

Natural Resources Conservation Service
South Carolina
Conservation Practice Specification

FISHPOND MANAGEMENT
(No.)
CODE 399

CRITERIA

To produce adequate amounts of harvested fish, a pond or lake must be properly constructed. The pH of the soils in the bottom of the pond should be corrected to 7.0. For proper management, a water control pipe that releases deep water and retains surface waters should be installed. This pipe system should also have draw-down capabilities. See practice standards and specifications for Pond (378) for more information.

For effective management, ponds less than one acre are best suited for channel catfish alone or hybrid sunfish. A farm pond that is to be stocked with bluegill and bass should be at least one acre in size, preferably larger. Although small ponds can normally provide unlimited bluegill fishing, the potential is great that bass will be over-harvested in ponds less than one acre. The goal should be the highest level of management to which a landowner will agree.

Stocking

Bass, bluegill, and red-ear combination. Stock with hatchery produced fish. Stock a total of 500 bluegill sunfish and red-eared sunfish and 50 largemouth bass per surface acre. If the pond is managed with fertilizer, the stocking rate would be 1000 bluegill and red-eared sunfish and 100 largemouth bass.

Catfish (for game fishponds only). With the regular bass, bluegill, red-ear combination, 50 channel catfish per acre may be added if desired. Add catfish fingerlings only in new or renovated ponds. These fish eat small catfish stocked in ponds containing bass or other predaceous fish. Catfish may be stocked in existing bluegill/bass ponds provided they are large enough to escape predation >6". Do not stock catfish in combination with bluegills only, since catfish are not very efficient predators.

The bluegills will become overcrowded, resulting in poor growth of both species.

Catfish stocked alone for sport fish. Channel catfish can be grown in farm ponds for sport fishing and home use. For unfertilized ponds without supplemental feeding, stock at 100-150 per acre. If the pond is kept fertile, stock up to 200-250 per acre. Producing catfish as a game fish is best done by using supplemental feeding. Stock 400 to 1,000 fingerlings per acre, depending on the frequency and amount of supplemental feeding. Stocking at these higher rates is risky unless adequate aeration capabilities are installed.

Hybrid bream and bass. Stocking hybrid sunfish offers some attractive management possibilities in small ponds of 3 acres or less. Maximum growth can be attained by stocking 750 hybrids and 50 bass per acre, and then following a good fertilization program and supplemental feeding. The stocking of hybrid bream (bluegill x green sunfish), Georgia giants etc. is not recommended. If this is done, the pond owner should be aware these fish will reproduce but the offspring will not maintain the genetic characteristics of the original parent stock over successive generations.

Sterile grass carp. Grass carp should be utilized as a control measure following early detection and ID of a plant species. It should also be stressed these fish will readily consume supplemental pelleted food intended for bluegill. Fingerling grass carp should be stocked at a rate of three to five per acre. Due to problems with predation only grass carp 10" or greater in length should be stocked under any circumstances. In older ponds where bass are present, a minimum carp size of 8 inches will be needed. The stocking rate for older ponds will depend on the severity and type of the weed problem. Slight weed problems will require a stocking of five per acre. Severe weed

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

problems may require a stocking of up to 20-25 per acre.

Crappie (white perch). Do not stock in farm ponds and small lakes as these fish are not adapted to such bodies of water and usually cause serious problems requiring complete pond renovation.

Liming

Waters ranging from a pH of 6.5 to 9.0 at daybreak are most desirable for fish production. Ponds constructed on acid soils will usually fall well below this level. These acid waters will be clear, infertile, and encourage the growth of aquatic vegetation. To avoid this undesirable condition in new ponds, disk in a minimum of 2 tons of agricultural limestone per acre before the pond fills. This should last for several years. To accurately determine the amount of lime needed, have the soil tested. In older ponds, a soil sample can be taken from the bottom of the pond or a water testing kit can be used to check for total alkalinity. At less than 20 parts per million, add 1 to 2 tons of agricultural lime per acre. Many ponds in S.C. have alkalinity levels less than 10 ppm and will require up to 4 or more tons of lime /acre. For best results, the lime should be evenly spread over the entire pond surface. Since lime takes about three months to react, the fall is usually the best time to apply the lime.

Fertilization

Below or total alkalinity of less than 20 parts per million must be limed at a rate of 1 to 2 tons of lime per acre before fertilizing. Ponds having surface spillways, which flow more often than every three weeks during the growing season, are impractical to fertilize. The added fertilizer is washed out through the spillway. Delay fertilizing these ponds until heavy spring time flows subside. Ponds with severe weed problems should not be fertilized until the weed problems are controlled.

Fertilizers should only be used in a pond to address a recognized objective such as the need to produce more fish or to help reduce aquatic vegetation. Once begun, a fertilization program should continue each year.

Kind of fertilizer. Use a fertilizer such as traditional granular (20-20-5) or equivalent, super-phosphate (0-20-0), triple super-phosphate (0-46-0), liquid (10-34-0) or (13-37-

0), water-soluble (12-49-6) or (10-52-0) or timed release (10-50-0).

When to fertilize. Begin fertilization in the spring when water temperatures have stabilized at 65°F, or higher. As a rule of thumb, this means about March 15 in coastal South Carolina and April 1 in the piedmont and mountains.

If a liquid, powder, or traditional granular formulations is used, make the first three applications of fertilizer two weeks apart. Make additional applications whenever a white object can be seen clearly at 18 inches. Applications are usually needed at approximate 3- to 5-week intervals from spring through September.

If the timed-released fertilizer is used, apply 25 to 40 pounds of pellets per acre. This is a one time application for many ponds and will provide gradual release of nutrients until fall. However, for best results, a complete pond fertilizer such as 20-20-5 granular or 10-34-0 liquid should be applied at recommended rates to promote the initial bloom.

How to apply--Never broadcast granular fertilizer and never apply undiluted liquid fertilizer. In either case, the fertilizer will rapidly sink to the bottom and be tied up in the soil rather than becoming available in the water. Powdered formulations can be broadcast since they are highly water soluble and do not sink to be tied up in bottom mud.

For best results on the application of granular forms or timed-release pellets, a fertilizer platform should be used. One fertilizer platform can be used to fertilize 2 to 3 acres. If a platform is not available, an alternative method is to simply place bags containing the needed amount of fertilizer in shallow water (2 to 4 foot) with the tops cut out. The bags serve to separate soil and fertilizer, and wave action will dissolve and distribute the fertilizer.

Liquid fertilizer should be diluted with two parts of water to one part fertilizer before application. In small ponds, liquids can be sprayed effectively from the bank with handheld sprayers. Boats make application easy in larger ponds. The diluted fertilizer can be sprayed over the water surface or allow it to flow into the prop-wash of an outboard motor.

New ponds or those that have never been fertilized sometimes fail to respond to fertilizer. Getting a plankton bloom may be difficult with

0-46-0 fertilizer even if the pond has been properly limed. If an application of 0-46-0 does not produce a bloom in 3 to 5 days, nitrogen may be needed. Apply 50 pounds of 34-0-0 (ammonium nitrate) or 40 pounds of 20-2-5 per acre. This should produce a desired bloom in 3 to 5 days. Normal application of pond fertilizer should be continued thereafter.

Clearing Muddy Ponds

If muddiness is caused by sediment, control by treating the source. When suspended soil particles do not settle out, the application of 20 pounds of triple super-phosphate (0-46-0) per acre at 2 to 3 week intervals should help. The fertilizer should be well dissolved in solution. Alum at a rate of 15 pounds per acre is also effective. The application of 300 to 500 pounds per surface acre of gypsum (land plaster) will also clear a muddy pond. The gypsum should be evenly spread over the pond and stirred with an outboard motor. Caution should be used when applying this material as pH levels could be significantly lowered.

The use of hay will also help clear a muddy pond. Apply 7 to 10 square bales of hay per acre. Do not use green hay. The hay should be well cured. The bales should be broken and scattered over the water. When the water clears, a regular fertilization program should be continued. Caution should be used during summer months to prevent oxygen depletion.

If the water in the pond stays milky, apply 75 pounds of cottonseed meal and 25 pounds of super-phosphate (0-20-0) per acre each time you apply the other fertilizer until the water clears. When the water clears, the regular fertilization program should be continued.

Correcting Unbalanced or Overpopulations

Problems with fish populations arise from time to time in ponds. Common problems include the following: overpopulations of small bluegills, overpopulation of small bass, or undesirable species stocked purposely or accidentally. Sometimes it is necessary to eradicate the entire fish population and restock. Contact a biologist of the Natural Resources Conservation Service or the South Carolina Department of Natural Resources for recommendations on complete eradication of existing fish stocks.

Seining. In small ponds that have no stumps and other vegetation, an overcrowded bluegill

population in its early stages may be corrected by seining. Use a seine 50 to 100 feet long with 1/2 inch mesh which lets small fingerlings remain. Throw back all bass and keeping-size bluegills, but destroy small and intermediate size bluegills. Seine at 10-day intervals until most of the intermediate size bluegills have been removed. This method may be effective in special situations and should be done under the supervision of a fisheries biologist.

Draw-downs. By reducing the volume of water, bluegills and other sunfish are concentrated, thus allowing better control by predator fish. When the water level is down, the soil chemistry of the exposed bottom changes and much of the nutrient material locked up in the bottom mud is released and made available for next year's fish growth. Draw-downs also help control aquatic vegetation. Begin drawing down in fall and achieve maximum draw-down by late November. Allow the pond to re-fill by late February. This practice is especially applicable to larger lakes and will also work on smaller ponds.

Partial kills. Overcrowding by intermediate-sized bluegills can often be corrected by a partial kill. Use one pint of 5 percent liquid rotenone per 300 linear feet of shoreline placed in a thin line about 20 to 25 feet from the water's edge. Do this between September 15 and October 15 on a clear, still and warm day between 11 a.m. and 2 p.m. Do not use in ponds less than 3 acres or on a windy day. Five percent rotenone is a restricted use pesticide, not available to the general public. Marginal poisoning should be conducted with great care so as to avoid overkill or death of non-target species such as largemouth bass.

Selective kills. Shad can be killed with rotenone or antimycin A with little harm to game fish. Very small amounts are needed, but accurate measurements and correct application methods are necessary.

Supplemental bass stocking. Supplemental stocking of 25-50 adult bass (1/2 pound and larger) or 100-300 bass fingerlings/acre can frequently correct overpopulations of bream and undesirable fish.

Oxygen Deficiencies

Oxygen deficiencies may occur during the spring and summer months, especially during the "spring turnover" (March and April) or during

summer periods of hot, still, cloudy days. Ponds should be watched closely during such periods. The critical time of oxygen shortage is at daybreak. If fish are seen on the surface or otherwise showing distress, start remedial measures immediately. Use aeration equipment or a pump to lift surface water and spray it into the air and back into the pond. If fish are not surfacing in distress at daybreak, they are safe until the next daybreak, at least. Do not stir the water with a boat and motor as this further reduces the available oxygen in the surface layer of water and distributes it throughout the water column.

Aquatic Vegetation

Aquatic vegetation can best be prevented in most ponds and lakes by eliminating shallow areas (water less than 3 feet) and keeping the water fertile.

Aquatic plants are: algae or pond scum; floating weeds; submerged weeds; and emergent or marsh plants. Each group has different growth habits and requires different treatments.

There are many chemical preparations on the market for controlling aquatic vegetation. Most are safe for general use in ponds and lakes if the manufacturer's recommendations are followed. Some are toxic to fish if larger amounts than recommended are used.

If a pond has a heavy growth of vegetation, not over half of it should be treated with chemicals at one time to prevent an oxygen deficiency. Treat about a third or half of the pond, let the vegetation decay, then treat the remainder.

A winter draw-down may also be an effective weed control technique, especially if done in successive years. For effective weed control, the water level should be lowered to expose aquatic weeds in the more shallow portions of the pond. Usually, water levels are reduced enough to expose 35 to 50 percent of the pond bottom, but this percentage may vary greatly, depending upon topography and design of the pond. Maximum draw-down should be accomplished by mid to late November and water level should remain low through February.

Many types of aquatic vegetation can be controlled by grass carp. Stocking rates vary from 5 to 20 per acre based on the severity of the weed problem.

CONSIDERATIONS

1. Water quantity: Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
2. Water quality:
 - a. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.
 - b. Effects on the use and management of nutrients and pesticides and resulting effects on surface and ground water quality.
 - c. Effects on the visual quality of downstream water resources.

PLANS AND SPECIFICATIONS

Plans for Fishpond Management shall be in keeping with this standard and specification and shall describe the requirements for applying the practices to achieve its intended purpose.

OPERATION AND MAINTENANCE

Ponds or lakes should be managed on a regular basis to obtain the maximum benefits. The criteria section should be closely followed to insure the proper operation and maintenance of this practice.

REFERENCES

Natural Resources Conservation Service, Mississippi State Field Office Technical Guide, Standard 399, Fish Pond Management. January, 2000.

Fish Pond Management Guide, South Carolina Department of Natural Resources.