

March 14, 2018

Mr. Dave Bayer
Northwood Lake HOA
4905 Northwood Lake Drive West
Northport, AL 35473

Dear Mr. Bayer:

Enclosed, please find your copy of the Management Plan we recently completed for Northwood Lake.

Northwood Lake is presently functioning as a dynamic, balanced fishery. As such, our management recommendations center primarily on reducing the total number of adult predators (largemouth bass), introducing supplemental forage (threadfin shad) and improving the conditions for the production of forage through enhancing the pond's fertility level:

- Initiate an intensive fertilization regime.
- Largemouth bass (13" and less) should be harvested, up to a total of ~1,725 pounds per year.
- Harvest all crappie caught.
- Harvest all spotted bass caught.
- Limit bluegill harvest up to 10 per angler per day.
- Stock 4 loads of threadfin shad in Spring 2018.
- Apply 200 tons of agricultural lime in Winter 2018-19.
- Conduct an electrofishing balance assessment (Annual Evaluation) roughly one year from this date.

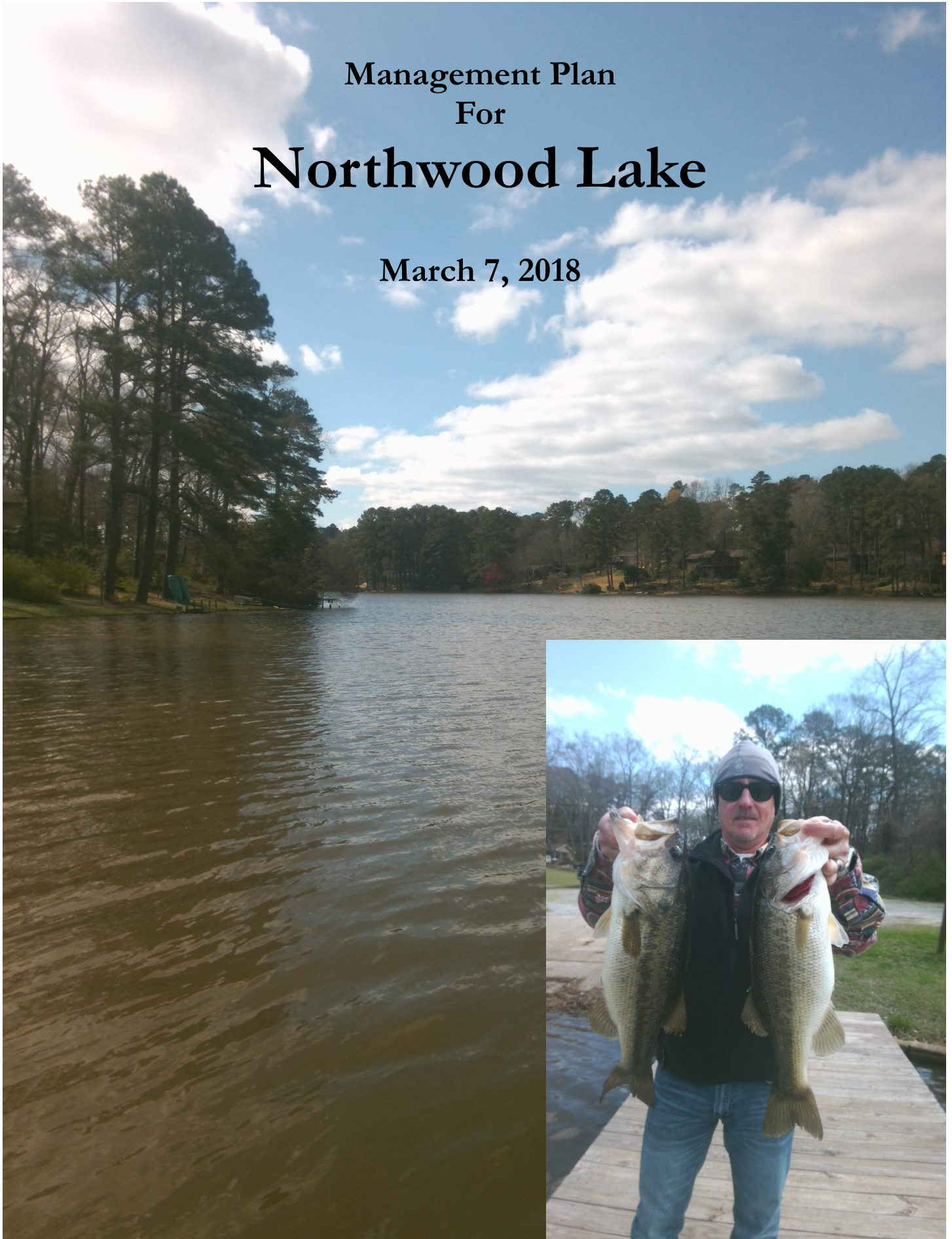
Mr. Bayer, we are always available to discuss these recommendations or answer any other questions you might have.

Good fishing,

Ben Lee

Management Plan
For
Northwood Lake

March 7, 2018





Introduction

Management of bass-bluegill sportfish ponds in the Southeast is based on the ideas of H.S. Swingle, founder of the Fisheries Management program at Auburn University. [Southeastern Pond Management](#) combines Dr. Swingle's management principles with the latest and most innovative management techniques to provide quality pond care. Successful pond management is based on assessing and manipulating pond fertility, aquatic weeds, and fish populations. Control of these three factors allows fish ponds to provide the maximum benefit to the pond owner. It is important to note that "benefit" is defined by the owner and can take the form of trophy bass, trophy bluegill, or a well-balanced fish community. Fortunately, modern pond management is flexible enough to fine-tune a pond to precisely fit the goals of the owner.

[Southeastern Pond Management](#) visited Northwood Lake Property on March 7, 2018, in order to conduct a comprehensive evaluation of the 69 acre [Northwood Lake](#). A representative sample of the fish community was collected by electrofishing to accurately assess the present state of balance between the predator and prey species. In addition, the physical and chemical properties of the water were inspected to assess water quality. The degree of aquatic weed infestation was also recorded. Results of these assessments, plus consultation with Dave Bayer, provide the basis for this management plan.

The goal of this management plan is to create and maintain a balanced fish community with the potential for trophy largemouth bass in [Northwood Lake](#). The following evaluation report and management plan details and explains our recommendations with the following goals in mind:

- ◆ Create conditions favorable for the consistent production of "quality size" and "trophy size" largemouth bass (Table 1).
- ◆ Create conditions favorable for the consistent production of "quality size" bluegill (Table 1).
- ◆ Generally maintain a high level of water quality as well as an aesthetically pleasing environment for aquatic recreation.

Table 1.

	LMB	Bluegill
"Quality Size"	16-20"	7-10"
"Trophy Size"	20"+	10"+

This report is designed with the above interests in mind. Normally, we feel most comfortable with the recommendations listed at the end of this report. However, we encourage you to pursue whatever goals you may choose. In addition, although parts of this report may seem quite technical, we include this information only to clearly illustrate the present fish community structure. As biologists, we depend on the electrofishing survey to show us where management input is necessary.

It is important to note that quality fishing will not be accomplished "overnight". As you read through this plan, bear in mind that the specific activities we have recommended are not one-time inputs, but rather a collection of ongoing management activities that will establish and maintain long-term quality fishing. Proper pond management, like the management of any natural resource, is an ongoing process. Each management input is recommended individually; however, it should be noted that the *management program* suffers if all activities are not implemented. Feel free to contact us and further discuss management ideas you may have.



Electrofishing equipment was used to collect a fish sample from [Northwood Lake](#), March 2018.



Pond Assessment

[Northwood Lake](#) is a 69-acre watershed impoundment located in Tuscaloosa County, Alabama. The pond was originally impounded in 1950. A concrete spillway is present. In addition, we noted a limited amount of cover for bass and bluegill in the form of brush piles and fallen trees.

The surrounding topography is characterized by rolling hills of mostly pine and some hardwood tree growth. [Northwood Lake](#) is located in a region of the state where soils are often relatively infertile, and highly acidic (low pH). Ponds constructed on such soils usually require the application of agricultural lime to ensure a successful fertilization program. At the time of our visit, total water alkalinity was measured at **6.3** parts per million (ppm). This level of alkalinity is well below the minimum recommended threshold of **20** ppm, and represents conditions unsuitable for effective fertilization. [Northwood Lake](#) has not been adequately fertilized in the recent past.

[Northwood Lake](#) appeared to have no plankton bloom at the time of our visit, the result of inadequate fertilization.

[Northwood Lake](#) contains areas along the margins and in the upper end that are less than 3 feet deep and highly susceptible to aquatic weed growth. During the evaluation, we observed a moderate infestation of water lily and a light infestation of water primrose, parrot feather and water pennywort growing along the margins. Descriptions of these plants may be found in the Aquatic Weed Identification section of this report.

Fish harvest has been moderate in the recent past. Harvest, and its importance in structuring fish communities will be discussed later in this report.



[Northwood Lake](#), March 2018.



Fish Community Balance

Ponds and the animals they support are governed by a predator-prey relationship. The interactions of predator and prey are characterized by a concept we refer to as *balance*. By definition, suitable balance in a fish community is characterized by a healthy distribution of both predator and prey over a wide range of age and size classes. In order to assess the relative balance of a fish community, the species functioning as predators and the species functioning as prey must be defined. **Predators** are species which rely on other fish as their primary food source. **Prey** species rely on sources other than fish for their food source.

Classic balance in small impoundments is defined by several parameters, not the least of which involves a suitable ratio (by weight) of predator to prey. Further, the key to maintaining balance in a sport fish pond is a healthy size distribution of both predator and prey. If one size-class becomes overly abundant or lacking, a condition of imbalance results. By analyzing an electrofishing sample it is possible to determine the state of balance within a given fish community.

In fisheries science, the *condition* of individual fish is used as another indicator of the overall balance of the entire fish community. Relative weight (W_r) is an index used to categorize the condition of fish within a given population. Calculated W_r values greater than 100 indicate

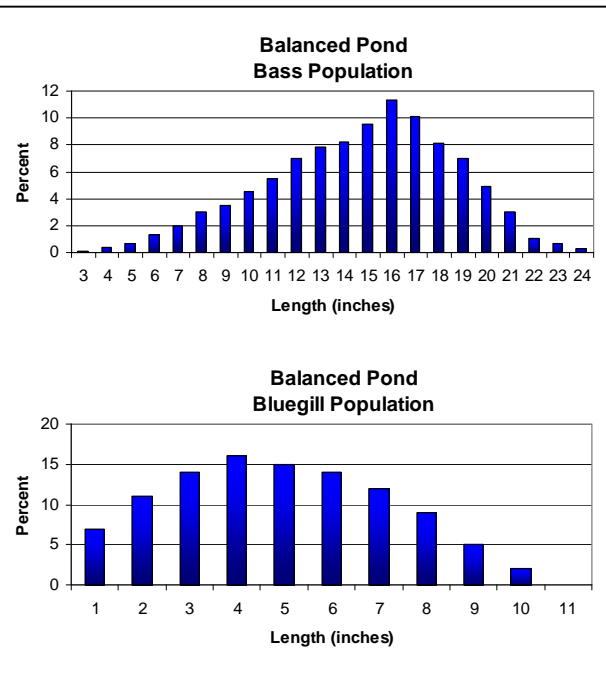


Figure 1. Length distribution of bass and bluegill in a typical balanced pond.

plump, robust fish. W_r values less than 100 suggest that individuals are in less than excellent condition, perhaps the result of some predator:prey imbalance. W_r values less than 85 would indicate malnourished fish; a sign of intense competition for forage.

Figure 1 depicts balanced populations of predator and prey in a typical sport fish pond. Note that all sizes are well represented; no noticeable gaps are present.



Predator and prey fish are measured and weighed to analyze the overall balance of the fish community.



Fishery Assessment

The fishery in [Northwood Lake](#) was sampled with standard boat-mounted electrofishing equipment. The sample contained largemouth bass, Northern bluegill, crappie, catfish, spotted bass and redear sunfish (shellcracker). Currently, largemouth bass, crappie, catfish and spotted bass are functioning as the primary predators in [Northwood Lake](#). The bluegill and shellcracker are the prey.

Largemouth bass ranging in size from 3 to 21 inches in total length were collected in moderate abundance (Figure 2). The bass population was dominated by two distinct size ranges: 12 to 13 inches and 15 to 17 inches. Largemouth bass 13 inches and smaller represent the primary targets for harvest over the coming months.

The larger bass collected from [Northwood Lake](#) were individually tagged with an identification number so their growth can be monitored (refer to the Tagged Fish Data section of the report).

Bluegill and shellcracker were collected ranging in size from 2 to 9 inches in total length. Figure 3 depicts the length distribution of the bluegill population. Of note, an abundant amount intermediate (3-5") bluegill were collected. Further, mature adult bluegill were present in the sample. These items collectively require management attention.

The average relative weight of adult bass collected from [Northwood Lake](#) was 94 (Figure 4). In other words, most of the adult bass were in relatively good condition. The bass population is dominated by healthy individuals.

Overall, we characterize the fish community in [Northwood Lake](#) as balanced. A more detailed explanation of balanced ponds in general, and [Northwood Lake](#) in particular is located in the Current State of Balance section of this report.

Management inputs aimed at keeping the fishery toward balance are listed in the Recommended Management Activities section of this report.

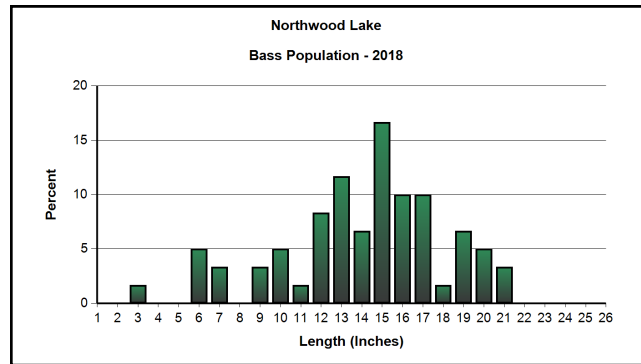


Figure 2. Length distribution of bass collected from [Northwood Lake](#) in March 2018.

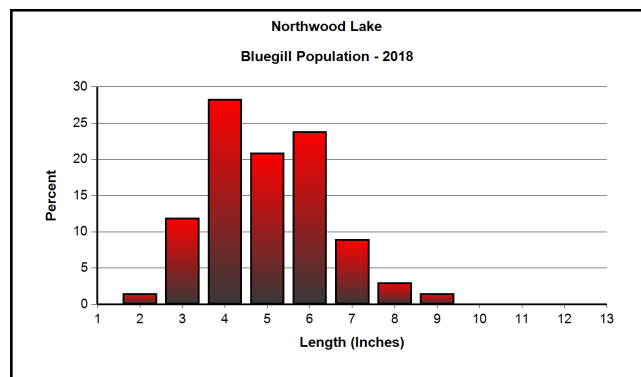


Figure 3. Length distribution of bluegill collected from [Northwood Lake](#) in March 2018.

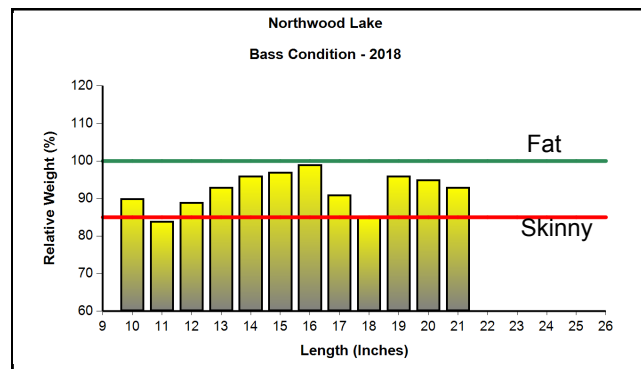


Figure 4. Relative weights (W_r) of adult largemouth bass collected from [Northwood Lake](#) in March 2018.



Length, Weight, and Condition of Tagged Bass in Northwood Lake March 7, 2018

Tag #	Length (in)	Weight (lbs)	W _r
1829	21.1	4.6	85 %
1828	20.0	4.4	96 %
1826	21.4	5.7	100 %
1825	19.9	4.1	91 %
18030	19.6	4.1	97 %





Balance

Most pond management activities are centered on creating or maintaining a balanced fish community. A balanced sport fish pond is preferred by most anglers because it provides quality bass and bluegill, both in terms of number and size. A balanced fish community is characterized by a wide size distribution of bass, bluegill and other forage species; adequate reproduction of all species is present.

As mentioned previously, our recent electrofishing sample from [Northwood Lake](#) contained a healthy distribution of bass across many different size groups. Additionally, the majority of the bass were in good condition. Bass in the 14 to 16 inch length group were in excellent condition, indicating an abundant forage base for this length group of bass. However, bass in the 10 to 13 inch group were in slightly poorer condition, indicating the need for selective bass harvest and/or supplemental forage stocking to maintain a well balanced fishery.

The presence of intermediate size (3-5") prey is critically important in sport fish ponds. These individuals are the size preferred by the more abundant, younger bass in a typical population. A

high relative abundance of intermediate size prey is often an indication of a balanced pond.

When a state of balance exists, intermediate size prey are among the most abundant segment of the overall fish community. Under these conditions, bass typically grow quickly, and are capable of reaching their full growth potential.

During our electrofishing sample, we observed a healthy forage base, particularly the distribution of intermediate sized prey. In order to maintain the predatory:prey balance and the continued growth of bass in [Northwood Lake](#), it will be necessary to ensure that conditions for the production of forage such as fertilization, supplemental feeding and selective bass harvest are sustained or even enhanced.

In a typical fertilized sport fish pond, bass harvest is required in order to prevent overcrowding. The old idea of "throw him back and catch him when he gets bigger" is not a sound approach in small impoundments. If sufficient harvest does not occur, a bass-crowded condition is the likely result. This usually leads to a low quality bass fishery.

Strategies to improve the quality of the bass and bluegill fishing are discussed in the Recommended Management Activities section of the report.



A balanced pond supports an abundance of bass, bluegill and other forage species of all sizes.



Fish Harvest

One of the keys to a balanced fish community, as well as the growth of trophy largemouth bass in your pond, is the selective removal of largemouth bass. Largemouth bass, when present with bluegill as their primary source of forage, produce an annual surplus which must be harvested in order to maintain balance. We generally recommend harvesting the smaller, more abundant size range of bass at a rate of **25 to 35 pounds per acre per year**. Bass harvest rates are designed to reduce the level of predation on the bluegill population as well as increase the growth rate and condition of the remaining bass. Recommended harvest quotas often change in response to population changes and should be re-evaluated annually. Harvesting largemouth bass can be accomplished by the following methods:

(1) **Hook and Line Harvest:** Largemouth bass of the appropriate size should be removed whenever they are caught up to the harvest goals. A record should be kept of the total number and weight of bass removed during each fishing trip. Larger bass, those presently exceeding the size limit, may be "protected" since these represent the potential trophy bass in the pond.

(2) **Electrofishing Harvest:** Selective bass harvest through electrofishing is a particularly effective management tool. This method of harvest may be quite productive if hook-and-line efforts are not



A measuring device should be kept handy to determine the correct size bass to harvest.

adequate. The cost for this service is based on time spent (hourly). We will keep close records of the total number and weight of individuals removed.

One important point is that bluegill and shellcracker harvest is strictly optional in balanced ponds. It is not necessary to harvest a certain weight of bluegill per acre to maintain the predator/prey balance or to prevent bluegill overpopulation. The bass will more than adequately control bluegill numbers. Typically, a generous amount of adult bluegill can be harvested in a well-fertilized, balanced lake. However, over-harvest of bluegill may be a concern, depending on the number of anglers and fishing pressure. We often recommend limiting bluegill harvest to **10 per person per day** in bass-crowded ponds to prevent over-harvest. In severely bass-crowded ponds, we recommend **suspending bluegill harvest** until the population increases through management efforts.



Bass must be harvested at the proper rate each year in order to maintain a balanced fish community in small impoundments.



Lime Application

Water alkalinity plays a large role in the health and productivity of fish communities. The water alkalinity of a pond is determined by the soil pH and the alkalinity of the water source feeding the pond. Highly alkaline soils in the watershed of a pond (such as in the black belt) help promote the growth of phytoplankton, the base of the food chain, by allowing full availability of the nutrients in the system. Alkaline soils also have a high buffering capacity, which reduces broad daily fluctuations in pH.

Most small impoundments across the Southeast however, have relatively acidic soils in their watershed and require periodic applications of lime to maintain a total alkalinity of at least 20 ppm of CaCO_3 . This minimum alkalinity level is required to have high nutrient availability to phytoplankton communities, thus maximizing the effectiveness of a

fertilization program. In lakes with an alkalinity reading of less than 20 ppm, we recommend applying a liberal dose of agricultural limestone.

There exists no “magic formula” to determine the amount of lime required to increase and maintain total alkalinity above the 20 ppm threshold. Many lakes in the Southeast seem to require only 2-3 tons per acre in order to meet the initial “lime requirement”. However, since you cannot apply too much lime to a pond and the more applied, the longer the benefit, it is usually more cost effective to apply larger amounts of lime, such as 4 to 8 tons/acre, at longer intervals.

The length of time between necessary lime applications is very difficult to predict. There are many environmental variables at play such as: 1) beginning alkalinity of the water, 2) amount of water flowing through the pond, 3) other sources of alkalinity (springs, etc.), 4) amount of tannic acid released in the water from trees and leaf matter and 5) amount of acidic soil particles entering the water.

The method of lime application is critically important to the effectiveness and longevity of a liming effort. Agricultural lime does not readily

dissolve in water, rather it sinks and reacts with the soil on the pond bottom. Therefore, proper application of lime involves uniform distribution of the



Alkalinity tests quickly indicate the need for lime in ponds.



Bulk lime is applied by washing it directly into the water in such a way that it covers most of the lake bottom.

material over at least 80-90% of the surface of a lake. This is best accomplished using a specialized boat called a liming barge. Bulk lime is loaded directly onto the front platform of the barge; it is then washed from the platform with water from a high pressure pump as the boat is slowly driven throughout the pond.



Fertilization

The concept of *carrying capacity* describes the total biomass (i.e., weight) of fish a pond is capable of producing. A given body of water, subject to varying levels of fertility, has a finite limit, or carrying capacity, in terms of the overall biomass which it can support. Lake fertility limits the number as well as the average and maximum size of fish present.

The limiting nutrient in most freshwater systems, as it relates to plankton production and a generally high level of fertility, is phosphorous. Phosphorous must be added on a regular basis during the growing season in order to stimulate significant plankton growth. Plankton, both plant and animal, are the base of the food chain in ponds. Infertile ponds, those with low alkalinity and relatively little nutrient input, are characterized by low levels of plankton production. In effect, this limits the amount of food available to the small insects and insect larvae which are the next link in the food chain. The *ripple effect* of low fertility is observed far up the food chain, all the way to the primary predators, largemouth bass. In order to create and maintain a high level of plankton production, thus providing conditions most favorable for fish production, fertilizing on a regular basis is required.

Fertilization takes place during the growing season, from March through October. We recommend SportMAX® Water Soluble Pond Fertilizer (10-52-4), applied at a rate of 4-8 pounds per surface acre per application. Fertilizer should be applied according to the Standard Pond Fertilization Schedule:



When you subscribe to our Fertilization Service, our technicians will routinely visit your pond and properly apply fertilizer. A well fertilized pond should have 18 to 24 inches of visibility.

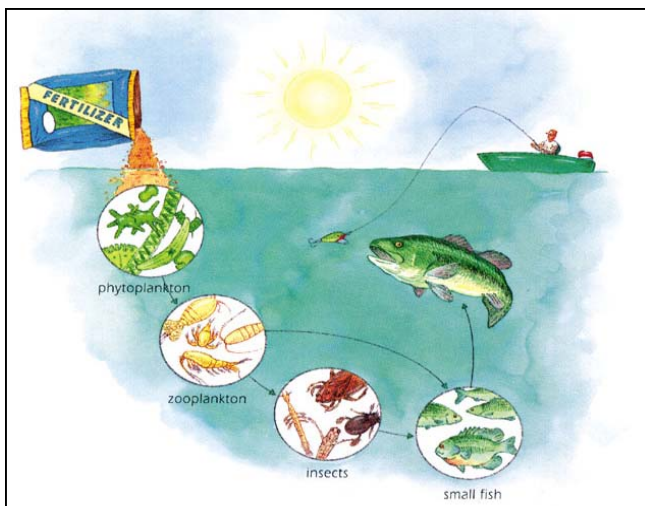
Standard Pond Fertilization Schedule

- ◆ Beginning in early March, make three applications at two week intervals.
- ◆ Make the next three applications at three week intervals.
- ◆ Thereafter, apply once per month or whenever visibility exceeds 18-24 inches.
- ◆ Cease fertilization by the end of October.

Our **Fertilization Service** completely removes the burden and nuisance of fertilizing your lake. Our trained technicians will visit your pond, at prescribed intervals, carefully measuring and recording water visibility and applying the proper dosage of fertilizer. Our visits are conveniently recorded on a small sign, situated on the pond bank. In addition, we regularly check and log total water alkalinity as well as keep an eye out for potentially problematic vegetation.

Fertilization is the most basic and important element necessary to create an environment conducive to the production and growth of sport fish.

The cost of our Fertilization Service is listed in the Recommended Management Activities section of this report.



Food chain of a typical fertilized pond.



Supplemental Forage Stocking

The harvest of largemouth bass at the proper size and rate can be quite challenging in sport fish lakes, especially if they are not fished extensively. When the annual largemouth bass harvest falls short of the recommended quota, stocking supplemental forage becomes extremely important in efforts to maintain an adequate forage base. An abundance of forage must be available at all times in order to maximize the growth of top-end predators such as largemouth bass. The feeding behavior and movement patterns of adult predators change frequently. Therefore, the presence of a variety of forage types, occupying different habitats within the pond, tends to maximize predator:prey encounters and improves overall foraging efficiency.

In your lake, the introduction of **threadfin shad** (*Dorosoma petenense*) will be highly constructive. The benefits to stocking threadfin shad are numerous. The combination of a relatively small adult size, coupled with their ability to reproduce in large numbers, make threadfin shad a near perfect food for the most abundant size group of largemouth bass. Most often, results of successfully establishing threadfin shad into a lake will be observed in improved growth rates for all size groups of bass. In addition, by partially shifting

bass predation from bluegill to shad, more bluegill will reach the important *intermediate* size range. Finally, through subtle interactions lower in the food chain, threadfin shad effectively reduce bass *recruitment*. In other words, fewer bass fingerlings survive to adulthood, thereby reducing the annual bass surplus. The bass that are *recruited* into the adult population will enjoy an increased abundance of prey, which leads to enhanced growth rates and a larger maximum size.

Threadfin shad frequently exhibit a distinctive schooling behavior, most often in open-water areas. In fact, the shad's primary defense against predators is its ability to seek out open water, away from where predators are more likely to be waiting to ambush prey. Once the bass figure out this behavior, the jig is up. Ponds with abundant shad populations frequently enjoy excellent top-water fishing action, oftentimes in or around schools of shad in open water.

Threadfin shad typically have two distinct heavy spawning periods: in the Spring and again in early Fall. Stocking is most often recommended immediately prior to or during a heavy spawning period. Stocking rates are designed to establish a sustainable population of threadfin shad and vary depending on the size of the lake and its state of balance.



Threadfin shad are ideal forage for increasing the growth and condition of largemouth bass. Adults range from 3 to 7 inches.



Aquatic Weed Control

Aquatic weed growth can be a serious problem in recreational ponds. Weeds use up important nutrients in fertilizers that are intended for fish production, as well as interfere with normal activities such as fishing and swimming. In addition, excessive weed growth detracts from the aesthetic value of a pond, particularly if it is the focal point of a recreational area.

There are three approaches we use to prevent or reduce unwanted aquatic weeds. They can be placed in 3 different categories: chemical control, biological control, and sunlight-limiting control. Often, an integrated approach involving a combination of these tools offers the most effective solution.

Chemical control involves the use of aquatically approved herbicides to reduce or eradicate aquatic weeds. Although chemical control can be costly on large areas, it is usually the best method for a quick response.

The most common form of biological control is stocking grass carp. Grass carp are often introduced into ponds at low stocking densities as a preventive measure before weeds become established. However, once weeds have become established, a higher density of grass carp is needed to control them. Grass carp readily eat a variety of common weeds, do not reproduce, and are fairly inexpensive. Typically, grass carp become less effective when they reach 6 to 7 years old and must



Herbicide application is typically the quickest form of weed control.



Grass carp are often introduced for long-term control (top). Pond dyes temporarily limit sunlight to retard aquatic weed growth (bottom).

be restocked. One drawback to grass carp is their propensity to train on pellet food intended for bluegill; thereby reducing the effectiveness of a supplemental feeding program.

There are also a variety of water colorants or dyes that can be added to ponds before weeds become established that limit sunlight penetration and “shade out” certain types of weeds. A regimented fertilization program is often the most effective form of sunlight-limiting control. Typically, phytoplankton blooms stimulated early in the spring through fertilization can shade out potential weed growth before it becomes a problem.

Color photos, including distinguishing characteristics and growth habits of the aquatic vegetation in your pond, are listed in the following Aquatic Weed Identification section.



Common Name: Fragrant Water Lily

Scientific Name: *Nymphaea odorata*

Distinguishing Characteristics:

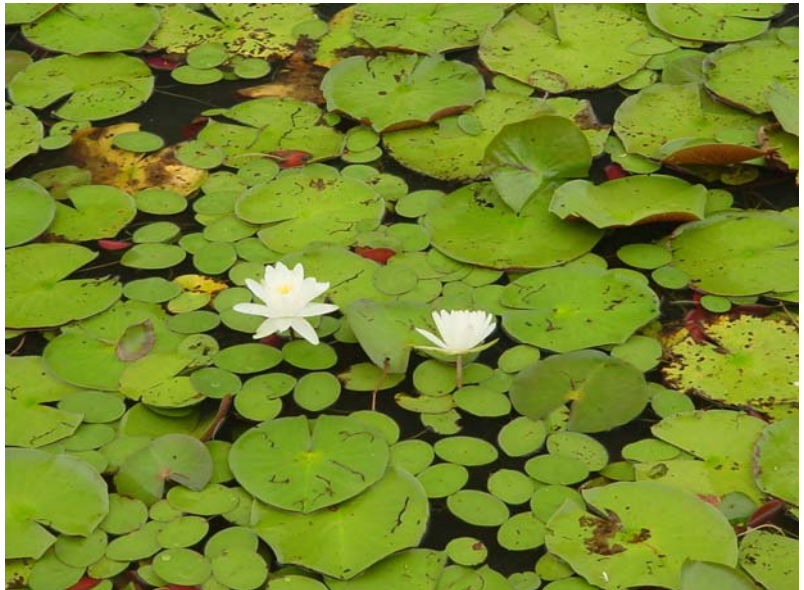
Lily pad medium to large, almost perfectly round, with single notch to center. Usually smaller lily pads of various sizes mixed in. Lily pad usually floats and edges may curl up. Underside of lily pad deep brownish-purple. Flowers showy, fragrant blooms that appear as large snowballs from a distance. Colors vary.

Growth Habit:

Floating-Leaved.

Management Program Impact:

Moderate.





Common Name: Parrotfeather

Scientific Name: *Myriophyllum aquaticum*

Distinguishing Characteristics:

Leaves in whorls along stem. Leaves bright, blue-green and have “feathery” appearance.

Growth Habit:

Emersed. Stems trail along ground or in tangled mass on water surface. Stems become erect on ends and grow out of water.

Management Program Impact:

Moderate.





Common Name: Water Pennywort

Scientific Name: *Hydrocotyle* sp.

Distinguishing Characteristics:

Small plant with single, terminal leaf shaped like a half-dollar. Rounded, blunt teeth along leaf margin. Leaf shiny and leathery. Stem attaches to bottom center of leaf.

Growth Habit:

Emersed. Two growth forms:

- Short plant (less than 1 foot) grows in moist soil or shallow water.
- Tangled mass of fine stems with floating leaves. Sometimes forms dense mats.

Management Program Impact:

Moderate.





Common Name: Water Primrose

Scientific Name: *Ludwigia* sp.

Distinguishing Characteristics:

Leaves arranged oppositely. Flowers yellow if present.

Growth Habit:

Emerald. Could be sprawling across surface of water or erect in moist areas along the shoreline.

Management Program Impact:

Low to moderate. Favorable in small amounts.





Dam and Shoreline Maintenance

Dam and shoreline maintenance should be addressed periodically to ensure the integrity of the dam and overall recreational value of the pond. The dam should be kept free of trees; roots may eventually tunnel into the dam, creating weak spots. If mature trees are already present, they should not be cut down, as dead and decaying roots are potentially more harmful. Generally, trees less than 4 inches in diameter at breast height do not have roots penetrating the core of the dam and should be removed before they become a threat to the structure of the dam.

In an effort to prevent erosion the entire dam should be covered with a manageable grass. Large rock is recommended at the waterline along the dam face if there is the potential for erosion from wave action. The spillway should also have some type of erosion prevention. The amount and frequency of water flow should determine the type. The bottom and sides of the spillway should be lined with large rock or concrete if water flows across it often. For

spillways that are used less frequently, well maintained grass provides sufficient erosion protection. Spillways should be checked periodically and any debris should be cleared.

Additionally, the shoreline and surrounding watershed should be vegetated to prevent erosion and muddy water. If necessary, livestock should be provided limited access to the pond. Heavier vegetation should be trimmed or treated with herbicide.

Beavers and muskrats can cause aesthetic and structural damage to sport fish lakes. Large rock placed along the waterline of the dam will usually prevent beavers and muskrats from boring in. Trees can be protected by wrapping steel mesh around the base of the tree to a height of about 4 feet. Otters often visit ponds from nearby creeks and can have a significant impact on the fish population. Droppings with scales and fish bones are evidence of otter visits. These nuisance animals should be removed as soon as detected. Techniques include body-gripping traps, snares, foothold traps, and shooting. Permits and licenses may be required.



Beavers and muskrats can bore in to the side of the dam and weaken its structure. Emergency spillways should be lined with concrete if they receive heavy flow (inset).



Annual Evaluation

In addition to ongoing management, your pond should be checked on a regular basis. Our annual maintenance plan includes an aquatic weed assessment, a water test to determine lime requirement, and an electrofishing balance check to assess the fish community.

Regular electrofishing evaluations are necessary to assess the effectiveness of a management program. Electrofishing allows us to stay on top of the pond's condition in order to make necessary changes in management recommendations.



Annual electrofishing evaluations determine the effectiveness of management practices.



Summary of Management Recommendations

Northwood Lake is functioning as a balanced system that has a low level of fertility. Several management inputs are necessary to maintain a state of balance as well as increase the total density of sport fish. The management activities we are recommending for **Northwood Lake** will center on reducing the total number of adult predators, introducing supplemental forage, and enhancing the conditions for the production of forage.

To create conditions suitable for effective fertilization, we recommend **applying at least 200 tons of agricultural limestone** this winter. To maintain a high density of sport fish as well as help control aquatic vegetation, we recommend **initiating an intensive fertilization program** in **Northwood Lake**. **SportMax® Water Soluble Pond Fertilizer** (10-52-4) should be applied according to the *Standard Pond Fertilization Schedule*.

For **Northwood Lake**, **harvest bass 13 inches and smaller** at a rate of **25 pounds per acre per year** (1,725 lbs./yr.). The recommended bass harvest rate and size will likely change over the next few years as the fish community responds to management inputs.

We recommend **limiting bluegill harvest** in **Northwood Lake** to a “consumptive” level, meaning ONLY bluegill and shellcracker which are intended for table fare should be removed; the over-harvest of adult bluegill, particularly during the spawning season, may lead to a decrease in the total number of mature, adult bluegill and a corresponding decline in angling catch per unit of effort. **Annual electrofishing evaluations** will help determine if fish harvest recommendations should be adjusted.

Supplemental forage in the form of threadfin shad should be stocked in order to enhance the growth and condition of the largemouth bass.

Aquatic weed control will also be an integral part of the management program for **Northwood Lake**. Water lily, water primrose, parrot feather and water pennywort have the potential to multiply quickly and should be monitored closely, particularly during the growing season. We feel that the quickest and most efficient way to control aquatic weeds in **Northwood Lake**, if they should become a problem in the future, is by herbicide application.

Finally, **additional cover in the form of brush or rock piles** would increase the catch rates of sport fish in **Northwood Lake**.

The management activities we recommend over the course of the next twelve months are listed in the following pages. In an effort to assist in the prioritization of these management inputs, we have developed a simple color-coding system. You will note this system in the bottom right-hand corner of the respective Management Recommendations to follow:

LEVEL 1

Highest priority. Generally, require immediate attention.

LEVEL 2

Secondary in importance to Level 1. Directed toward achieving your stated management objectives.

LEVEL 3

Increase enjoyment and/or functionality of your pond but have less impact on the overall management program.



ANNUAL HARVEST

ANNUALLY
2018

Current Status: Owner Responsibility

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Harvest ~1,725 pounds of LMB (13" inches and less)

COST:
Hook and line: N/A

LEVEL 1

ANNUAL HARVEST

ANNUALLY
2018

Current Status: Owner Responsibility

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Harvest all crappie caught

COST:
Hook and line: N/A

LEVEL 1

ANNUAL HARVEST

ANNUALLY
2018

Current Status: Owner Responsibility

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Harvest ALL spotted bass caught

COST:
Hook and line: N/A

LEVEL 1

BG HARVEST

ANNUALLY
2018

Current Status: Owner Responsibility

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Harvest bluegill up to 10 per angler per day

COST: N/A**LEVEL 1**



FERTILIZATION ROUTE

SPRING 2018

Current Status: Awaiting Owner Approval

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Initiate fertilization program

COST: \$ 623.20 per application*

* Price subject to change. Cost includes 4 pounds of fertilizer per acre applied by our technicians according to the Standard Pond Fertilization Schedule. Additional fertilizer may be applied to achieve desired results. Cost of additional fertilizer is \$1.95 per pound, also subject to change.

LEVEL 1

THREADFIN SHAD

SPRING 2018

Current Status: Awaiting Owner Approval

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Stock 4 loads (~40,000) adult threadfin shad

COST: \$ 1,900.00/load*

* This price does not include delivery.

LEVEL 1

LIME APPLICATION

WINTER
2018-19

Current Status: Awaiting Owner Approval

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Apply 200 tons of agricultural limestone

COST: \$ 75.00/ton*

* This price includes purchase and delivery of lime, application of lime and the cost of a loader/operator. An additional mileage charge will be added.

LEVEL 1

ANNUAL EVALUATION

SPRING 2019

Current Status: Awaiting Owner Approval

☐ Approved ☐ Declined ☐ Done

Date Approved: _____

Date Done: _____

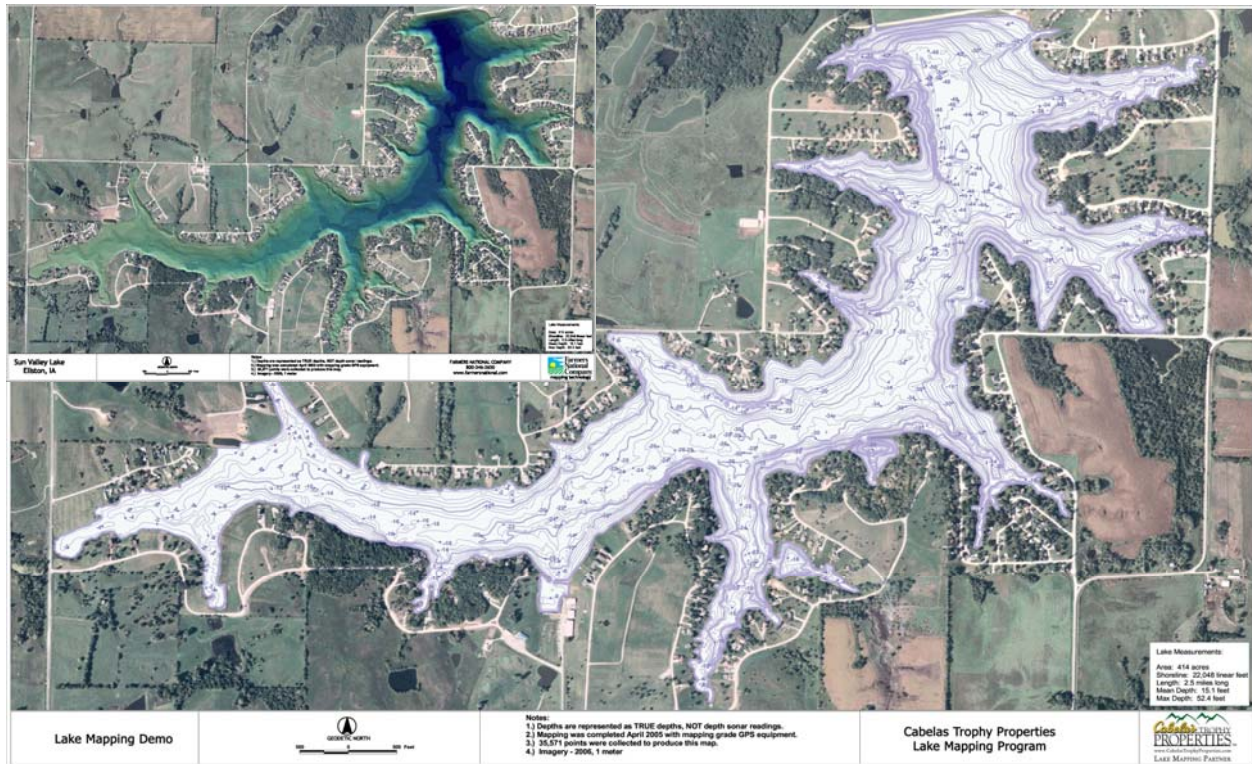


MANAGEMENT ACTIVITY:
Annual electrofishing evaluation

COST: \$ 950.00*

* This price includes comprehensive written Management Report. An additional mileage charge will be added.

LEVEL 1



Lake and Land Mapping

Southeastern Pond Management (SPM) has partnered with Cabela's Trophy Properties to bring you the most innovative designs of lake and land mapping. Using state of the art Global Positioning Systems (GPS) together with an advanced depth sounder, not only can we map your property, we now have the technology to create more advanced lake maps. This technology allows us to pinpoint humps, stumps, channels, and many other fish attracting features of your lake.

Lake mapping is a widely used tool for marking fishing hotspots in lakes and reservoirs, but when

applied to private waters, these maps can be a useful management tool as well. Our lake maps will estimate the exact acreage and volume of your lake, which can assist with many management activities such as fish stocking, aquatic weed control, and sediment accumulation and removal. We offer a variety of different lake map options including contour mapping, 3D mapping, and electronic swim through technology. The 3D swim through technology allows you to experience your lake from the eyes of the fish!

Land mapping technology is an extremely useful tool for property managers, hunting clubs, timber management or just recreational enjoyment. We can design several different land maps including contour maps, aerial imagery, and electronic fly through technology. These maps can display features such as property boundaries, green fields, and many more.

We offer maps in all different sizes from 8"x11" up to large scale wall maps. Our biologists will work closely with you in deciding which type and various features are best suited for the design of your new SPM lake or land map. If you are interested in learning more about the Lake and Land Mapping program we offer, please contact us and we will gladly answer any questions you may have.



Pond Mapping

Bass Harvest Records

[illegible]

Bass Harvest Records

[illegible]

Tagged Fish Data

[illegible]

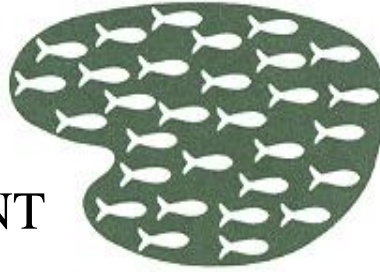
Fertilizer Application Records

[illegible]

Other Records

[illegible]

SOUTHEASTERN
POND
MANAGEMENT



“Managing Your Liquid Assets”

Southeastern Pond Management

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(205) 664-5596

Auburn Office

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Auburn, AL 36830
(334) 887-7663

Mississippi Office

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