

May 5, 2016

Mr. Chris Madden
3480 Woodland Lake Drive
Hernando, MS 38632

Dear Mr. Madden:

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

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

- Initiate an intensive fertilization regime.
- Initiate an intensive supplemental feeding regime.
- Largemouth bass (13" and less) should be harvested, up to a total of ~7,500 pounds per year.
- Limit bluegill harvest to a consumptive level.
- Harvest crappie at will.
- Stock 8 loads of threadfin shad in Spring 2016.
- Stock 7,000 pounds of crawfish in Spring 2016.
- Conduct an electrofishing balance assessment (Annual Evaluation) roughly one year from this date.

Mr. Madden, thanks for having us out to Woodland Lake. It looks like a good fishing lake with great potential! Large-mouth bass reproduction seems to be very high in Woodland Lake. With that being said, adequate bass harvest is vital in order to achieve a balanced fishery. Do not be afraid to harvest crappie as well. Harvest of bluegill and shell-cracker should be limited to an immediate consumptive level. A daily creel limit would be a good idea to prevent over harvest. The addition of threadfin shad and crawfish will give the largemouth bass the boost they need to grow out of the 10 to 13 inch range. We are always available to discuss these recommendations or answer any other questions you might have.

Good fishing,

Darren Parks
Southeastern Pond Management
Dparks@sepond.com
(731)-441-9068

Management Plan
For
Woodland Lake

April 22, 2016





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 Woodland Lake on April 22, 2016, in order to conduct a comprehensive evaluation of the 300 acre Woodland 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 provide the basis for this management plan.

The goal of this management plan is to create and maintain a balanced fish community in Woodland 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.

This report is designed with the above interests

Table 1.

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

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 Woodland Lake, April 2016.



Pond Assessment

Woodland Lake is a 300-acre watershed impoundment located in Desoto County, Mississippi. It is unknown when the pond was originally impounded. 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. Woodland Lake is located in a region of the state where soils are often relatively fertile, and highly alkaline (high pH). Ponds constructed on such soils usually do not require the application of agricultural lime to ensure a successful fertilization program. At the time of our visit, total water alkalinity was measured at **38** parts per million (ppm). This level of alkalinity is well above the minimum recommended threshold of **20** ppm, and represents conditions suitable for effective fertilization. Woodland Lake has not been adequately fertilized in the recent past.

Woodland Lake appeared to have a moderate plankton bloom at the time of our visit, but a consistent fertilization regime would produce an excellent plankton bloom.

Woodland 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. We did not observe any problematic aquatic vegetation at the time of our visit. Aquatic weeds and problems associated with them will be discussed in the Aquatic Weed Control section of this report.

It is unknown how Woodland Lake was originally stocked. Fish harvest has been limited in the recent past. Harvest, and its importance in structuring fish communities will be discussed later in this report.



Woodland Lake, April 2016.



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 (Wr) is an index used to categorize the condition of fish within a given population. Calculated Wr values greater than 100 indicate

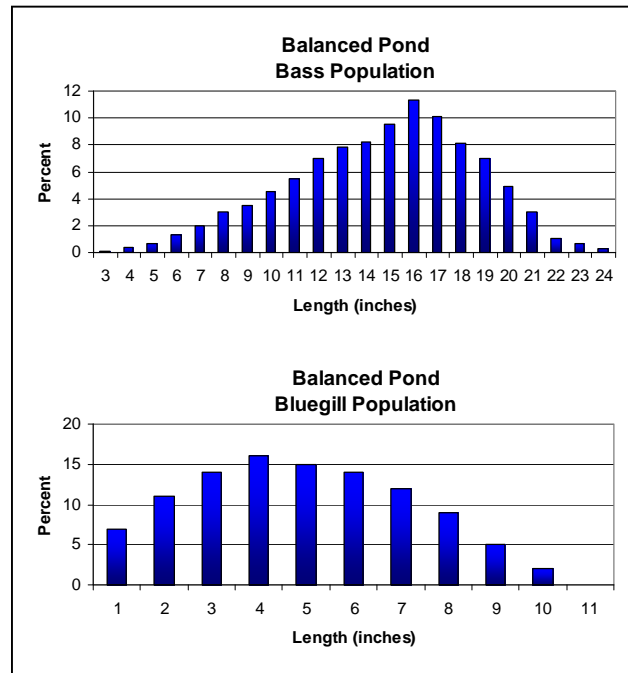


Figure 1. Length distribution of bass and bluegill in a typical balanced pond.

plump, robust fish. Wr values less than 100 suggest that individuals are in less than excellent condition, perhaps the result of some predator:prey imbalance. Wr 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 Woodland Lake was sampled with standard boat-mounted electrofishing equipment. The sample contained largemouth bass, bluegill, gizzard shad, crappie, catfish, green sunfish, and redear sunfish (shellcracker). Currently, largemouth bass, crappie, and catfish are functioning as the primary predators in Woodland Lake. The bluegill, shad, and shellcracker are the prey.

Largemouth bass ranging in size from 4 to 22 inches in total length were collected in moderate abundance (Figure 2). The bass population was dominated by two distinct size ranges: 5 to 7 inches and 10 to 13 inches. Largemouth bass 13 inches and smaller represent the primary targets for harvest over the coming months. We harvested 20 pounds of bass during the evaluation.

Bluegill and shellcracker were collected ranging in size from 2 to 11 inches in total length. Figure 3 depicts the length distribution of the bluegill population. The bluegill population is in fair condition, but higher bluegill reproduction will be achieved with the addition of supplemental forage (threadfin shad and crawfish). Limiting bluegill harvest to a consumptive level is also important when maintaining a healthy population.

The average relative weight of adult bass collected from Woodland Lake was 81 (Figure 4). In other words, most of the adult bass were in marginal condition. The bass population is dominated by skinny, slow growing individuals. To achieve a balanced largemouth bass population, the addition of supplemental forage along with adequate fish harvest (largemouth bass and crappie) are both necessary.

Overall, we characterize the fish community in Woodland Lake as bass-crowded. A more detailed explanation of bass-crowded ponds in general, and Woodland Lake in particular is located in the Current State of Balance section of this report.

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

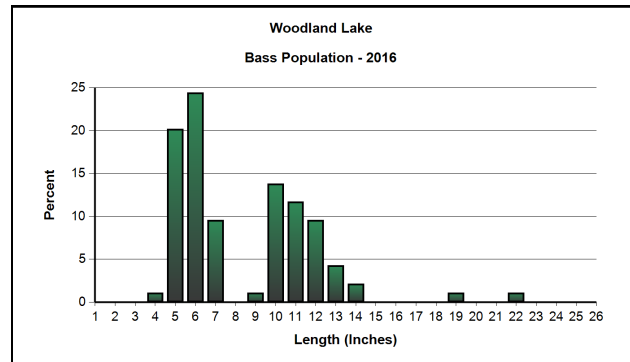


Figure 2. Length distribution of bass collected from Woodland Lake in April 2016.

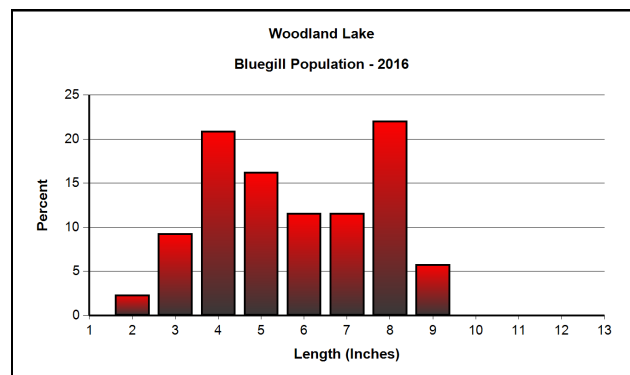


Figure 3. Length distribution of bluegill collected from Woodland Lake in April 2016.

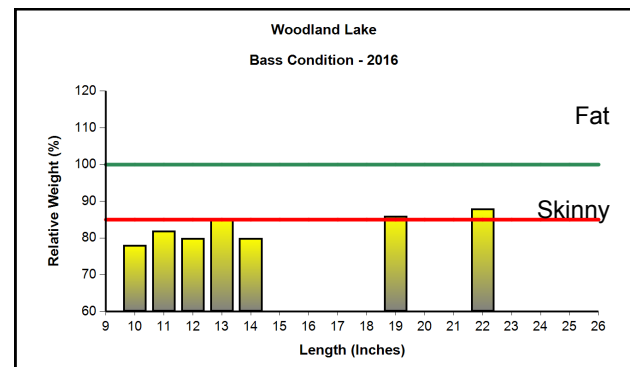


Figure 4. Relative weights (W_r) of adult largemouth bass collected from Woodland Lake in April 2016.



Bass-Crowded

Bass-crowded is an imbalanced condition that is relatively common in private ponds and is characterized by large numbers of small, skinny bass, and relatively few but unusually large adult bluegill. In this situation, bass growth is stunted due primarily to a lack of adequate nutrition. The largemouth bass is such an efficient predator that, if not controlled through responsible harvest, it will severely reduce its own food supply. Under these conditions, bass will perform poorly and will never reach their full growth potential.

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 low relative abundance of intermediate size prey is often an indication of a bass-crowded pond. Under these conditions, bass typically become stunted between 8 and 14 inches. Bass in this size range require an ample supply of 3-5" prey in order to grow past the stunted size and become "quality" and "trophy" adults. When a condition of balance exists, intermediate size prey are among the most abundant segment of the overall fish community. As mentioned previously, our recent electrofishing sample from Woodland Lake included relatively abundant numbers of intermediate size bluegill, particularly in the 4 to 5 inch size range.

Under-harvest of bass is most often the cause of the bass-crowded condition. In bass-crowded populations, despite their overabundance and relatively poor condition, the adult bass spawn each year. Due to the presence of an actively reproducing prey population, these juvenile bass are able to grow quite well in their first year. In order to maintain this rate of growth past 8-10 inches however, they require a slightly larger prey item. In bass-crowded ponds, the availability of slightly larger (3-5") prey is limited. As a result, the growth rates of the bass decline dramatically and they begin to demonstrate characteristics of stunting. Recent bass harvest was reported as "limited" in Woodland Lake.

In a typical fertilized sport fish pond, bass harvest is required in order to prevent



Typical bass from a bass-crowded pond.

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, the crowded condition perpetuates itself. This results in a less than quality bass fishery.

Finally, competing predator species were observed in relatively low numbers in Woodland Lake. There is not an immediate concern that these species will significantly impact the management program if harvest recommendations are followed. Nevertheless, the potential impacts of competing predator species are discussed in the following pages.

Strategies specifically geared toward improving the bass-crowded condition are discussed in the Recommended Management Activities section of this report.



Competing Predator Species

The presence of predator fish species other than largemouth bass may have an impact on the balance of the fish community. The severity of the impact depends largely on the species present and its density relative to the entire fish community. Some predator species may prove to be beneficial to certain management goals at moderate densities; however, most species negatively affect management goals to some degree. Generally, the more fish species present in a pond, the more complicated and less predictable pond management practices become. Once established, it is often difficult to completely remove an undesirable predator from a pond; however, harvesting every individual caught will increase the availability of prey for largemouth bass. In order to maintain a balanced pond with competing species, the bass must become a larger component of the predator community. An additional forage species, such as threadfin shad, typically reduces the negative effects of additional predators.

Competing predator species can be introduced in a number of ways. A pond can be contaminated with different fish species by a feeder stream, especially if the pond basin is not poisoned before stocking. Occasionally, adjacent waters flood and connect a pond introducing different species. For example, oxbow lakes are often flooded on a regular basis by an adjacent stream or river. This greatly reduces the effectiveness of many management practices. Many times, competing predator fish are brought in from other waters by fishermen themselves. Several competing predator fish found in small impoundments are listed below:

Black and/or white crappie are commonly introduced by fishermen in ponds, however they are not a desired predator species in small impoundments less than 50 acres. Not only do crappie compete with adult bass for food, but also with juveniles because they typically spawn before bass. Furthermore, their reproduction is often highly erratic. Maintaining balance with an abundant crappie population can be difficult in small impoundments.

Catfish are often stocked with bass and bluegill to add angling opportunity. Unfortunately, catfish are also direct competitors of largemouth bass and



Crappie



Channel Catfish

can have an impact on the forage community if they are allowed to reach large sizes. Catfish recruitment is usually low in ponds with an established bass population. Therefore, a small population of catfish can be sustained in small impoundments if an abundant forage base is maintained.

Spotted bass caught from public waters are often mistaken for largemouth bass and introduced in sport fish ponds. Spotted bass compete fiercely with largemouth bass in small impoundments. Not only do the adults compete for food, but spotted bass typically spawn earlier, thus giving the fry a survival advantage. Often this early advantage allows spotted bass to dominate the bass population in smaller systems. Once spotted bass become established, targeting spotted bass when harvesting becomes an ongoing management practice.



Spotted Bass



Gar



Bowfin



Green Sunfish

Other predator species, such as **gar**, **pickerel**, **bowfin**, etc., are often considered “rough” or “trash” fish. The presence of these fish in a pond usually indicates flooding of an adjacent river or major tributary. They are often difficult to remove with angling. They do not seem to become as abundant as crappie or spotted bass in a bass/bluegill pond, but have a negative impact nonetheless.

Other species such as **green sunfish** and **warmouth** commonly inhabit sport fish ponds. These species typically are introduced by small feeder creeks. Green sunfish, in particular, have the ability to enter ponds without a feeder stream, possibly by way of aquatic birds. Each of these fish can function as predators by eating small bluegill

and other forage in ponds. They can also compete with bluegill for food and spawning sites. Fortunately, their impact is usually minimal as they rarely exceed 6 or 7 inches and typically do not become abundant in a pond with an established bass population. However, these species can become problematic if allowed to multiply before a healthy bass population is present.



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.

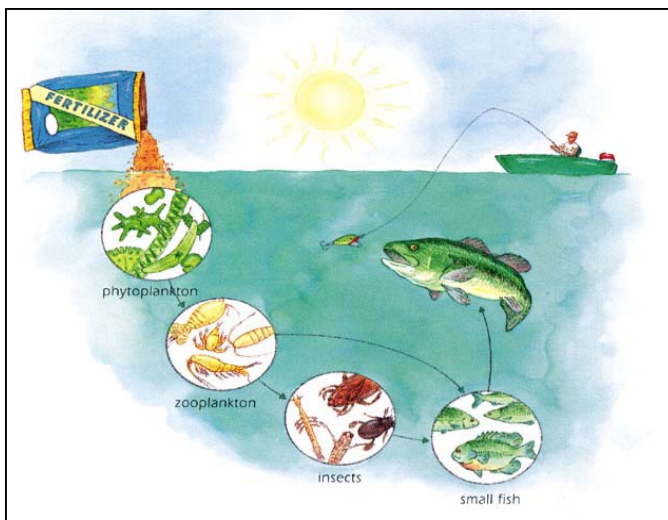


Fertilization

The concept of *carrying capacity* describes the total 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 is the most basic and important element necessary to create an environment conducive to the production and growth of sport fish. 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:



Food chain of a typical fertilized pond.



SportMAX® Water Soluble Pond Fertilizer can be poured directly into the prop wash of a small motor. 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.

We offer a convenient **Fertilization Service**, which 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.

If you elect to fertilize on your own, **we can supply you with a season's worth of material, prior to the scheduled start of the season.** SportMAX® comes conveniently packaged in heavy duty, water-resistant plastic bags; ideally, it may be stored in a barn or equipment shed sufficient to keep the direct elements away.

SportMAX® is easy to use; proper application involves simply pouring the material directly from the bag into the open water — no mixing... no mess!

Recommended application rates for SportMAX® range from 4 to 8 pounds per acre. Particularly in the early season, the higher rate is often necessary to stimulate a plankton bloom. Generally by the middle part of the season, the lower rate is adequate.



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.

To directly increase the growth and condition of bass even further, we recommend stocking **crawfish**. We often observe a tremendous increase in the condition of largemouth bass as early as two weeks after crawfish are introduced. Bass in lakes that are periodically stocked with crawfish are reportedly easier to catch, especially with crawfish-type lures. Crawfish occur naturally in almost every

aquatic system in the southeast and are readily consumed by largemouth bass when they cross paths. The ease of capture and extremely high protein content make crawfish a very efficient prey item for bass.

Native crawfish populations rarely become abundant enough to account for a large portion of bass diets in small impoundments. Supplemental stocking of adult crawfish will provide an immediate supply of forage to quickly increase bass growth rates and overall condition. Stocking crawfish can also reduce the predation pressure on the bluegill population and increase recruitment of juvenile bluegill into the intermediate size range.

Crawfish primarily feed on aquatic vegetation and detritus. In late spring and early summer, females dig burrows (“chimneys”) on the pond bank to lay eggs where 500 to 700 young will hatch and return to the pond. Although there is no practical approach to measuring their contribution to the forage base in subsequent seasons, we are confident in their ability to increase the growth and condition of bass each year they are stocked. Crawfish are usually available in April and May. Stocking rates are based on the size of the pond and the pond owners’ desired results.



Crawfish are easy prey that can quickly increase the growth rates of largemouth bass.



If managed correctly, a lake with a reproducing **gizzard shad** population can be ideal for producing exceptionally large bass. Unfortunately, unchecked gizzard shad populations inevitably “lock-up”, as reproduction ceases and their population becomes dominated by large adults. In these cases, corrective measures, typically in the form of a selective rotenone treatment, are necessary. Interestingly, we have found that the presence of **threadfin shad** (*Dorosoma petenense*) often extends the time period in which gizzard shad continue to reproduce. Introducing threadfin shad with gizzard shad creates a more natural environment for each species by providing a healthy competition for the available food. As a result, the amount of time between corrective rotenone treatments can be extended.

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 spawning periods: one in the Spring and again in early Fall. Stocking should occur immediately prior to spawning. 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.



Supplemental Feeding

Feeding bluegill pellet food is a proven management practice used to increase the number of “quality” and “trophy” size bluegill in ponds. Feeding produces unusually large and healthy bluegill and increases their reproductive potential. In addition, feeding concentrates fish for improved catch rates and provides entertainment from watching the fish eat. Given these benefits we recommend initiating an intensive feeding program in your pond.

In an effort to benefit the entire bluegill population, fish food should be applied from at least 1 feeding station for every 5 acres of water. Each feeding station should dispense feed at a rate of 5-10 lbs/day during the growing season (March - October). The daily ration should be divided into 3 short feeding periods, such as: early morning, late morning, and late afternoon. Several short periods are necessary to reduce feed waste because bluegill have small stomachs and will not consume much at once. Most commercial floating catfish fingerling pellets are suitable for feeding bluegill. These types of feeds are readily available on the market; Purina® makes an excellent pellet, under the name, “Game Fish Chow”. Game Fish Chow is made up of several different pellet sizes that can be consumed by a wide size range of bluegill.



Optimally, choose a floating ration with multiple pellet sizes.

For an additional boost to the bluegill population, feeding in the winter is an option. Winter feeding keeps the bluegill plump and healthy during a period when natural food is not readily available. To improve consumption in the cold months, a sinking feed may be used. Sinking feed can be purchased during the winter at most dealers that normally stock fish food. Several feeding periods should be maintained for the winter also. However, the timer on the feeder should be changed in late October to adjust for the shorter day length.



Supplemental feeding attracts bluegill to certain areas so they are easier to catch.

We market Sweeney and Texas Hunter automated game and fish feeders. Simply put, these feeders are the finest of their kind. Sweeney directional feeders are offered in two sizes (AF1100 - 75 pound capacity and AF1300 - 225 pound capacity) and three colors (galvanized, hunter green and camo). Texas Hunter directional feeders are also offered in two sizes (DF125 - 75 pound capacity and DF425 - 225 pound capacity) and they are only available in green. They are powered by rechargeable 12-volt batteries and most models come equipped with a solar charger. Sweeney and Texas Hunter directional feeders may be conveniently mounted on the bank or on piers.



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.

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 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



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).

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.

Given the present state of vegetation in your pond, chemical control is recommended. This approach involves the use of aquatic-approved herbicides to reduce or eradicate aquatic weeds. We are commercially licensed to apply aquatic-approved herbicides. Our treatments are warranted to control existing weed growth. We cannot, however, warrant against re-growth; the integrated approach to controlling nuisance vegetation is your best insurance against weed problems in the future. The cost and timing of our recommended herbicide treatment are listed in the Recommended Management Activities section of this report.

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: 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.





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

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

To maintain a high density of sport fish as well as help control aquatic vegetation, we recommend **initiating an intensive fertilization program** in Woodland Lake. **SportMax® Water Soluble Pond Fertilizer (10-52-4)** should be applied according to the *Standard Pond Fertilization Schedule*.

For Woodland Lake, **harvest bass 13 inches and smaller** at a rate of **25 pounds per acre per year** (7,500 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 Woodland 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 and crawfish should be stocked in order to enhance the growth and condition of the largemouth bass.

We recommend **initiating an intensive supplemental feeding program** in Woodland Lake. Fish food should be applied from multiple feeding stations at a rate of at least 5 lbs/feeder/day from March through October.

Aquatic weed control will also be an

integral part of the management program for Woodland Lake. We did not observe any problematic aquatic vegetation during the evaluation. However, many aquatic plants have the potential to multiply quickly and should be monitored closely, particularly during the growing season.

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

Current Status: Owner Responsibility

- Approved Declined Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Harvest ~7,500 pounds of LMB (13" inches and less)

COST:
Hook and line: N/A

LEVEL 1

ANNUAL HARVEST

ANNUALLY

Current Status: Owner Responsibility

- Approved Declined Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Harvest crappie at will.

COST:
Hook and line: N/A

LEVEL 1

SUSPEND BG HARVEST

ANNUALLY

Current Status: Owner Responsibility

- Approved Declined Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Limit bluegill harvest to a consumptive level

COST: N/A

LEVEL 1

FERTILIZATION

ANNUALLY

Current Status: Owner Responsibility

- Approved Declined Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Begin fertilization program

COST: Cost of Fertilizer

LEVEL 1



SPORTMAX

SPRING 2016



COST: \$ 1.80/lb*

* Pricing subject to market variability. Final price will be confirmed prior to delivery. This price does not include delivery.

Current Status: Awaiting Owner Approval

Approved Declined Done

Date Approved: _____

Date Done: _____

MANAGEMENT ACTIVITY:

Deliver 2,000 pounds of SportMAX Water Soluble Pond Fertilizer (10-52-4)

LEVEL 1

SUPPLEMENTAL FEEDING

SPRING 2016



COST: \$ 950.00 each*

* This price includes a Texas Hunter LM-135 directional fish feeder, solar charger, rechargeable battery, assembly, and installation. An additional delivery charge will be added.

Current Status: Awaiting Owner Approval

Approved Declined Done

Date Approved: _____

Date Done: _____

MANAGEMENT ACTIVITY:

Install Texas Hunter LM-135 directional fish feeders
Feed at a rate of 5-10 pounds/day from each feeder

LEVEL 1

THREADFIN SHAD

SPRING 2016



COST: \$ 1,800.00/load*

* This price does not include delivery.

Current Status: Awaiting Owner Approval

Approved Declined Done

Date Approved: _____

Date Done: _____

MANAGEMENT ACTIVITY:

Stock 8 loads (~80,000) adult threadfin shad

LEVEL 1

CRAWFISH

SPRING 2016



COST: \$ 2.50/lb*

* Pricing subject to market variability. Final pricing to be confirmed prior to stocking. This price does not include delivery.

Current Status: Awaiting Owner Approval

Approved Declined Done

Date Approved: _____

Date Done: _____

MANAGEMENT ACTIVITY:

Stock 7,000 pounds of crawfish

LEVEL 3



ANNUAL EVALUATION

SPRING 2017

Current Status: Awaiting Owner Approval

Approved Declined Done

Date Approved: _____

Date Done: _____



MANAGEMENT ACTIVITY:
Annual electrofishing evaluation

COST: \$ 1,000.00*

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

LEVEL 1



Recreational Stocking Options

There are several species of freshwater fish that can be stocked to increase angling diversity as well as the overall recreational value of a sport fish lake. Some of these stocking options may have an impact on the balance of the fish community. This impact can often be minimized with conservative stocking rates and intensifying certain management activities.

Channel catfish (*ictalurus punctatus*) are especially popular additions to sport fish ponds. Catfish are generally easy and fun to catch, grow quickly, and good table fare. They are also direct competitors of largemouth bass. Catfish recruitment (reproduction) is usually low in ponds with a healthy bass population. However, they can impact the forage community and should be harvested before they reach large sizes. Maintaining an abundant forage base and intensifying the supplemental feeding program will reduce their impact on the fish community.

Another popular addition is the **hybrid striped bass** (*Morone chrysops* x *saxatilis*). Known for hard-fighting, hybrid striped bass can provide an exciting change of pace to bass angling. They are genetically sterile and adapt well to small impoundments, usually occupying more offshore, open-water areas than the largemouth bass. They will readily consume pellet fish food; their growth rates may be significantly increased by offering a high protein feed. Intensifying the feeding program and

maintaining a healthy threadfin shad population is recommended with the addition of hybrid striped bass.

A relatively new option in sport fish lakes, specifically designed to increase catch rates of bass is the introduction of **feed-trained largemouth bass**. These highly aggressive northern bass (*Micropterus salmoides salmoides*) have been trained to consume pellet fish food. Like hybrid striped bass, feed-trained bass benefit greatly from a high-protein ration.



Feed-trained Largemouth Bass

Supplemental feeding is also productive in efforts to maintain their aggressiveness and high catchability. Feed-trained bass will consume natural forage and reproduce in sport fish ponds, thus they can affect the overall balance of the fish community. The predator:prey dynamics in the pond should be considered before stocking feed-trained bass. Broadcasting a high-protein ration and stocking supplemental forage is highly recommended with the addition of feed-trained bass. Also, bass harvest rates may need to be increased to accommodate the additional fish. Feed-trained bass are typically marked in such a way as to make them easily distinguishable from other bass.



Channel Catfish



Hybrid Striped Bass



Rainbow Trout

Rainbow trout (*Oncorhynchus mykiss*) are frequently stocked in Southeastern ponds to increase angling opportunity during the winter. Rainbow trout become aggressive when the water cools and will actively consume high-protein pellet fish food throughout the winter. They too can have an impact on the forage community, but only for a brief time, as they perish when the water warms in mid to late spring.

Redear sunfish (*Lepomis microlophus*), also known as shellcracker, are traditionally stocked along with bluegill in sport fish ponds. Redear sunfish are a perfect addition to bass/bluegill ponds because they compete very little with bluegill for food and spawning grounds. Redear



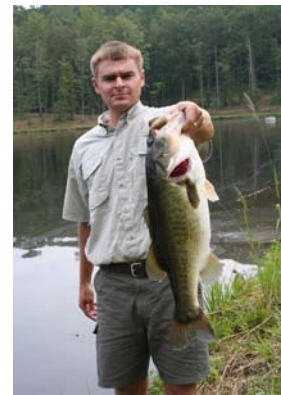
Redear Sunfish

sunfish typically only spawn once a year, compared to bluegill which are multiple spawners. For this

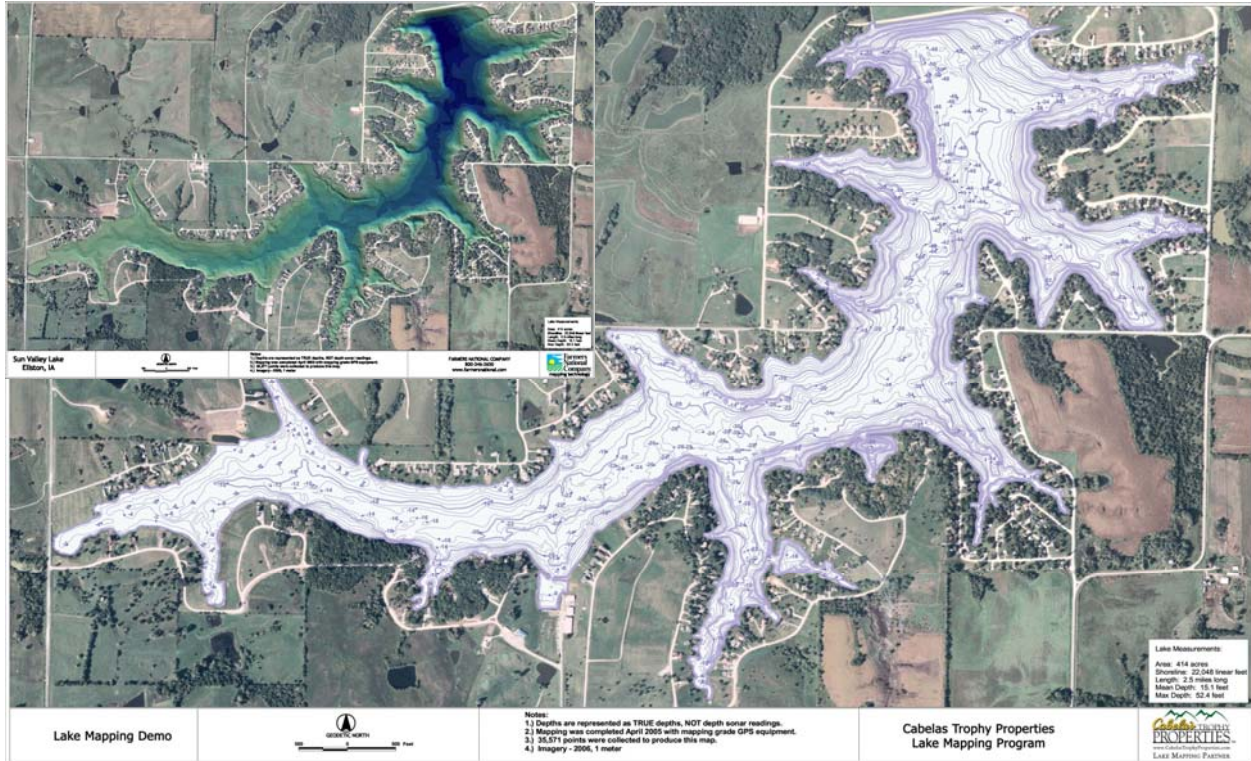
reason, redear sunfish tend to decrease in numbers over time in ponds with an abundant bass population. Intermediate size redear sunfish are often stocked in older ponds to boost the population.

Occasionally, we have available **jumbo-size Florida largemouth bass** (*Micropterus salmoides floridanus*) for stocking.

These additions are popular among pond owners desiring instant results in terms of big bass. Stocking rates are generally low, resulting in virtually no adverse impacts on the structure of the existing forage base.



Jumbo Largemouth Bass



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.

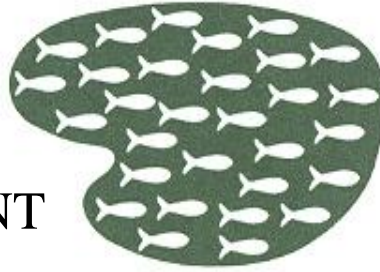
We offer maps in all different sizes from 8"x11" up to large scale wall maps. Our biologists will work closely with you in deciding which type and various features are best suited for the design of your new SPM lake or land map. If you are interested in learning more about the Lake and Land Mapping program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



Pond Mapping



SOUTHEASTERN
POND
MANAGEMENT



“Managing Your Liquid Assets”

Southeastern Pond Management

Birmingham Office

2469 Highway 31
Calera, AL 35040
(205) 664-5596

Auburn Office

9944 Highway 280 West
Auburn, AL 36830
(334) 887-7663

Mississippi Office

254 Commercial Parkway
Canton, MS 39046
(601) 853-0680

Tennessee Office

131-A Miller Ave.
Jackson, TN 38305
(731) 664-6355

www.sepond.com
e-mail: pondhelp@sepond.com