

April 12, 2024

Woodland Lake
PO Box 202
Hernando, MS 38632

Dear Mr. Lance Martin

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

Woodland 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 and crappie), introducing supplemental forage (threadfin shad), and improving the conditions for the production of forage through enhancing the pond's fertility level and supplemental feeding:

- Largemouth bass (15" and less) should be harvested, up to a total of ~1250 pounds per year.
- All crappie should be harvested.
- Maintain the current fertilization program in 2024.
- Maintain the current supplemental feeding program in 2024.
- Stock 2 load of threadfin shad in Spring 2024
- Conduct an electrofishing balance assessment (Annual Evaluation) roughly one year from this date.

Mr. Martin, Woodland Lake appeared to be in great condition at the time of our visit. The bass and crappie populations were healthy with good length distributions across all sizes. The gizzard shad population is still very plentiful throughout the entire lake. The threadfin population was not as dense, but some were observed in small moderations. The bluegill population continues to do well in the intermediate (3-5 inch) size range, but the larger bluegill are scarce. Consistent supplemental feeding will increase the length distribution and allow for larger bluegill to establish. We are always available to discuss these recommendations or answer any other questions you might have.

Good fishing,

Cody Fuller
731-571-7547
cfuller@sepond.com

Management Plan For

WOODLAND LAKE

34.8238 ° N, -90.1936 ° W

April 11, 2024



INTRODUCTION

As an integral part of the ongoing management program for Woodland Lake, Southeastern Pond Management conducted a comprehensive evaluation of the 125 acre impoundment on April 11, 2024. A representative sample of the fish community was collected by electrofishing to accurately assess the present state of balance. In addition, a water chemistry test was conducted to determine total alkalinity. The degree of aquatic weed infestation was also recorded. Results of the 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 follow goals in mind:

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

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.

Previous evaluations of Woodland Lake have resulted in the thoughtful outline of management options in an effort to approach your stated management goals. Our latest findings, as well as results from previously applied management recommendations, are contained within the following pages.

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



THE POND ASSESSMENT

At the time of our visit, total water alkalinity in Woodland Lake was measured at 45 parts per million (ppm). This level of alkalinity is above the minimum recommended threshold of 20 ppm, and represents conditions suitable for effective fertilization. Woodland Lake has been fertilized adequately in the recent past, resulting in a moderate plankton bloom at the time of our visit. Automatic fish feeders are present on the pond and are reportedly maintained and filled regularly. The natural woody fish habitat was noted as showing signs of age and decay. Occasionally adding fresh brush to habitat areas will keep them attractive to fish.

During the evaluation, we observed a light infestation of water primrose and a light infestation of pennywort growing along the banks. Descriptions of these plants may be found in the Aquatic Weed Identification section of this report.

Bass harvest was reported as limited. This level of harvest has proven adequate. Harvest, and its importance in structuring fish communities will be discussed in more detail in the Recommended Management Activities section of this report.



FISH COMMUNITY BALANCE

Fish communities in ponds are governed by a predator-prey relationship. The interactions of predator and prey are characterized by a concept we refer to as *balance*. 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. **Predators** are species which rely on fish as their primary food source. **Prey** species rely on sources other than fish.

Classic balance in small impoundments is defined by several parameters, most importantly a suitable ratio (by size and weight) of predator to 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 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 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.

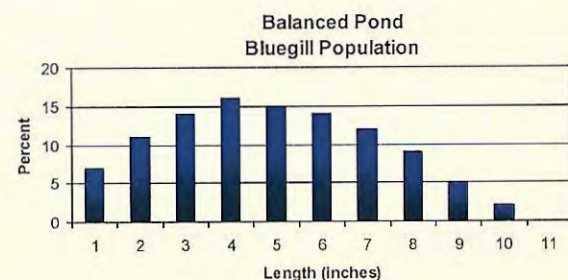
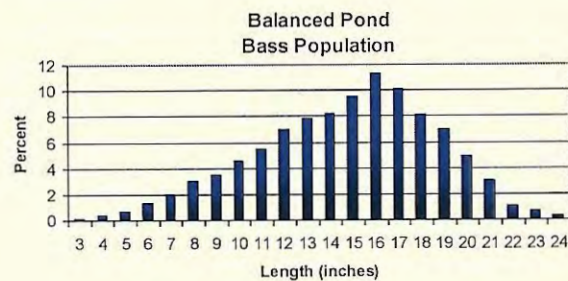


Figure 1. Length distribution of bass and bluegill in a typical balanced pond.



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, crappie, native bluegill, gizzard shad, threadfin shad and redear sunfish (shellcracker). Currently, largemouth bass and crappie are functioning as the primary predators in Woodland Lake. The bluegill, gizzard shad, threadfin shad, and shellcracker are the prey.

Threadfin and gizzard shad have become an important component of the forage base in Woodland Lake. We observed several different size groups of gizzard shad, indicating a healthy population. The threadfin shad population was not as dense as the gizzard shad population. Maintaining a healthy shad population will be important for Woodland Lake to continue producing quality and trophy size bass.

Bluegill and shellcracker were collected ranging in size from 2 to 8 inches in total length. Figure 2 depicts the length distribution of the bluegill population. Of note, a moderate amount of bluegill was collected. Further, mature adult bluegill were relatively scarce in the sample.

Largemouth bass ranging in size from 4 to 22 inches in total length were collected in moderate abundance. The length distribution of largemouth bass (Figure 3) reveals the presence of bass over a wide range of size classes. This represents some improvement from the previous evaluation, most likely the result of improved bass harvest, and the increase in available forage.

The average relative weight of adult bass in our most recent sample additionally reflects a slight decline from the previous evaluation. This year's average relative weight was 95, as compared to 2021, 103 (Figure 4). Largemouth bass 15 inches and smaller represent the primary targets for harvest over the coming months. We harvested ~15 pounds of bass during the evaluation.

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

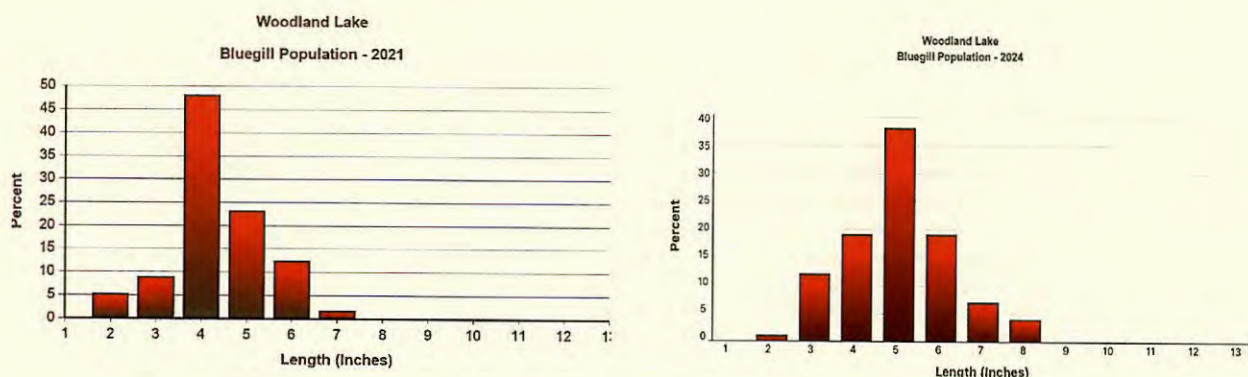


Figure 2. Comparison of the length distribution of bluegill collected from Woodland Lake in April 2021 and April 2024.

FISHERY ASSESSMENT

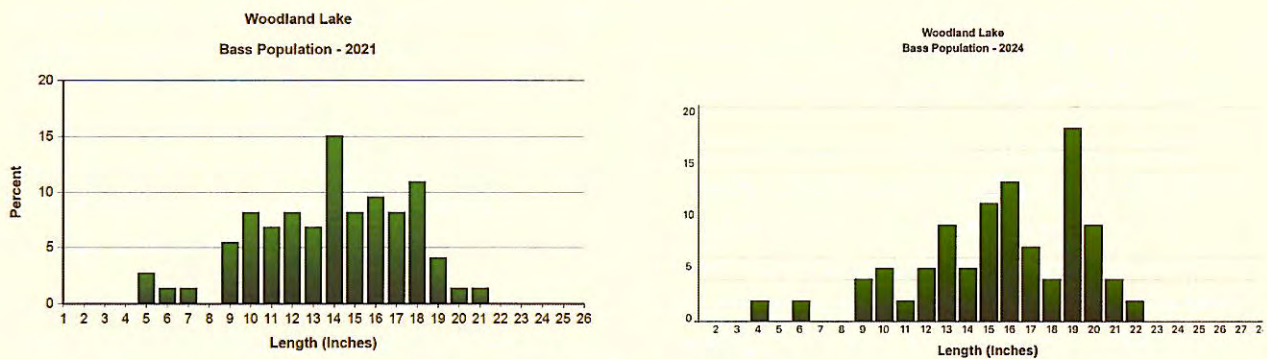


Figure 3. Comparison of the length distribution of bass collected in Woodland Lake in April 2021 and April 2024.

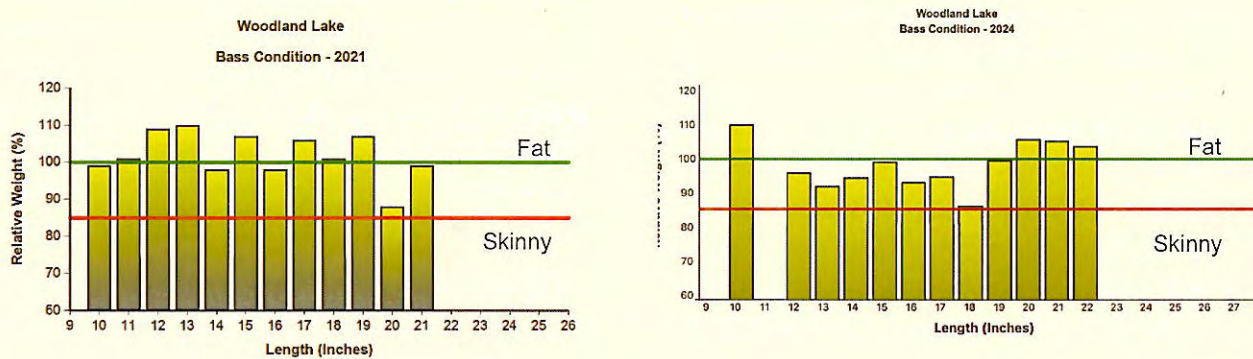


Figure 4. Relative weight distribution of adult largemouth bass collected from Woodland Lake in April 2021 and April 2024.

MANAGING A BALANCED FISH COMMUNITY

Much of pond management is 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 Woodland Lake contained a healthy distribution of bass across a range of size groups. Additionally, the majority of the bass were in good condition with relative weights ranging from 85 to 110. Bass in the 19 to 22 inch length group were in excellent condition, indicating an abundant forage base for this length group of bass. However, bass in the 12 to 16 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 Woodland 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.



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 relative abundance. Generally, the more species present, 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 these species when possible is generally recommended. 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, may substantially reduce the negative effects of competing predators.

Competing predator species may be introduced in a number of ways. A pond may become contaminated by a feeder stream, especially if the pond basin is not poisoned prior to stocking. Occasionally flood waters bring in unwanted species. Finally, competing predator fish are frequently brought by anglers. Several competing predator fish commonly found in small impoundments are listed below:

Black and/or white crappie are commonly introduced by anglers into ponds, however they

are not typically a desired predator species in small impoundments. Crappie compete with juvenile as well as adult bass for food. Furthermore, their reproduction cycles are often highly erratic.

Catfish are often stocked with bass and bluegill to add diversity. However, catfish are also direct competitors of largemouth bass and can have an impact on the forage community once they reach maturity. Catfish reproduction and recruitment is typically low in ponds with established bass populations; bass effectively prey on any catfish reproduction. As a result, a population of catfish may be sustained in small impoundments if an abundant forage base is maintained.

Spotted bass are often mistaken for largemouth bass and may be introduced in sport fish ponds by well-intentioned anglers. Spotted bass compete fiercely with largemouth bass in small impoundments. In addition to competition for forage, spotted bass spawn earlier than largemouth, giving the spotted bass fry a survival advantage. This advantage may adversely effect the largemouth bass population. Once spotted bass become established, targeting spotted bass for harvest becomes an ongoing management practice.



Crappie



Channel Catfish

COMPETING PREDATOR SPECIES

Other predator species, such as gar, pickerel, bowfin, etc., are 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 challenging to remove with angling, but should be targeted 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.



Gar



Spotted Bass



Bowfin



Green Sunfish

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 reevaluated annually. Harvesting largemouth bass can be accomplished by the following methods:

- 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.

- 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 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 shell-cracker 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.



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.



SportMAX® Water Soluble Fertilizer takes all the fuss and mess out of properly fertilizing your pond. A well fertilized pond should have 18 to 24 inches of visibility.

Fertilization takes place during the growing season, from March through October. Fertilization is the most basic and important element necessary to create an environment conducive to the production and growth of sport fish. Fertilizer should be applied according to the 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.

Simply put, the most efficient and effective pond fertilizer on the market today is SportMAX® Water Soluble Pond Fertilizer (10-52-4). Since you have elected to handle the fertilization of your own lake, **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.



Food chain in a typical pond

SUPPLEMENTAL FERTILIZATION STOCKING

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. The cost of a season's worth of SportMAX® Water Soluble Pond Fertilizer, including delivery to your lake, is listed in the Recommended Management Activities section of this report.



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.

SUPPLEMENTAL FORAGE STOCKING

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.

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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 maintaining the 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 sizes that can be consumed by a wide size range of bluegill.



A good bluegill feed has several different 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.

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 offered in three sizes (LM135 - 70 pound capacity, LM175 - 100 pound capacity, and LM435 - 250 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.



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

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 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.



Herbicide application is typically the quickest form of weed control.



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

AQUATIC WEED IDENTIFICATION

Common Name: Water Primrose

Scientific Name: *Ludwigia* sp.

Distinguishing Characteristics:

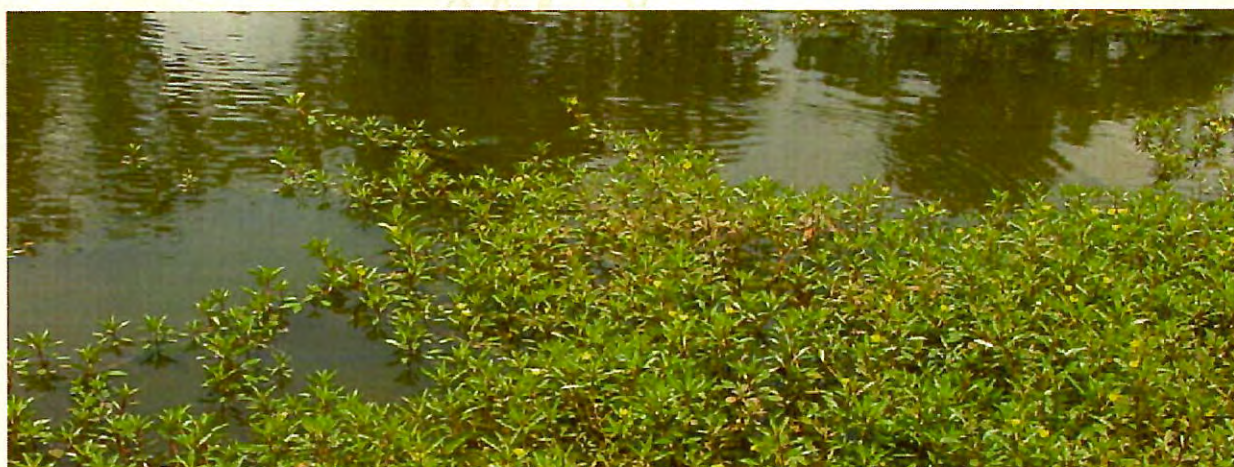
Leaves arranged oppositely. Flowers yellow if present.

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.



AQUATIC WEED IDENTIFICATION

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 of 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.



NUISANCE ANIMAL CONTROL

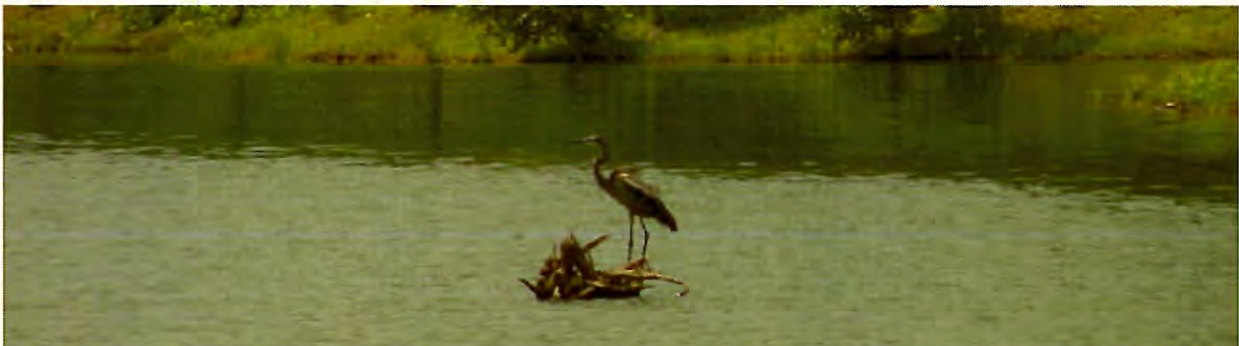
Several different aquatic animals can affect the management of small impoundments. Some critters bore holes and make dens in the dams of ponds. This can reduce the integrity of the dam as well as ruin the aesthetic value of the pond. Other animals can impact the fish community. However, there are many aquatic animals that have little negative impact on ponds or the fish community and coexist quite well. Determining if an animal has a negative effect on a sport fish pond, and then creating a method of control is an important component of a comprehensive management program.

Beavers and muskrats are common residents of sport fish ponds across the Southeast. Although they seem to have little affect on the fish community, they are both capable of significant aesthetic and structural damage. They often bore in to the shoreline of ponds to create dens. Dens built along the dam can eventually weaken the structure of the dam. Beavers are especially capable of severe timber destruction around the shoreline. Attempts to remove beavers and muskrats should begin as soon as detected. Techniques include body-gripping traps, snares, foothold traps, and shooting. Complete removal of beavers and muskrats can be quite difficult in small impoundments, thus protecting the dam and shoreline trees may be necessary. 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 can be frequent visitors of sport fish ponds, especially if they are built on or near a large creek. Otters consume large amounts of fish each day and can have a significant impact on a sport fish community. Their impact varies with the number of individuals present, frequency of visits, and size of the pond. Otters are secretive and often go unseen; however, droppings with scales and fish bones are evidence of their presence. Techniques for removal include body-gripping traps, snares, foothold traps, and shooting.

Many fish-eating birds visit sport fish ponds seasonally or even daily. Cormorants are probably capable of the most destruction to fish communities as they often congregate in large numbers to over winter in the southeast. Lakes located near large river systems and/or near large catfish operations are the most susceptible to cormorant problems.



NUISANCE ANIMAL CONTROL

Also, ponds with an abundance of standing timber seem to be particularly attractive. Depending on the food availability, cormorants may remain on a pond for months, potentially making a large impact on the fish community. The best approach to controlling cormorant predation on small impoundments is to use harassment techniques. These techniques often involve shooting guns, noise makers, cannons, etc. However, this technique requires a dedicated effort and often must be repeated several times a day for several weeks. Lethal control of cormorants requires a depredation permit issued by the U.S. Fish and Wildlife Service.

Hérons and kingfishers usually have a solitary lifestyle and will not congregate in large groups. Although, their impact may be more noticeable in small ponds less than 1 or 2 acres, their control is hardly worth the effort. Mergansers also visit southeastern ponds during the winter; however, their impact appears minimal.

A long-time misconception is that turtles can become too abundant and can affect the balance of a fish community. Turtles typically for-

age on aquatic invertebrates, plant material, and dead organic matter. Although they may stumble upon an occasional nest of fish eggs, turtles have no noticeable effect on the ability for sport fish to reproduce sufficiently.

If an aquatic animal is thought to be negatively impacting the recreational value of a sport fish pond, it is recommended that you consult one of our fisheries biologists before control measures are taken. Remember to follow the state game laws and acquire permits and licenses if required.



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.



MANAGEMENT RECOMMENDATIONS

Woodland Lake is functioning as a balanced system that has a moderate 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 Woodland Lake will center on reducing the total number of adult predators, introducing supplemental forage, increase supplemental feeding, 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 continuing a 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 15 inches and smaller at a rate of 10 pounds per acre per year (1,250 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 suspending bluegill harvest in Woodland Lake until the bluegill population recovers through management inputs. **OR** 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 can 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 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. Water primrose and 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 Woodland 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 Woodland 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.

Management Recommendations

ANNUAL HARVEST ANNUALLY 2024		COST: Hook and line: N/A Electrofishing: \$450.00/hour.*
Current Status: Owner Responsibility	MANAGEMENT ACTIVITY: Harvest ~1,250 pounds of LMB (15" inches and less)	*An additional mileage charge will be added.
☐ Approved ☐ Declined ☐ Done	Date Approved: _____	LEVEL 1
Date Done: _____		
ANNUAL HARVEST ANNUALLY 2024		COST: Hook and line: N/A
Current Status: Owner Responsibility	MANAGEMENT ACTIVITY: Harvest all crappie caught	LEVEL 1
☐ Approved ☐ Declined ☐ Done	Date Approved: _____	
Date Done: _____		
SUPPLEMENTAL FEEDING ANNUALLY 2024		COST: Cost of Food
Current Status: Owner Responsibility	MANAGEMENT ACTIVITY: Continue feeding program. Feed at a rate of 5-10 pounds/day from each feeder	LEVEL 1
☐ Approved ☐ Declined ☐ Done	Date Approved: _____	
Date Done: _____		
SPORTMAX ANNUALLY 2025		COST: \$ 2.50/lb*
Current Status: Awaiting Owner Approval	MANAGEMENT ACTIVITY: Deliver 500 pounds of SportMAX Water Soluble Pond Fertilizer (10-52-4)	* Pricing subject to market variability. Final price will be confirmed prior to delivery. This price does not include delivery.
☐ Approved ☐ Declined ☐ Done	Date Approved: _____	LEVEL 1
Date Done: _____		

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, benefit greatly from a Bass high-protein ration.

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 as way as to make them easily distinguishable from other bass.



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RECREATIONAL STOCKING OPTIONS

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 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* *JBass 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.



[illegible]