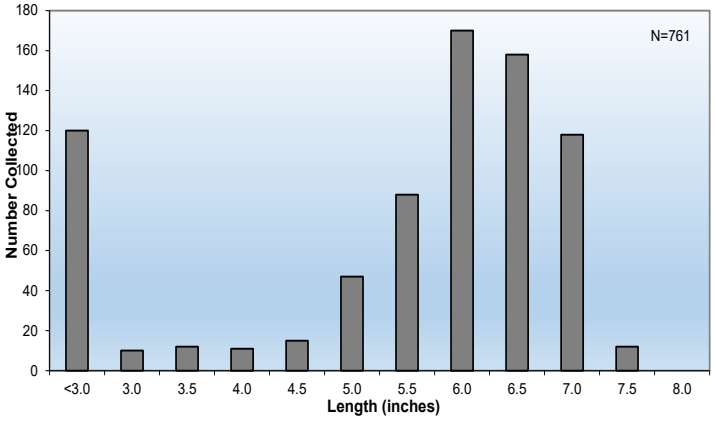

Figure 3. Length frequency distribution of Bluegill

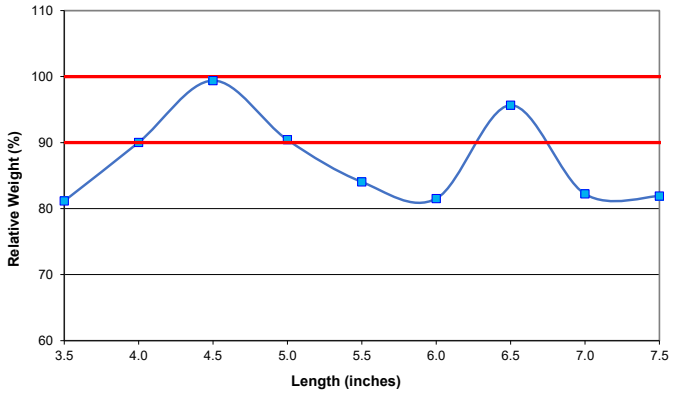

Figure 4. Bluegill relative weights

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Predator-Prey Relationship

Largemouth Bass are an opportunistic predator that will eat just about any species of fish they can catch. To keep a Largemouth Bass growing properly there needs to be several different sizes of forage available. This allows the bass to continually find the optimal size of prey as it continues to grow. When the optimal size of prey is available the fish can conserve energy, resulting in a higher growth rate. If the prey is too small a Largemouth Bass could potentially spend more energy chasing a meal than it gains by eating it. This results in skinny and slow growing fish. Managing a forage base to create a variety of sizes is key to creating a healthy and balanced Largemouth Bass population.

Lake Santee—Largemouth Bass

A total of 98 Largemouth Bass ranging in size from less than 3.0 to 20.0 inches was collected (Figure 5). Approximately 53% of Largemouth Bass caught were less than 8.0inches in length. This indicates successful reproduction in 2021. The remaining Largemouth Bass sampled were evenly distributed. This led to a PSD of 43 for Largemouth Bass, which is within the desired range of 40-60. Relative weights ranged from 77 to 120 (Figure 6). The majority of relative weights fell above the 90 mark. This is an indicator that most Largemouth Bass are finding enough food.

It appears the overabundant population of Bluegill and/or Gizzard Shad are leading to good growth rates. Relative weights are solid across all size classes.

Largemouth Bass

Both Bluegill and Gizzard Shad have been known to disrupt spawning success when found in excessive numbers. Bluegill and Gizzard Shad are extremely abundant in Lake Santee, yet Largemouth Bass appear to have had very successful spawning in 2021. Unfortunately a high percentage of the young-of-year Largemouth Bass are unlikely to make it through the winter. Typically a Largemouth Bass will grow to 4-6 inches and have good reserves built up by the time winter arrives. Those reserves are required to make it through the harsh winter. The majority of Largemouth Bass collected under 4-5 inches experienced slowed growth throughout most of the season due to competition with Gizzard Shad, Bluegill, and Black Crappie.

The supplemental Largemouth Bass stockings are in place to replace a portion of the year class that does not make it through the winter. Fish from the hatchery are already 4-6 inches, in good condition, and typically have an additional month to continue to grow and add to their reserves for the winter after being stocked.

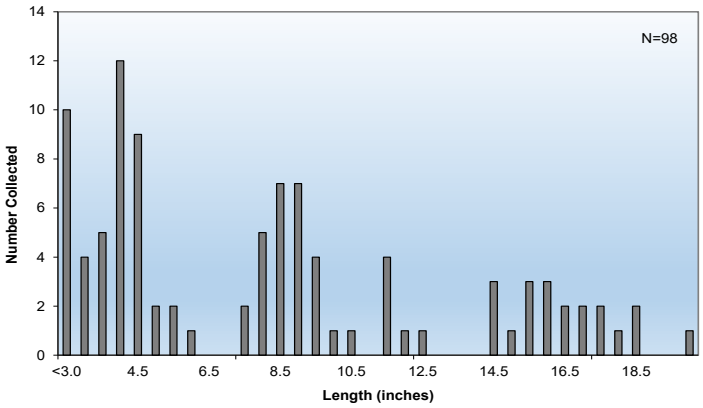

Figure 5. Length frequency distribution of Largemouth Bass

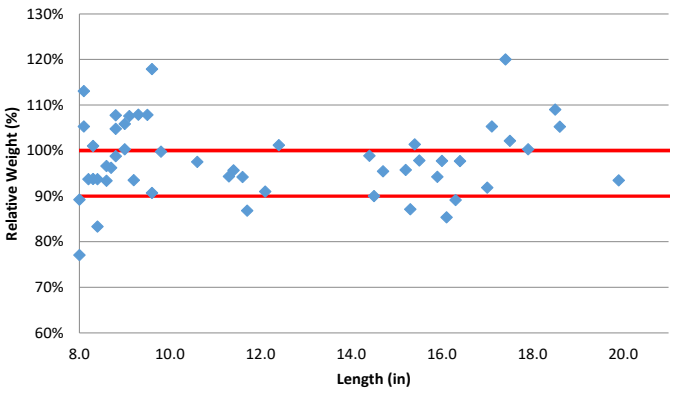

Figure 6. Largemouth Bass relative weights

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Bluegill Comparison

The Bluegill population at Lake Santee has shifted back towards less mid-sized Bluegill (Figure 7). The frequency of large individuals in the population has increased slightly, while the frequency of mid-sized individuals has dropped slightly. PSD has dropped from 76 (2015), to 39 (2018), back up to 71 (2021). The decrease in mid-sized Bluegill and increase in PSD is likely due to the overall higher number of predators present at this time. Relative weights are similar over the past three surveys, but appear to have improved slightly since 2015 (Figure 8)

Overall, the Bluegill population is mostly unchanged over the last several years.

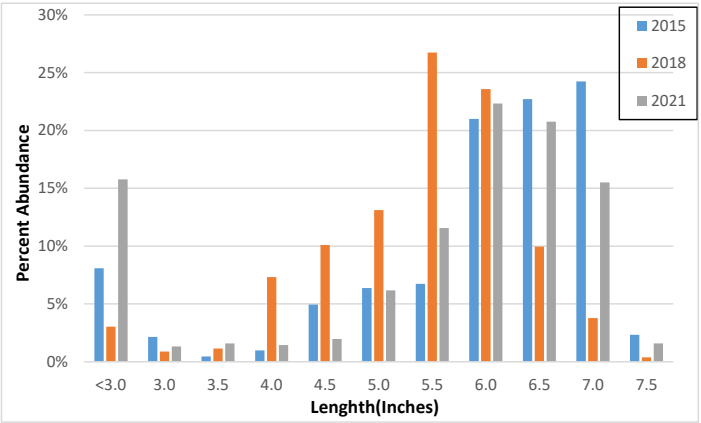

Figure 7. Bluegill length frequency comparison

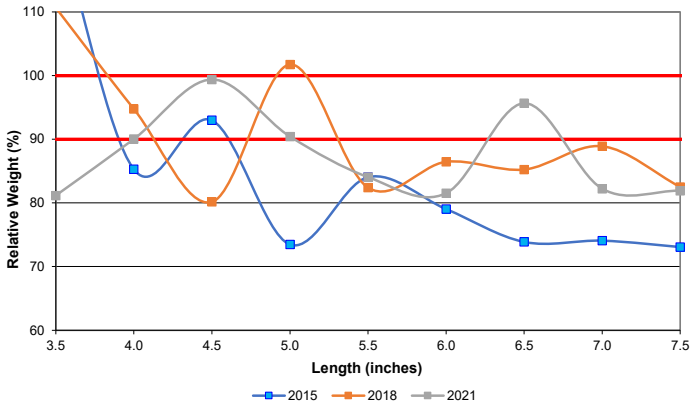

Figure 8. Bluegill relative weight comparison

Largemouth Bass Comparison

When comparing Largemouth Bass length frequency distribution over the past three surveys the only major difference is the increase in Largemouth Bass collected below 5.0 inches (Figure 9). This indicates successful spawning in 2021, but not necessarily successful recruitment moving forward. The PSD has shifted slightly, but has remained inside the desired 40-60 range over the past three surveys. Relative weights appear to be more consistent across all size classes. A major positive sign is the improved relative weights in Largemouth Bass below 12.0 inches in length (Figure 10).

An additional positive sign is the overall catch rate of Largemouth Bass. The catch rate of 56/hr is the highest seen in the past 15 years. With that said, the biggest jump in abundance came in size classes below 5.0 inches and are not all likely to survive the winter.

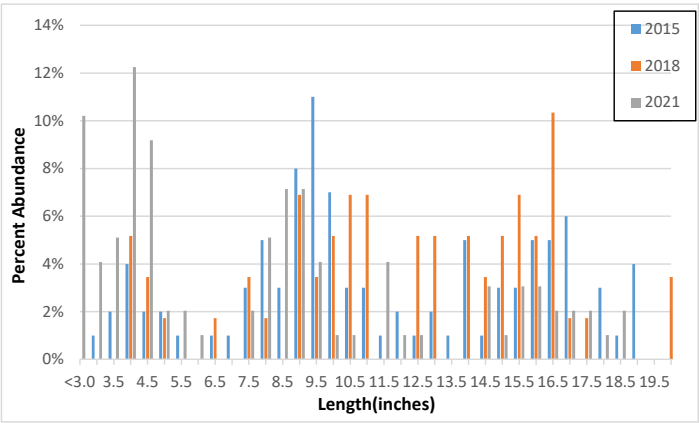

Figure 9. Length frequency distribution of Largemouth Bass

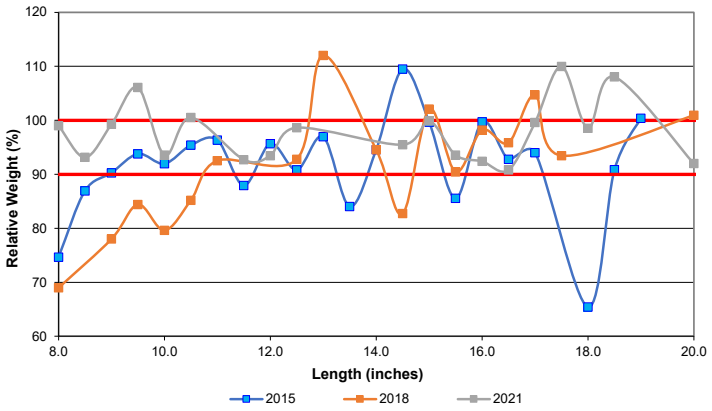

Figure 10. Largemouth Bass relative weights

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Predator-Prey Relationship (Gizzard Shad)

Gizzard Shad were also found in Lake Santee. This is another commonly known forage species that can make up a large percentage of a predators diet when available at smaller sizes, but can often come with more negatives than positives. The first issue caused by Gizzard Shad is the reduction in recruitment. Gizzard Shad are a filter feeding species that consume large amounts of phytoplankton and zooplankton. Unfortunately, this is exactly what all larval fish eat as soon as they are hatched. When Gizzard Shad are in large abundances they can compete with these larval fish for food and greatly impact recruitment of species such as Largemouth Bass.

In some lakes Gizzard Shad can reproduce very quickly and grow extremely fast. These may sound like great attributes for a forage fish, but often times Gizzard Shad grow too large for Largemouth Bass to consume. While the juvenile size classes of Gizzard Shad are beneficial as forage, they provide no benefit at adult size classes and can have negative impacts on water quality. Without a large enough predator to consume them these fish will never transfer their biomass up the food chain into a more desirable fish. Due to these issues the Gizzard Shad population should be closely monitored and the following management options should be considered.

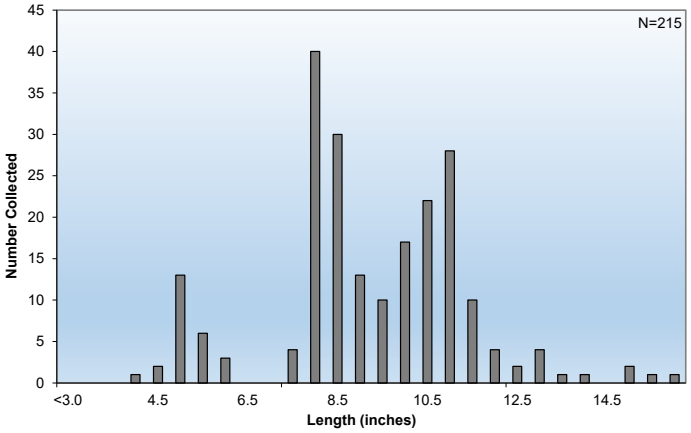

Figure 11. Length frequency distribution of Gizzard Shad

Gizzard Shad

Management Options

There are only a few options when trying to manage Gizzard Shad populations. One method is chemical eradication. This can be very costly on large lakes and results in dead fish throughout the lake. The other method commonly used to manage Gizzard Shad in impoundments is the supplemental stocking of large predators such as Hybrid Striped Bass or Muskellunge. By introducing a large apex predator some of the adult sized Gizzard Shad can then be consumed. This does not always improve the recruitment issue previously discussed, but it does provide an additional angling opportunity to the lake. If the Gizzard Shad population is large enough these stockings can be done with little to no impact on the existing Largemouth Bass fishery.

Lake Santee Gizzard Shad

Lake Santee Gizzard Shad are predominantly focused into larger size classes at this time. It is recommended to continue stocking Largemouth Bass and Hybrid Striped Bass each fall. This will continue to utilize some of the biomass tied up in Gizzard Shad and provide anglers with more sport fish to catch.

This is the first survey in 15 years that a Hybrid Striped Bass was not collected. Stocking recommendation of Hybrid Striped Bass is being increased to 1,500 per year. Previous stockings have been 1,000 each year.

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Harvest

Harvesting fish is often one of the most important and under utilized management practices in a pond or lake. Harvesting, or culling, fish is simply the act of intentionally removing fish from a specific population to decrease competition among the remaining individuals. The culture of catch and release bass fishing started in the 1970's and still has a strong hold on fisherman today. There is a misconception that taking a fish out of a system will be detrimental to the population and if released someone could catch that fish again after it has "grown up." The reality is in some situations there is too much competition and the next time that fish is caught it could be the exact same size a year later. By removing that fish, and others, it leaves more food available for the remaining individuals to continue to grow each and every year.

Example of Stunted Largemouth Bass

Ponds and lakes can both become overrun with predators or prey. Each scenario presents a different set of problems. In a predator (Largemouth Bass) dominant system prey populations are decimated and the lack of food results in slow or stunted growth. In a prey (Bluegill) dominated system spawning and recruitment success of other species can be negatively impacted due to egg predation or direct competition with young-of-year fish, along with slow growth within the population.

Fixing these issues requires targeted annual harvest. In an unbalanced system generally only one species requires a heavy amount of the harvest, while in a balanced system fish should be removed from most populations to maintain a continuous level of growth.

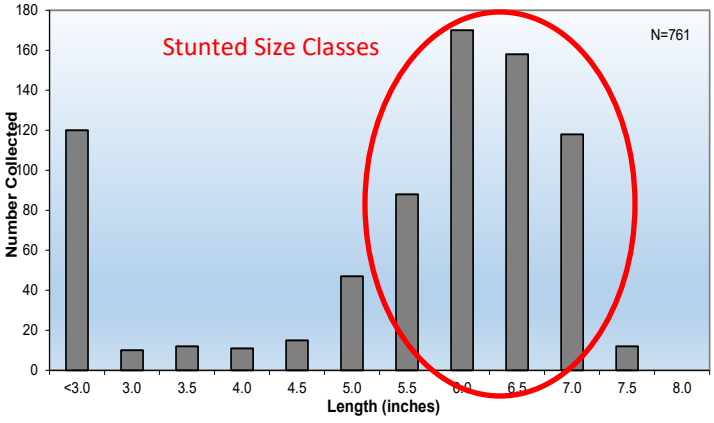

Figure 11. Bluegill relative weights

The fishery at Lake Santee contains extremely abundant Bluegill and Black Crappie populations. Figure 11 shows the Bluegill population crowded in the 6.0-7.0 inch size range. Black Crappie are also crowded in this size range. Growth appears to slow down once these panfish reach this size due to such heavy competition. Anglers can be encouraged to harvest both Bluegill and Black Crappie whenever possible.

Anglers should also consider removing Brown Bullhead and Common Carp when they are collected. Both species are undesirable and are contributing to minor issues in the lake.

Largemouth Bass should continue as a catch-and-release species.

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Structure and Habitat

Structure and habitat are an extremely important factor to consider no matter what body of water is being managed. Just like anything else, the amount of structure in a lake should be kept in moderation. Too much or too little can lead to predictable scenarios. When very little or no structure is available Largemouth Bass spend too much time roaming around looking for food instead of saving energy and waiting near a piece of structure for food to swim by. The other end of the spectrum allows so many places for Bluegill or other prey species to hide that Largemouth Bass can't efficiently catch their prey. In both scenarios Largemouth Bass tend to have low relative weights even with proper harvest rates in place. In most cases roughly 20% of the shoreline containing structure is sufficient. This number can vary depending on the complexity of the cover.

Adding structure to a pond can be beneficial in a variety of ways. It can be a great way to increase the survival of small juvenile fish. This provides a forage base with a wide range of sizes available for your predators. Another benefit of adding structure to a pond is that they attract fish. Strategically placing structure can give you places that you can reliably catch fish.

Fish structure can take many different forms . Aquatic vegetation, brush piles, Christmas trees, and a variety of man-made structures can all be utilized by fish. All of these different structure types have different benefits that make them good management options. Aquatic vegetation

American Pondweed

Largemouth Bass utilizing a Mossback Root Wad Kit

grows on its own but can be hard to manage at times. Brush piles and Christmas trees are often free, but will break down over time and need to be replaced. Manufactured structure can be costly initially, but will last a lifetime. Variety is important when assessing structure in a body of water. Adding structures of varied complexity and in varied depth can help to provide habitat to a variety of fish at different stages of life.

Vegetation is the best form of habitat improvement that can take place at Lake Santee. Vegetation provides habitat for fish and invertebrates to associate with, reduces algal abundance by sequestering nutrients, stabilizes sediments, and improves overall water quality.

Forming sanctuary areas using artificial structure is a great way to increase habitat. These areas can be supplemented on a yearly basis and can form very productive fishing areas. Artificial structure does not easily snag and will not change in complexity over time.

Sinking woody structure is an additional way to increase the amount of available structure. Woody structure is cheap and can form an additional food source for invertebrates that fish will readily consume. Woody structure should be limited because it can increase the amount of organic build-up that forms in a lake.

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Summary/Recommendations

The fishery at Lake Santee contains a diverse fish assemblage, highlighted by quality Largemouth Bass, quality Channel Catfish, and a low density of trophy Redear. Gizzard Shad, Brown Bullhead, Bluegill and Black Crappie continue to be abundant. These species are likely the leading factors in the low recruitment of Largemouth Bass. Bluegill and Black Crappie are available for anglers to target, but are not growing very well at this time. Brown Bullhead and Common Carp should both be removed from the fishery when caught. Largemouth Bass should continue to be catch and release only.

The Largemouth Bass population appears to be healthy and likely growing well. Relative weights were consistently above 90 and the catch rate is higher than average compared to previous surveys. Yearly stockings of Largemouth Bass should be reduced to 3,500 in response to the higher catch rate. Stocking rates should be reevaluated following a 2024 survey.

Hybrid Striped Bass were not collected during the survey for the first time in 15 years or so. Hybrid Striped Bass are pelagic predators, meaning they roam around in open water looking for food. This makes them unlikely to be collected during electrofishing events, but previous surveys have typically had one or two individuals show up in the sample. Yearly stockings should be increased to 1,500 per year.

Lake Santee continues to lack complex habitat. The major habitat form present in the lake is rip rap shoreline and docks. Rip rap does provides some protection for young-of-year fish, but once they reach 3-4 inches the cracks and crevasses in the rocks are too small for them to utilize properly. The docks along the shoreline provide shade, but do not provide any complex habitat for small fish to hide in. Shoreline plantings are still recommended for a variety of reasons; fish habitat being one of them. Artificial habitat could be added in different areas of the lake to provide protection for smaller fish. Increasing complex habitat could help protect more juvenile Bluegill and Largemouth Bass. Additionally, artificial habitat can provide more areas for Largemouth Bass to ambush their prey. Largemouth Bass can allocate more energy towards growth if they can sit and wait for their prey to swim by instead of having to chase down their food. Major sanctuary areas could be created and added to over time. These areas should be out of the way of boats and swimmers and could be buoyed off if needed. Additionally, individual lot owners could place a small amount of habitat directly under their dock. This would attract fish to the area and keep the habitat out of the way of swimmers and boats.

Habitat placement strategy could be aided by having a bathymetric survey done on the lake. This information would show where points, drop offs, and flats are located in the lake. Once these areas are determined, locations for habitat placement become more obvious. These maps can also be used to determine future areas to consider for dredging and can give a reference to how fast certain areas are filling in.

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Summary/Recommendations

The following recommendations, **listed in order of importance**, will help protect and enhance the fishery in Lake Santee:

1. Stock 3,500 4.0 to 6.0 inch Largemouth Bass each year.
2. Stock 1,500 4-6 inch Hybrid Striped Bass each year.
3. Continue efforts to establish native shoreline plants.
4. Install 10 sanctuary areas using artificial structure.
    - Structure should be focused in <10.0 ft of water.
    - Sanctuary areas can be added to on a yearly basis.
    - Contact Aquatic Control for pricing on Artificial Structure if desired.
5. Bluegill Bag Limit: No limit (encourage harvest).
6. Largemouth Bass Bag limit: Catch and Release only.
7. Black Crappie Bag limit: No limit (encourage harvest).
8. Redear Sunfish Bag Limit: 5 per day.
9. Consider a Bathymetric Lake Mapping.
10. Conduct a Fisheries Analysis survey in 2024.
11. Remove any Common Carp, Green Sunfish, and Brown Bullhead whenever caught.

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Other Species Present

Black Crappie (*Pomoxis nigromaculatus)*

Black Crappie are members of the Centrarchidae(Sunfish) family. Black Crappie had a relative abundance of 7.31% and made up 3.93% of the catch weight. Black Crappie can be difficult to manage in a pond ecosystem and in many cases are advised against in systems less than 10 acres. This is due to the tendency of Black Crappie becoming overabundant and stunted in smaller systems. In situations where Crappie are stocked, Black Crappie are usually the more advisable species due to lower reproduction in comparison to White Crappie. Black Crappie eat a variety of organisms while developing into adulthood, and then as adults tend to only eat small fish. Black Crappie tend to sit deeper in the water column and often do not show up well in electrofishing surveys.

Black Crappie

Brown Bullhead

Brown Bullhead (*Ameiurus nebulosus*)

Brown Bullhead is in the Ictaluridae (Catfish) Family and had a relative abundance of 3.10% and made up 4.61% of the catch weight. Brown Bullhead will eat a variety of food items such as macroinvertebrates, small fish, detritus, etc. Brown Bullhead are not generally considered a desirable fish species. They can become very abundant and compete with more desirable species. They do not grow very large and are not often used as table fare.

Channel Catfish (*Ictalurus punctatus)*

Channel Catfish are members of the Ictaluridae family and were found to have a relative abundance of 2.46% and made up 10.25% of the catch weight. Channel Catfish can be problematic to a fishery if overabundant, but in small or moderate abundances, rarely cause problems. They are often desirable sportfish and can be good table fare. Channel Catfish are typically not represented very well in electrofishing surveys, and can often be more abundant than the data shows. Channel Catfish often do not have a high level of natural reproduction in small ponds and some lakes, and therefore need to be stocked if desired in many cases.

Channel Catfish

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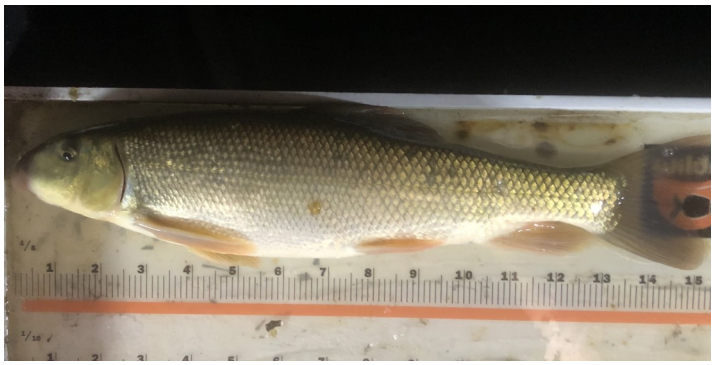
Redear Sunfish

Redear Sunfish (*Lepomis microlophus*)

Redear Sunfish are a member of the Centrarchidae(Sunfish) family and have a relative abundance of 0.64% and made up 2.20% of the catch weight. Redear Sunfish are not as fecund (reproductively successful) as Bluegill and rarely become overabundant. They can grow to large sizes and are regularly sought after by pan-fisherman. Redear Sunfish primarily feed on mollusks and invertebrates and have been shown in many cases to reduce levels of parasitism in fish populations.

White Sucker (*Catostomus commersonii*)

White Sucker are a member of the family Catostomidae (Sucker family) and a relative abundance of 2.29% and made up 0.40% of the catch weight. White Sucker usually have light coloration during most of the year, with darker coloration during the Spring spawn. White Sucker scales start small near the head and progressively get larger as they approach the tail. White Sucker have subterminal mouths and consume a variety of food items including, invertebrates, eggs, detritus, and small fish. In lake systems suckers are often not considered to be desirable, though they likely have very little negative impact.



White Sucker

Green Sunfish

Green Sunfish *Lepomis Cyanellus*

Green Sunfish are a member of the Centrarchidae (Sunfish) family and were found to have a relative abundance of 0.32% and made up 0.08% of the catch weight. Green Sunfish can be aggressive and competitive with Bluegill and other species for food and resources therefore they are generally considered an undesirable species. Green Sunfish look superficially like Bluegill. They can easily be distinguished by their larger mouths and more rounded pectoral fins.

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Other Species Present

Golden Shiner

Golden Shiner (*Notemigonus crysoleucas*)

Golden Shiner is in the Cyprinidae (Minnow) Family and had a relative abundance of 0.24% and made up 0.03% of the catch weight. Golden Shiner are a desirable forage species. They are often stocked to improve growth in Largemouth Bass and other predator species. They grow to a larger size than a lot of other species stocked for forage. Golden Shiner have a decurved lateral line and tend to have a golden hue to the scales.

Common Carp (*Cyprinus carpio*)

Common Carp is in the Cyprinidae (Minnow) Family and had a relative abundance of 0.08% and made up 3.24% of the catch weight. Common Carp are a non-native, invasive species that can cause several problems. They consume a lot of food resources and tend to uproot aquatic vegetation, reducing water quality. Common Carp are also known to have detrimental effects on reproduction of many fish species by damaging spawning grounds. Common Carp should be removed when caught in order to reduce their impact on the fishery.

Common Carp

Spotfin Shiner

Spotfin Shiner (*Cyprinella spilotera*)

Spotfin Shiner is in the Cyprinidae (Minnow) Family and had a relative abundance of 0.08% and made up <0.01% of the catch weight. Spotfin Shiner are a desirable forage fish species for a variety of predators. Spotfin Shiner have a distinct dark blotch on the last 2-3 dorsal fin membranes.

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Fish Collection Tables

SIZE GROUP (IN)	NUMBER	PERCENTAGE	AVERAGE WEIGHT (lbs.)	TOTAL WEIGHT (lbs.)	WS	RELATIVE WEIGHT
BLUEGILL						
<3.0	120	15.77%	0.01	1.20	-	-
3.0	10	1.31%	0.02	0.20	0.02	-
3.5	12	1.58%	0.02	0.26	0.03	81
4.0	11	1.45%	0.04	0.42	0.04	90
4.5	15	1.97%	0.06	0.93	0.06	99
5.0	47	6.18%	0.08	3.76	0.09	90
5.5	88	11.56%	0.10	8.98	0.12	84
6.0	170	22.34%	0.13	22.44	0.16	82
6.5	158	20.76%	0.20	31.92	0.21	96
7.0	118	15.51%	0.22	26.20	0.27	82
7.5	12	1.58%	0.28	3.34	0.34	82
TOTAL	761			99.64		
LARGEMOUTH BASS						
<3.0	10	10.20%	0.01	0.10	-	-
3.0	4	4.08%	0.01	0.05	0.01	-
3.5	5	5.10%	0.02	0.12	0.02	-
4.0	12	12.24%	0.03	0.25	0.03	-
4.5	9	9.18%	0.04	0.22	0.04	-
5.0	2	2.04%	0.05	0.10	0.06	-
5.5	2	2.04%	0.06	0.12	0.07	-
6.0	1	1.02%	0.09	0.09	0.10	-
7.5	2	2.04%	0.19	0.37	0.20	-
8.0	5	5.10%	0.24	1.22	0.25	99
8.5	7	7.14%	0.28	1.95	0.30	93
9.0	7	7.14%	0.36	2.54	0.36	99
9.5	4	4.08%	0.45	1.81	0.43	106
10.0	1	1.02%	0.47	0.47	0.50	94
10.5	1	1.02%	0.59	0.59	0.59	101
11.5	4	4.08%	0.73	2.91	0.78	93
12.0	1	1.02%	0.84	0.84	0.90	93
12.5	1	1.02%	1.01	1.01	1.02	99
14.5	3	3.06%	1.57	4.71	1.64	95
15.0	1	1.02%	1.83	1.83	1.83	100
15.5	3	3.06%	1.90	5.71	2.03	94
16.0	3	3.06%	2.08	6.24	2.25	92
16.5	2	2.04%	2.26	4.51	2.48	91
17.0	2	2.04%	2.72	5.44	2.73	100
17.5	2	2.04%	3.30	6.59	3.00	110
18.0	1	1.02%	3.23	3.23	3.28	99
18.5	2	2.04%	3.87	7.73	3.58	108
20.0	1	1.02%	4.22	4.22	4.59	92
TOTAL	98			64.97		

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GIZZARD SHAD

4.0	1	0.47%	0.03	0.03
4.5	2	0.93%	0.04	0.08
5.0	13	6.05%	0.05	0.60
5.5	6	2.79%	0.06	0.35
6.0	3	1.40%	0.08	0.24
7.5	4	1.86%	0.14	0.57
8.0	40	18.60%	0.19	7.60
8.5	30	13.95%	0.22	6.72
9.0	13	6.05%	0.26	3.43
9.5	10	4.65%	0.33	3.30
10.0	17	7.91%	0.32	5.37
10.5	22	10.23%	0.41	8.93
11.0	28	13.02%	0.46	12.88
11.5	10	4.65%	0.48	4.80
12.0	4	1.86%	0.50	2.00
12.5	2	0.93%	0.61	1.22
13.0	4	1.86%	0.71	2.85
13.5	1	0.47%	0.65	0.65
14.0	1	0.47%	0.82	0.82
15.0	2	0.93%	1.17	2.34
15.5	1	0.47%	0.96	0.96
16.0	1	0.47%	1.59	1.59
TOTAL	215			67.34

BLACK CRAPPIE

3.5	7	7.61%	0.02	0.14
5.5	2	2.17%	0.08	0.15
6.0	6	6.52%	0.11	0.65
6.5	28	30.43%	0.12	3.30
7.0	25	27.17%	0.15	3.85
7.5	18	19.57%	0.17	3.13
8.0	6	6.52%	0.20	1.20
TOTAL	92			12.42

BROWN BULLHEAD

<3.0	4	10.26%	0.01	0.04
3.5	1	2.56%	0.03	0.03
7.0	3	7.69%	0.17	0.52
7.5	4	10.26%	0.21	0.83
8.0	1	2.56%	0.23	0.23
9.0	3	7.69%	0.40	1.20
9.5	6	15.38%	0.42	2.51
10.0	11	28.21%	0.52	5.76
10.5	5	12.82%	0.56	2.82
11.5	1	2.56%	0.65	0.65
TOTAL	39			14.59

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CHANNEL CATFISH

8.5	3	9.68%	0.31	0.92
9.0	1	3.23%	0.35	0.35
9.5	3	9.68%	0.32	0.95
10.5	1	3.23%	0.56	0.56
11.0	3	9.68%	0.71	2.12
11.5	1	3.23%	0.72	0.72
14.0	1	3.23%	0.83	0.83
14.5	1	3.23%	0.98	0.98
15.0	2	6.45%	0.94	1.88
15.5	3	9.68%	0.97	2.91
16.0	2	6.45%	1.13	2.26
16.5	1	3.23%	1.31	1.31
17.0	4	12.90%	1.44	5.74
18.0	1	3.23%	2.08	2.08
18.5	2	6.45%	1.98	3.95
19.0	2	6.45%	2.43	4.86
TOTAL	31			32.42

REDEAR SUNFISH

<3.0	1	12.50%	0.01	0.01
8.5	1	12.50%	0.52	0.52
9.0	1	12.50%	0.66	0.66
10.0	1	12.50%	0.99	0.99
10.5	1	12.50%	1.09	1.09
11.0	2	25.00%	1.15	2.30
11.5	1	12.50%	1.39	1.39
TOTAL	8			6.96

WHITE SUCKER

11.5	1	20.00%	0.74	0.74
14.0	1	20.00%	1.22	1.22
14.5	1	20.00%	1.39	1.39
16.0	2	40.00%	1.95	3.89
TOTAL	5			7.24

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GREEN SUNFISH

<3.0	2	50.00%	0.01	0.02
5.0	1	25.00%	0.10	0.10
5.5	1	25.00%	0.12	0.12
TOTAL	4			0.24

GOLDEN SHINER

4.0	1	33.33%	0.02	0.02
4.5	2	66.67%	0.03	0.06
TOTAL	3			0.08

COMMON CARP

27.0	1	33.33%	10.25	10.25
TOTAL	1			10.25

SPOTFIN SHINER

<3.0	1	33.33%	0.01	0.01
TOTAL	1			0.01

Species	Scientific Name	N	%N	Size Range (in.)	Total weight (lbs.)	%Wt.	N/hr.
Bluegill	*Lepomis macrochirus*	761	60.49%	<3.0-7.5	99.64	31.52%	435
Gizzard Shad	*Dorosoma cepedianum*	215	17.09%	4.0-16.0	67.34	21.30%	123
Largemouth Bass	*Micropterus salmoides*	98	7.79%	<3.0-20.0	64.97	20.55%	56
Black Crappie	*Pomoxis nigromaculatus*	92	7.31%	3.5-8.0	12.42	3.93%	53
Brown Bullhead	*Ameiurus nebulosus*	39	3.10%	<3.0-11.5	14.59	4.61%	22
Channel Catfish	*Ictalurus punctatus*	31	2.46%	8.5-19.0	32.42	10.25%	18
Redear Sunfish	*Lepomis microlophus*	8	0.64%	<3.0-11.5	6.96	2.20%	5
White Sucker	*Catostomus commersonii*	5	0.40%	11.5-16.0	7.24	2.29%	3
Green Sunfish	*Lepomis cyanellus*	4	0.32%	<3.0-5.5	0.24	0.08%	2
Golden Shiner	*Notemigonus crysoleucas*	3	0.24%	4.0-4.5	0.08	0.03%	2
Common Carp	*Cyprinus carpio*	1	0.08%	27.0	10.25	3.24%	1
Spotfin Shiner	*Cyprinella spiloptera*	1	0.08%	<3.0	0.01	0.00%	1
Total		1258			316.16		

N = number of individuals
%N = percent number of a species as compared to the total number of fish collected
%Wt = percent weight of a species as compared to the total weight of all fish collected
N/hr. = catch rate of species (number of fish of a species collected per hour of electrofishing effort)