

Sportfish Management in Ponds

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Sportfish ponds and small impoundments provide significant opportunity to enjoy the outdoors and enhance property value. Properly managed ponds provide an abundant supply of fish for recreation and nutrition. The presence of water attracts wildlife of a variety not possible with dry land. Livestock can utilize ponds as a source of drinking water. Ponds can be adapted to provide a source of water for fire protection in rural areas. The calming effects of a body of water provides added value to real estate in urban and rural settings. These are some reasons why millions of ponds have been constructed in the United States and why pond construction and renovation continues.

Fish Stocking

Stock fish according to your goals for fish production and fishing preferences. Balance can be managed for combinations of largemouth bass, sunfish, and channel catfish. Other species can be added as forage for the bass, but adding fish that compete with the bass or sunfish can change the balance in a negative way. The initial stocking rates are also set by your fertilization plans. More fish can be stocked when a routine fertilization schedule is followed than when a pond is not fertilized.

hatchery before fish are purchased. Dead fish in holding tanks and fish with sores or ragged fins are signs of problems. When fish are delivered, check the fish before they are unloaded. Fish should be tempered or acclimated to the receiving pond water before unloading in order to avoid adding stress to the transport experience. Cool weather and cool water reduce the possibilities of transport stress of fish.

Special strains of largemouth bass or bluegill sunfish may be obtained from private hatcheries. The Florida strain of largemouth bass (*Micropterus salmoides floridanus*) and its hybrid with the Northern largemouth (*Micropterus salmoides salmoides*) grow faster and have significantly better survival for the first three

Catfish are usually stocked in the fall or winter when they are most available. Triploid grass carp are utilized to control aquatic plant growth in ponds and should be stocked in new ponds and ever five or six years thereafter.

| Table 1. Stocking rates for sportfish ponds in Georgia. | | |
|---|------------------------------------|--------------------------------------|
| Fish Species | Number per Acre of Fertilized Pond | Number per Acre of Unfertilized Pond |
| Bream (70-80% bluegill and 20-30% redear sunfish) | 500 to 1000 | 500 |
| Largemouth Bass | 100 | 50 |
| Channel Catfish (optional) | 100 to 500 | 100 |
| Rainbow Trout (winter only) | 100 to 300 | 100 |
| Sterile Grass Carp | 5 to 10 | 5 |

Hybrid bream need ponds with no outflow and no possibility of contamination with other sunfish. A common hybrid sunfish is produced by crossing the bluegill sunfish with the green sunfish. Other hybrids are more complex crosses among species. The growth potential for the hybrid depends on the genetic background of each parent strain or species. Most hybrid sunfish are reported to grow faster than the bluegill, however not all may be from domesticated strains selected for fast growth. Therefore, investigate the source of hybrid sunfish carefully and obtain referrals from previous hatchery customers. Hybrid sunfish must be harvested on a regular schedule in order to make room for the potential of growing trophy size bream. Some individuals in the hybrid population will always reproduce, although not as productively as the bluegill or green sunfish parents. Reproduction among the hybrid bream results in reversion to the adult species through a series of intergrades (progeny with varying degrees

preferred for their delicate meat. Bullheads rarely grow larger than eight or nine inches in length although records indicate they can exceed 18 inches. In bass-bream populations, bullheads compete with bream for food and may reduce spawning success by eating eggs out of the nest. Bullheads can be stocked in small ponds by themselves for best fish production. Feed regularly to improve bullhead growth.

Forage fish may be stocked with bass-bream populations to obtain certain management goals. Ponds intended for production of trophy bass need extra forage and special management. When the forage base is bream, aggressive largemouth bass strains may be limited by a shortage of food. Bass in excess of 10 pounds may be produced with additional forage. Fathead minnows should be purchased at least twice a year as a fo

Liming

Ponds are limed in order to change the soil pH from acid to slightly basic. Most soils in Georgia require some liming, however soils with limestone or marl deposits will probably not need to be limed for fish pond management purposes. Also, ponds that are filled using well water from limestone aquifers need little or no liming. Changing the acidity of soils allows them to release phosphorus more easily so that plants can utilize this nutrient for growth. Calcium carbonate in lime buffers the pH in the pond water so that changes during the day may not be great enough to cause distress to the fish.

The amount of lime needed per acre can be determined by analysis of a soil or water sample. Soil pH can be checked by submitting a sample to your county Extension agent. Water is used to determine lime requirement by checking the pond water alkalinity or total hardness. Water pH may not be a good indicator of lime requirement since the pH changes during the day due to the release and utilization of carbon dioxide by aquatic organisms. In some cases pond water pH may indicate the presence of dissolved organic acids like tannic acid. Certain ponds may have deposits of peat or decaying leaves that lower pH to levels that are too acid to support fish life.

When pond water alkalinity is above 20 mg calcium carbonate per liter, additional lime is not reotsu6.1(lim) -107 Tc-()artaE to cahorus m aci107pond wateror

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years.

Agricultural lime is the most common source of lime. Agricultural lime is a combination of calcium and magnesium carbonates. It is recommended that about 2 mg magnesium per liter of pond water should be available in fish ponds. Several types or grades of agricultural lime are available. The coarser types may be less soluble and lime from some sources may be hard to dissolve due to their mineral composition, but a lime that passes through 400 mesh screen is best for ponds. Lime takes about three months to dissolve and should be applied that far ahead of the spring fertilization period. Liquid lime (a suspension of fine particles of agricultural limestone) is useful because it dissolves quickly and can be easier to apply than bulk granular limestone.

Hydrated lime (builders lime or calcium hydroxide) can be applied to ponds to satisfy the lime requirement. More soluble and finely powdered, hydrated lime may increase pond water pH rapidly, causing a fish kill. It is best to apply less than 100 pounds of hydrated lime per surface acre at weekly intervals until the lime requirement is met. Hydrated lime application may need to be repeated every six to eight weeks in order to prevent a decline in water hardness.

Liming ponds allows use of algicides that contain copper. Since copper is more toxic when pond water alkalinity is low, lime can be used to increase alkalinity and reduce the toxicity of copper to fish. Trout, koi carp, and blue catfish have a lower tolerance to copper than do bream, bass, grass carp, or channel catfish. It is important to avoid using copper unless the alkalinity of pond water is higher than 40 mg per liter.

Feeding

When channel catfish are stocked in ponds, supplemental feeding is very important. Stocking rates of less than 100 catfish per acre can be sustained for a few years without feeding, but feeding should begin after the third year. Channel catfish spawn readily in ponds using any shelter they can find or digging out under the pond bank. Over the years, domestication of catfish has overcome their reluctance to spawn in static water ponds. So, catfish can restock themselves and overstocking can occur with uncontrolled catfish spawning. Supplying adequate feed for the catfish until they can be caught is necessary to prevent stress in the fish and disease infection following stress. In order to get rapid catfish growth, feed each day all they will eat in a 15 to 20 minute period. Avoid feeding during cloudy

weather when oxygen depletion is a danger. Discontinue feeding during very cool weather when water temperatures are below 65° F.

Supplemental feeding can improve bream growth under certain conditions but do not think that all bass-bream ponds must be fed. Bluegill sunfish have been grown to over one pound in size by using supplemental feeding. A high quality fish feed of 1/8 to 1/4 inch diameter should be used to feed bream. The feed should also contain between 32 and 36% protein. As with catfish, feed what the fish will consume in less than 15 to 20 minutes. However, bream are not fed in the sense that commercial, high density fish farms are, but special formulations are used as a supplemental ration. Automatic feeders can be utilized to make the feeding more successful by insuring regular feeding and allowing several feedings per day. Hybrid sunfish will also benefit from supplemental feed. However, stunted bream populations cannot be improved by using supplemental feeding. Other methods for correcting bream overcrowding will be explained later.

Feed amounts must be adjusted seasonally. Fish eat more in warm weather than in cold. It is not necessary to feed catfish or bream when water temperatures cool to less than 70° F. Also, in the hottest part of summer, feed amount should be reduced to account for slower feed consumption and the risk of oxygen depletion. Some feed reduction during changes in weather may also be advisable. Feed quantity or frequency can be reduced for a few days as a low pressure front passes by. Feed should be reduced or withheld after a few days of cloudy weather. When feeding more than 30 pounds of feed per acre per day, aeration should be available to protect from eventual oxygen depletion. In most bass-bream ponds, 10 pounds of feed per acre per day is adequate to support the fish. It is important to remember that oxygen depletion can occur even when ponds are not fed.

Fishing Methods

The first step to good pond management is setting goals for the type of fishing that you want. Once a goal is established, rules for catching, releasing, feeding or fertilizing can be set.

Fishing should not begin until June of the year following bream stocking and largemouth bass should not be removed until the second year after a successful spawn has been observed. This rule applies to both any bass-bream pond because the biology of both species requires managed harvest to prevent overcrowding of bream or over-fishing of bass. Several points must be considered:

1. Catching bream as soon as they become mature (3-4 months into first growing season) starts the bream harvest and helps the bass control bream reproduction.
2. Preserving bass until after their first spawn allows the bass to help manage bream numbers and provides bass replacements for the bass that are caught.
3. Largemouth bass diminish in numbers even without fishing and male largemouth bass seldom reach five years of age.
4. Removal of intermediate sized bream (4-6 inches) and bass (14 to 18 inches) helps develop a population of trophy sized fish by removing competition.

| Table 3. Catch rates for bass-bream ponds. | | |
|--|-------------------------|---------------------------|
| Species | Unfertilized Pond | Fertilized Pond |
| Bream (first year) | 40 pounds (120 fish) | 80 pounds (320 fish) |
| Bream (later years) | 40 pounds (120 fish) | 150 pound (600 fish) |
| Largemouth bass (second year) | 10 pounds (8 fish) | 20 pounds (15 fish) |
| Largemouth bass (later years) | 10 pounds (5 to 8 fish) | 35 pounds (15 to 20 fish) |

Bream serve as the forage base for largemouth bass and must be managed to provide enough food for bass growth but not allowed to overpopulate and stunt their own growth. Bream must be removed on a regular basis from the pond, either by the bass or by anglers. Set goals for bream fishing based on Table 3 and monitor the size of bream caught. It has been said, “Never return bream to the pond, regardless of size.” In overcrowded bream ponds, a bluegill may be only three inches long, but fully mature. Removal of intermediate sized bream, between 4 and 6 inches long, will encourage growth of the larger bream to trophy size. Due to the relatively slow growth of bluegill sunfish, plan to wait four years until trophy bluegill, above one pound, are caught. Since bluegill seldom exceed six years of age, remove bluegill when they are caught since you may not get a chance to watch the big ones grow any larger. Large ponds and lakes may develop larger bluegill because more food is available and more space is available to allow the fish to escape capture by bass or anglers while they grow to trophy size.

Largemouth bass management depends on control of bass harvest. It takes a commitment to record keeping and catch limits in order to maintain a pond with bass that you may want to hang on your wall (10 pounds or larger). Use the catch limits in Table 3. Catch bass and remove when they reach 14 to 18 inches. Also, check for signs of bass overcrowding, then remove any stunted 10 to 12 inch bass. Bass stunting from overcrowding is an indicator of a pond that is under fished. Ponds with little fishing pressure will not produce the weights and numbers of fish that are listed in this publication. Abstaining from fish harvest will allow the pond to revert to a wild condition with low fish numbers of relatively small size. If a fertilization program is continued with limited fishing pressure, overcrowding may have disastrous consequences and result in a fish kill.

increase the number of fish, it concentrates the ones that are there. If a pond is constructed with brush piles, ridges, or rock piles, locate the structure at different depths. After a pond has been filled, add structure such as Christmas trees, hardwood limbs, or man-made structures.

Fish populations should be monitored by angler catch records, electro-fishing, or seining. Most pond managers should be able to keep records of the size, number and species caught from their ponds (Table 4). Use the harvest goals that were set when the pond was stocked, fish the pond accordingly. All anglers who fish the pond should leave a record of the fish they catch (Figure 1). Some ponds have a mail box for depositing fishing records for the manager to check. However, when angler catch records are not kept, electro-fishing or seining can be use to check population balance. Electro-fishing requires a specially rigged boat that can go where the fish are to temporarily stun then causing them to float to the surface where they can be counted, weighed, and identified. Large mouth bass may be sampled more effectively if electro-fishing is done at night. Seining with 25 and 50 ft seines allows the shoreline fish to be sampled. Small fish can be caught in this manner to determine the success of fish spawning. Large fish are usually not caught by shore seining.

Figure 1. An example of an angler diary for keeping fishing records.

| Date | Initial | Number Fishing | Time Fishing | | Bass | | Bluegill | | Red ear | |
|------|---------|----------------|--------------|-------|------|------|----------|------|---------|-----|
| | | | Start | End | No. | Wt. | No. | Wt. | No. | Wt. |
| 6/25 | GB | 1 | 6 AM | 10 AM | R 2 | 2 lb | K 10 | 1 lb | --- | --- |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

K = Number of fish kept.
 R = Number of fish released.

The weight of a fish relative to a standard weight shows if the fish is getting enough to eat or not. The condition of a fish can indicate the balance between that fish and other fish in the pond of its own species and predator or prey species. For example, if a bass is thin there may be too many bass and too few bream. Use the

okay. If the fish are 80 percent of less of the standard weight, improvements should be made to correct the pond management system.

Table 5. Weights of bass at different lengths for determining fish condition.

Standard weights for northern largemouth bass.

Length, in

- 12
- 14
- 16
- 18
- 20
- 22
- 24

Renovating Fish Populations

When pond fish populations are out of balance and there is no acceptable method to restore balance, the pond may need to be renovated by draining, drying, and refilling before stocking a new fish population. If the pond can be drained, some of the fish may be salvaged for future use or sale. However, most recreational fish ponds were not constructed so that fish could be seined or netted from shallow water. Ponds may have shallow puddles to holes with three or more feet of water that cannot be easily drained. In those cases, a chemical fish toxicant may be used to complete the renovation.

Rotenone can be used to eliminate unwanted fish to make a new start on balancing the pond fish population. Rotenone is effective in ponds with deep water. Several formulations containing rotenone have been developed that have different effective rates that depend on the water depth, water temperature, and fish species. Rotenone biodegrades in four days to five weeks, depending on water temperature. Avoid applications where overflow of the treated pond may drain into other fish-bearing water. Detoxify rotenone by applying an equal amount of potassium permanganate or chlorine. Rotenone products must be used according to their label instructions and are restricted use pesticides. A certified pesticide applicator must be directly involved in application of rotenone and appropriate permits and permissions must be obtained.

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