

June 13, 2023

Mr. Dennis Nowell  
15343 Swan Court  
Gulfport, MS 39503

Dear Mr. Nowell:

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

Swan Lake is presently functioning as a dynamic, predator-crowded fishery. As such, our management recommendations center primarily on applying a herbicide application, reducing the total number of adult predators (largemouth bass and crappie), introducing supplemental forage (coppernose bluegill), limiting bluegill harvest, and improving the conditions for the production of forage through enhancing the pond's fertility level and supplemental feeding:

- Apply a herbicide application in Summer 2023.
- Maintain the current fertilization regime.
- Initiate an intensive supplemental feeding regime.
- Largemouth bass (14" and less) should be harvested, up to a total of ~510 pounds per year.
- Harvest all crappie caught.
- Stock 8,500 intermediate coppernose bluegill in Fall 2023.
- Limit bluegill harvest to 10 per angler per day in 2023.
- Conduct an electrofishing balance assessment (Annual Evaluation) roughly one year from this date.

I am pleased that the threadfin shad are established. Your fertilizing program will help maintain their abundance. However, the condition factors of the bass are down. It is imperative to harvest small bass and all crappie to reduce competition. This is a fundamental management input.

Good fishing,

Scott Kirk  
Fisheries Biologist, MS  
601-594-9424  
skirk@sepond.com

# Management Plan For

# SWAN LAKE

30.50749 ° N, -89.07730 ° W

May 31, 2023



# INTRODUCTION

As an integral part of the ongoing management program for Swan Lake, Southeastern Pond Management conducted a comprehensive evaluation of the 17 acre impoundment on May 31, 2023. 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 Swan 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 Swan 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
<b>LMB</b>	<b>16-20”</b>	<b>20”+</b>
<b>Bluegill</b>	<b>7-10”</b>	<b>10”+</b>

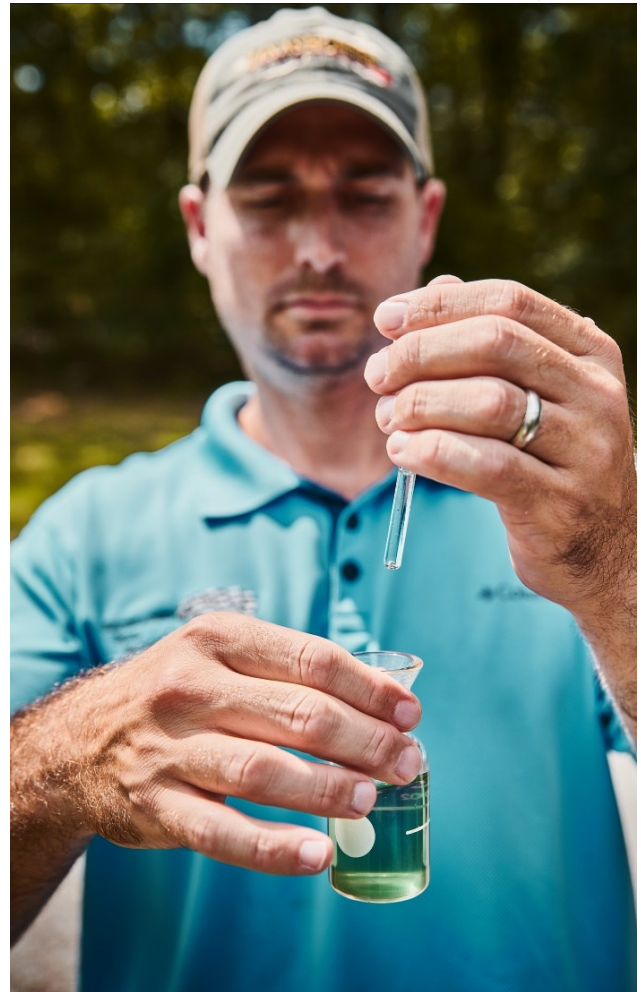


# LAKE ASSESSMENT

At the time of our visit, total water alkalinity in Swan Lake was measured at 21 parts per million (ppm). This level of alkalinity is above the minimum recommended threshold of 20 ppm, and represents conditions suitable for effective fertilization. Swan Lake has been fertilized moderately in the recent past, resulting in a light plankton bloom at the time of our visit. Automatic fish feeders are not present on the lake. 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 very light to light infestation of watershield, pondweed, and water lily, and a light to moderate infestation of chara growing along the margins. 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 inadequate. 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.

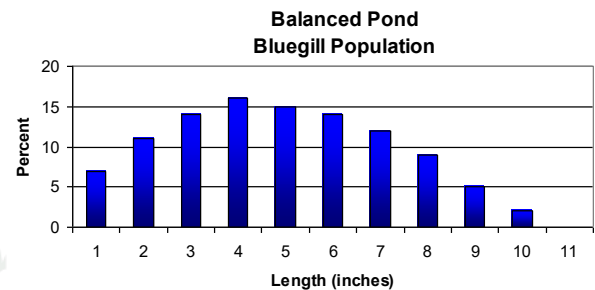
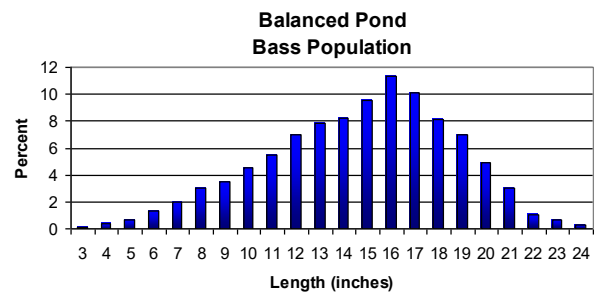


Figure 1. Length distribution of bass and bluegill in a typical balanced pond.



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

# FISHERY ASSESSMENT

The fishery in Swan Lake was sampled with standard boat-mounted electrofishing equipment. The sample contained largemouth bass, crappie, threadfin shad, northern bluegill, and redear sunfish (shellcracker). Currently, largemouth bass and crappie are functioning as the primary predators in Swan Lake. The shad, bluegill, and shellcracker are the prey.

Threadfin shad have become an important component of the forage base in Swan Lake. We observed several different size groups, indicating a healthy population. Maintaining a healthy shad population will be important for Swan 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 lack of intermediate (3-5") bluegill and other forage was collected. Further, mature adult bluegill were relatively scarce in the sample.

Largemouth bass ranging in size from 2 to 22 inches in total length were collected in high abundance. The length distribution of large-

mouth bass (Figure 3) reveals the presence of bass over a wide range of size classes. This represents little change from 2018, most likely the result of limited bass harvest.

The average relative weight of adult bass in our most recent sample reflects a decline over 2018. This year's average relative weight was 78, as compared to 2018, 93 (Figure 4). Largemouth bass 14 inches and smaller represent the primary targets for harvest over the coming months. We harvested 39 pounds of bass during the evaluation.

Crappie were abundant and averaged about 10 inches in length.

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

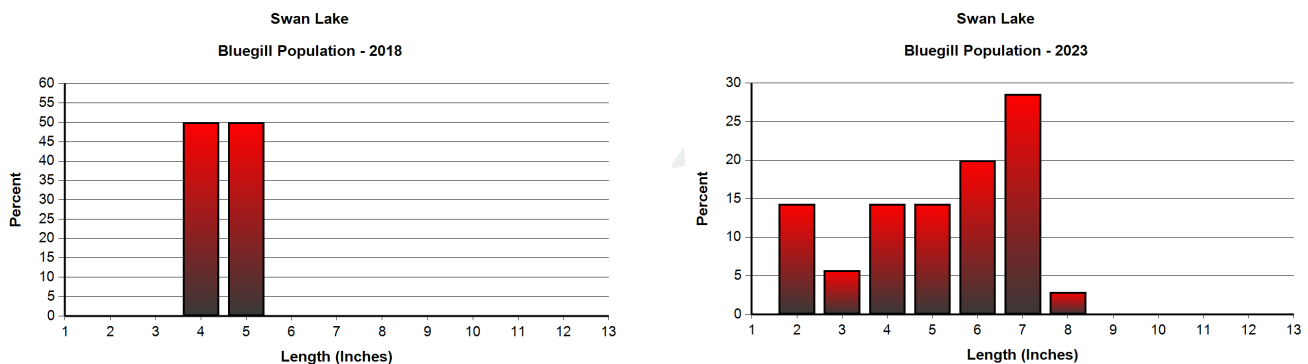


Figure 2. Comparison of the length distribution of bluegill collected from Swan Lake in April 2018 and May 2023.

# FISHERY ASSESSMENT

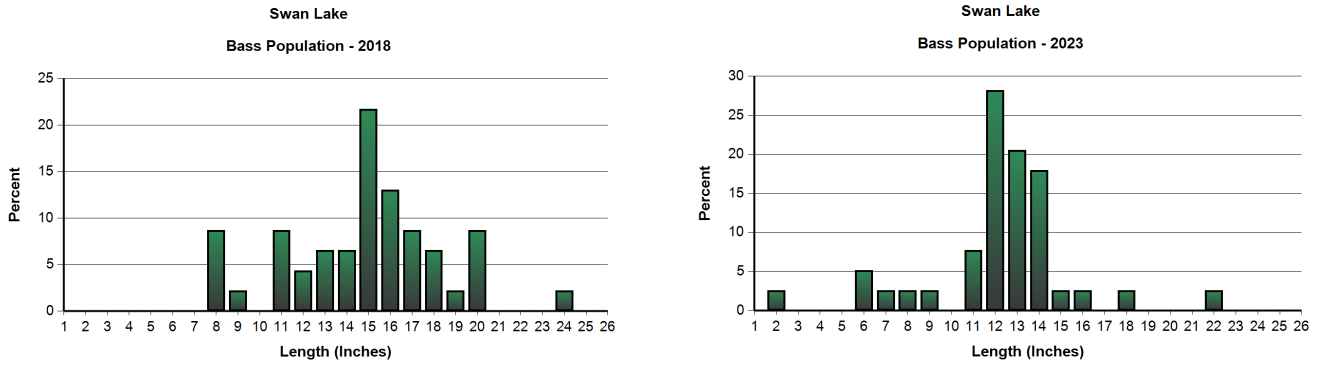


Figure 3. Comparison of the length distribution of bass collected in Swan Lake in April 2018 and May 2023.

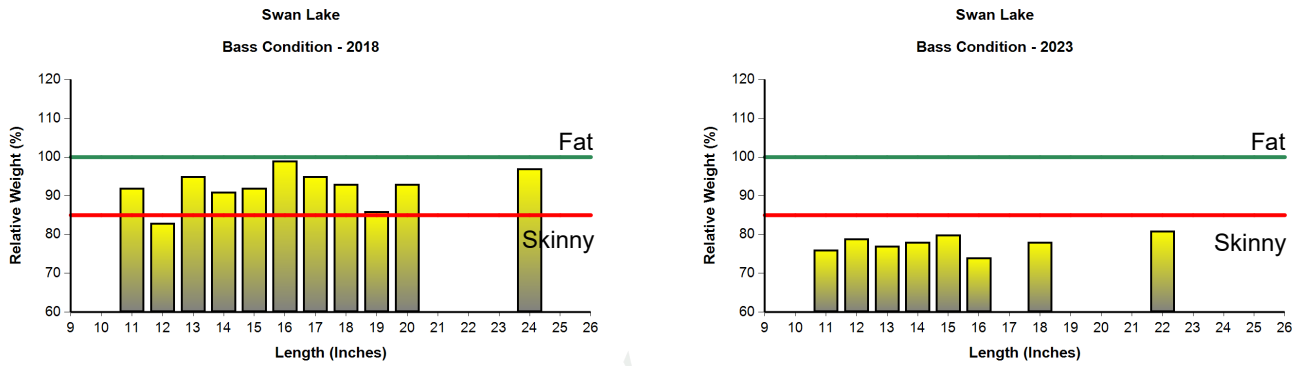


Figure 4. Relative weight distribution of adult largemouth bass collected from Swan Lake in April 2018 and May 2023.

# BASS-CROWDED

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

Intermediate bluegill (3 to 5 inches) are critically important in sport fish ponds because they are the ideal size forage for young and juvenile bass. A low relative abundance of intermediate size prey is often an indication of a bass-crowded pond. Under these conditions, bass commonly 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 Swan Lake included relatively low numbers of intermediate size bluegill, particularly in the 3 inch size range.

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 to 10 inches however, they require a slightly larger prey item. In bass-crowded ponds, as the availability of slightly larger (3-5") prey is limited by over predation, the individuals bass growth stalls, and the pop-

ulation begins to show characteristics of stunting in these size groups. The numbers of these bass must be reduced through harvest. Inadequate harvest is most often the cause of the bass-crowded condition. Recent bass harvest was reported as "limited" in Swan Lake. 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, the crowded condition perpetuates itself. This results in a less than quality bass fishery.

Finally, competing predator species in the form of crappie were observed in relatively high numbers in Swan Lake. In this case there is an immediate concern that this species will significantly impact the management program. The potential impact of competing predator species, such crappie, 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.



Typical bass from a bass-crowded pond.



# 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



**Crappie**

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 affect the largemouth bass population. Once spotted bass become established, targeting spotted bass for harvest becomes an ongoing management practice.



**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.

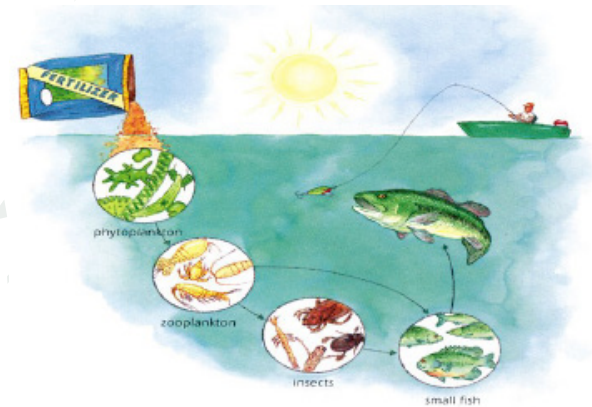


SportMAX® Water Soluble Fertilizer takes all the fuss and mess out of properly fertilizing your pond. A well fertilized pond should have 18 to 24 inches of visibility.

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

# FERTILIZATION

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.

To re-establish a healthy bluegill population, we recommend stocking **intermediate coppernose bluegill**. The term, *intermediate*, refers to their size: roughly 3 to 5 inches. Stocking intermediate bluegill will accomplish three important things: first, 3 to 5 inches represents an ideal forage size for the abundant stunted bass in your lake. The introduction of intermediate bluegill will directly increase the growth of these bass, by putting a suitable-size prey item in their mouths.



An abundant supply of intermediate bluegill is a requirement for a well-balanced pond.

Secondly, and most importantly, is the resulting increase in the amount of bluegill reproduction in your pond. Intermediate bluegill are sexually mature; they will spawn initially at the first spawning period subsequent to their introduction. Naturally, as they are multiple-spawners, these newly introduced bluegill will additionally spawn roughly once per month throughout the entire spawning season (May - October). The dramatic increase in the amount of bluegill reproduction will ultimately lead to a "flood" of bluegill in the intermediate size range. A final benefit, coppernose bluegill are highly aggressive surface feeders and will readily consume pellet feed. In fact, intermediate coppernose bluegill are often stocked to stimulate northern bluegill to consume pellet feed more aggressively. Stocking rates vary depending on the lake size and status of the current bluegill population.



Coppernose bluegill are very aggressive surface feeders.

# SUPPLEMENTAL FORAGE STOCKING

In sport fish lakes where only pure northern strain bluegill are present, we recommend stocking **intermediate coppernose bluegill** in an attempt to create a genetically diverse and ultimately more aggressive bluegill population. The northern bluegill (*Lepomis macrochirus macrochirus*), sometimes referred to as a common bluegill, is native to the rivers and reservoirs throughout most of the U.S. This subspecies has been stocked in sport fish ponds as the primary prey for bass for many years. However, a common variety stocked in ponds today is the coppernose bluegill (*Lepomis macrochirus purpurescens*). Analogous to the Florida largemouth bass, this subspecies of bluegill is native to much of Florida and parts of southern Georgia. The adult male coppernose bluegill may be easily identified by the distinct copper band across the top of its head. Vertical bars across the side of the body, in both sexes, are often present.

The habitat and biology of the coppernose bluegill is similar to the northern bluegill. Whereas, northern bluegill tend to be less responsive to pellet feeding, coppernose aggressively consume pellet feed when offered. When placed on a supplemental feeding program, coppernose bluegill often grow larger and faster than northern bluegill in small impoundments.

Due to their aggressive nature, anglers report higher catch rates in ponds where coppernose are present.

Coppernose bluegill will interbreed freely with the northern bluegill in your lake, resulting in enhanced genetic diversity. In addition, coppernose bluegill will help “train” your northern bluegill to consume pellet feed. Stocking rates vary, depending on lake size and status of the current bluegill population.



Coppernose bluegill will help “train” northern bluegill to consume pellet feed..



Northern bluegill (left) and coppernose bluegill (right).

# 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.

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.



Optimally, choose a floating ration with multiple pellet sizes.



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.

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

The most common form of biological control is stocking grass carp. Grass carp are often introduced into ponds at low stocking densities as a preventive measure before weeds become established. However, once weeds have become established, a higher density of grass carp is needed to control them. Grass carp readily eat

a variety of common weeds, do not reproduce, and are fairly inexpensive. Typically, grass carp become less effective when they reach 6 to 7 years old and must be restocked. One drawback to grass carp is their propensity to train on pellet food intended for bluegill; thereby reducing the effectiveness of a supplemental feeding program.

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

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



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:** Chara

**Scientific Name:** *Chara sp.*

**Distinguishing Characteristics:**

Branchlets whorled around stem.  
Strong “musty” or “garlic-type” odor.

**Growth Habit:**

Submersed. Forms dense underwater mats.

**Management Program Impact:**

Severe.



# AQUATIC WEED IDENTIFICATION

**Common Name:** Fragrant Water Lily

**Scientific Name:** *Nymphaea odorata*

**Distinguishing Characteristics:**

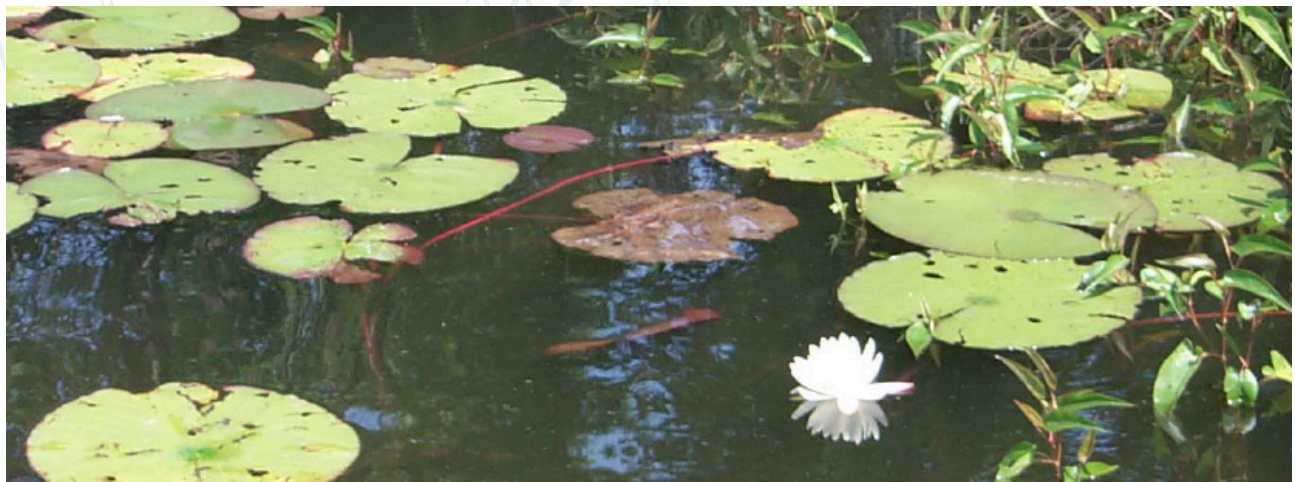
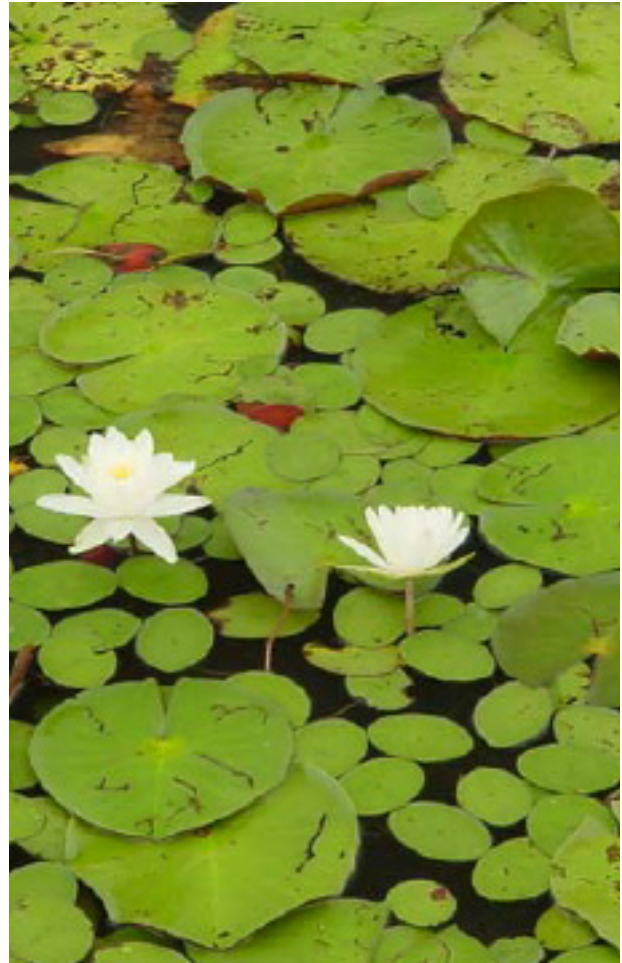
Lily pad medium to large, almost perfectly round, with single notch to center. Usually smaller lily pads of various sizes mixed in. Lily pad usually floats and edges may curl up. Underside of lily pad deep brownish-purple. Flowers showy, fragrant blooms that appear as large snowballs from a distance.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

**Growth Habit:**

Floating-Leaved.

**Management Program Impact:**

Moderate.



# AQUATIC WEED IDENTIFICATION

**Common Name:** Variable-Leaf Pondweed

**Scientific Name:** *Potamogeton diversifolius*

**Distinguishing Characteristics:**

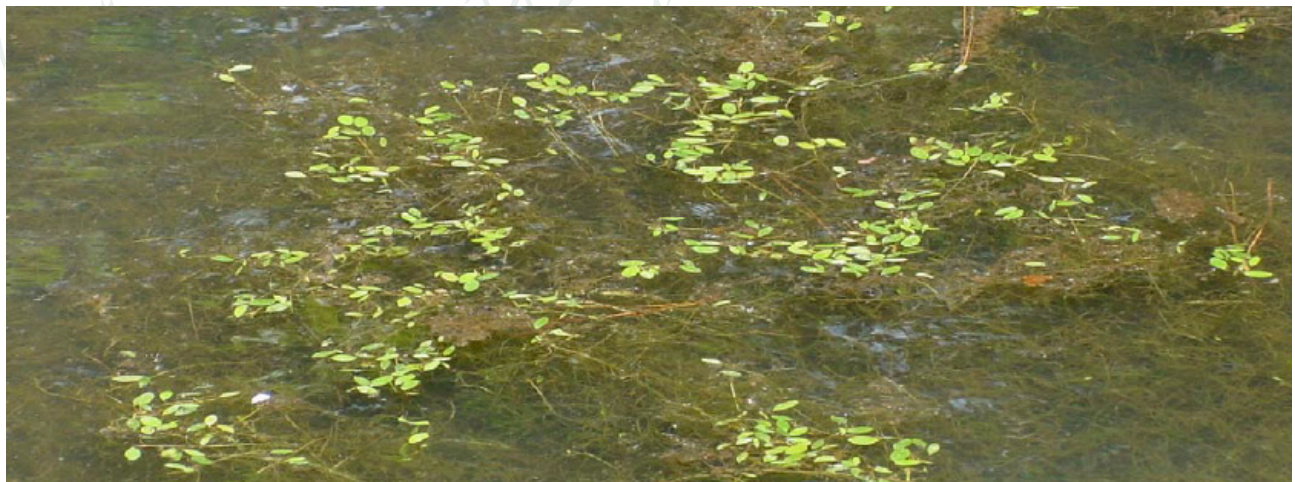
Leaves are thin and thread-like and arranged alternately along the stem. Once topped out, football-shaped leaves less than 2 inches long develop flat on the water surface.

**Growth Habit:**

Submersed.

**Management Program Impact:**

Severe.



# AQUATIC WEED IDENTIFICATION

**Common Name:** Watershield

**Scientific Name:** *Brasenia schreberi*

**Distinguishing Characteristics:**

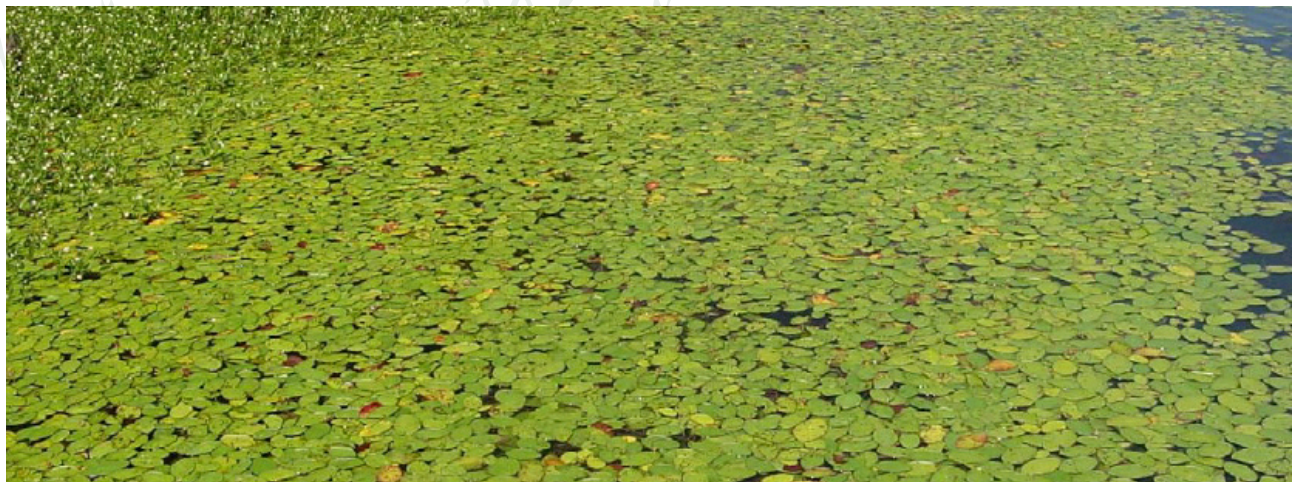
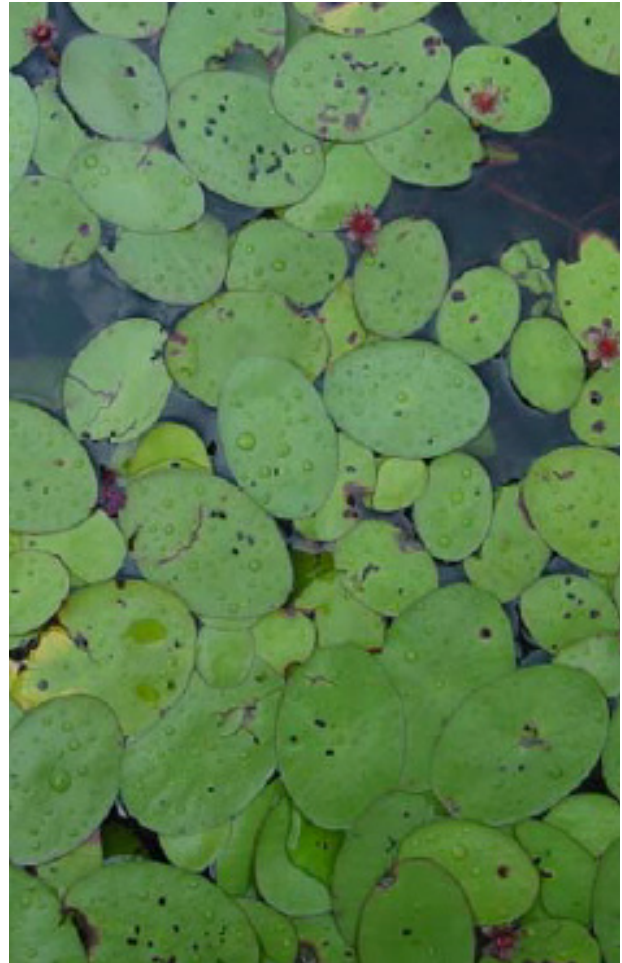
Lily pad 1 to 4 inches across and shaped like a football. No dissection. Underside of lily pad deep purple with gelatinous covering. When present, flowers reddish-purple and emerge from surface on short, red stalks.

**Growth Habit:**

Floating-Leaved. Regularly grows in water up to 6 feet.

**Management Program Impact:**

Moderate to severe.



# 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.



# 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

Swan Lake is functioning as a predator-crowded system that has a low level of fertility. Several management inputs are necessary to restore a state of balance as well as increase the total density of sport fish. The management activities we are recommending for Swan Lake will center on applying a herbicide application, 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 maintaining an intensive fertilization program in Swan Lake. SportMax® Water Soluble Pond Fertilizer (10-52-4) should be applied according to the *Standard Pond Fertilization Schedule*.

For Swan Lake, harvest bass 14 inches and smaller at a rate of 30 pounds per acre per year (510 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 Swan 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 coppershell bluegill should be stocked in order to enhance the growth and condition of the largemouth bass.

We recommend initiating an intensive supplemental feeding program in Swan Lake. Fish food should be applied from 3 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 Swan Lake. Watershield, pondweed, chara, and water lily 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 Swan 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 Swan 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.



**HERBICIDE TREATMENT**

**SUMMER 2023**

**Current Status: Owner Responsibility**

Approved  Declined  Done

Date Approved: \_\_\_\_\_

Date Done: \_\_\_\_\_



**MANAGEMENT ACTIVITY:**  
Herbicide treatment to control aquatic weeds

**COST: \$ N/A**

**LEVEL 2**

**INTERMEDIATE BLUEGILL**

**FALL 2023**

**Current Status: Awaiting Owner Approval**

Approved  Declined  Done

Date Approved: \_\_\_\_\_

Date Done: \_\_\_\_\_



**MANAGEMENT ACTIVITY:**  
Stock 8,500 intermediate coppernose bluegill

**COST: \$ 0.65/each\***

\* This price does not include delivery

**LEVEL 1**

**SUPPLEMENTAL FEEDING**

**FALL 2023**

**Current Status: Awaiting Owner Approval**

Approved  Declined

Date Approved: \_\_\_\_\_

Date Done: \_\_\_\_\_



**MANAGEMENT ACTIVITY:**  
Install 3 Texas Hunter LM-175 directional fish feeders  
Feed at a rate of 5-10 pounds/day from each feeder

**COST: \$ 1,375.00 each\***

\* This price includes a Texas Hunter LM-175 directional fish feeder, solar charger, rechargeable battery, assembly, and installation. An additional delivery charge will be added.

**LEVEL 1**

**ANNUAL HARVEST**

**ANNUALLY 2023**

**Current Status: Owner Responsibility**

Approved  Declined  Done

Date Approved: \_\_\_\_\_

Date Done: \_\_\_\_\_



**MANAGEMENT ACTIVITY:**  
Harvest all crappie caught

**COST: Hook and line: N/A**

**LEVEL 1**

**ANNUAL HARVEST**  
**ANNUALLY**  
**2023**

**Current Status: Owner Responsibility**

**Approved**    **Declined**    **Done**

**Date Approved:** \_\_\_\_\_

**Date Done:** \_\_\_\_\_



**COST: Hook and line: N/A**  
**Electrofishing: \$450.00/hour.\***

\*An additional mileage charge will be added.

**MANAGEMENT ACTIVITY:**  
Harvest ~510 pounds of LMB (14" inches and less)

**LEVEL 1**

**FERTILIZATION**  
**ANNUALLY**  
**2023**

**Current Status: Owner Responsibility**

**Approved**    **Declined**    **Done**

**Date Approved:** \_\_\_\_\_

**Date Done:** \_\_\_\_\_



**COST: Cost of Fertilizer**

**MANAGEMENT ACTIVITY:**  
Continue fertilization program

**LEVEL 1**

**BLUEGILL HARVEST**  
**ANNUALLY**  
**2023**

**Current Status: Owner Responsibility**

**Approved**    **Declined**    **Done**

**Date Approved:** \_\_\_\_\_

**Date Done:** \_\_\_\_\_



**COST: N/A**

**MANAGEMENT ACTIVITY:**  
Limit bluegill harvest to 10 per angler per day

**LEVEL 1**

**SPORTMAX**  
**SPRING 2024**

**Current Status: Awaiting Owner Approval**

**Approved**    **Declined**    **Done**

**Date Approved:** \_\_\_\_\_

**Date Done:** \_\_\_\_\_



**COST: \$ 2.50/lb\***

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

**MANAGEMENT ACTIVITY:**  
Deliver 1,000 pounds of SportMAX Water Soluble Pond Fertilizer (10-52-4)

**LEVEL 1**

ANNUAL EVALUATION

SUMMER 2024

Current Status: Awaiting Owner Approval

Approved  Declined  Done

Date Approved: \_\_\_\_\_

Date Done: \_\_\_\_\_



MANAGEMENT ACTIVITY:  
Annual electrofishing evaluation

**COST: \$ 1,200.00\***

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

**LEVEL 1**







