

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD
FISHPOND MANAGEMENT

(No.)

CODE 399

DEFINITION

Developing or improving impounded water to produce fish for domestic use or recreation.

PURPOSE

To improve or maintain fish production and fishery use by making a favorable water habitat, supplementing or increasing natural food supplies, and reducing competition from unwanted plants and animals.

CONDITIONS WHERE PRACTICE APPLIES

In ponds, lakes, and reservoirs where a crop of fish is wanted

CRITERIA

Criteria Applicable to all Impoundment's

- A. Eradicating wild fish - Before stocking with desired fish, eliminate all unwanted fish in the impoundment area. See Biology Reference, Wild Fish in Farm Ponds – How to Prevent and Control.
- B. Controlling waterweeds - Control troublesome weeds by cutting, digging, pulling, applying chemicals, or by other means.
 1. *Shallow edges* - Aquatic vegetation can best be prevented by eliminating shallow areas (less than 3 feet deep) around pond edges. A fertilization program will also darken the water, which prevents weeds from growing up from the bottom.
 2. *Grass Carp* - Grass carp can be stocked in new ponds as another weed preventive measure. Fingerling grass carp should be stocked at a rate of three to five per acre. 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 of the weed problem.

3. *Herbicides* - If herbicides are to be used, only chemicals that are cleared for use in fish culture should be applied. Where applying chemicals, carefully follow the manufacturer's recommendations. When applying chemicals during mid to late summer use CAUTION and DO NOT treat the entire pond at once. Treat about 1/3 of the pond, let the vegetation decay, and then repeat the procedure. This method should also be used on ponds that have a heavy growth of vegetation. This procedure will generally prevent an oxygen deficiency from developing, which could result in a fish kill.
4. *Drawdowns* - A winter drawdown 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 shallow portions of the pond. Once exposed, most water weeds cannot stand freezing temperatures without damage. 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 drawdown should be accomplished by mid to late November and water level should remain low through February.
- C. Correcting Unbalanced Fish Populations -

Common problems with fish populations include the following: Overpopulation of small bluegills, overpopulation of yearling bass, or undesirable species in pond.

 1. *Renovation by complete kill* - Pond renovation should be done when populations are badly unbalanced or undesirable fish

species make up a significant portion of the population. Refer to the job sheet on rotenoning a pond.

2. *Partial Kills* – Overcrowding by intermediate sized bluegills can often be corrected by a partial kill. This should be done with rotenone between September 15th and October 15th on a clear, still, and warm day between 11:00 a.m. and 2 p.m. Do not use in ponds less than 3 acres or on a windy day. Contact a competent fisheries biologist for assistance.
 3. *Drawdowns* – When water volume is reduced, bluegills and other forage fish are concentrated. Concentrated fish are easier prey for bass, and therefore forage fish populations are generally reduced. Summer drawdowns are most effective for population reduction of forage fish, but can lead to increased weed problems. Regardless of when the pond is drawn down, the water level should be allowed to come back to the normal level by mid-February in the southern part of the state and the end of February in the rest of the state.
 4. *Supplemental Bass Stocking* - Supplemental stocking of 25-50 adult bass (1/2 pound to 1½ pounds each) can frequently correct overpopulations by bream, other forage fish, and undesirable fish. The addition of 100 to 300 bass fingerlings per acre will also work, but will delay significant population reduction for several months until the bass are large enough to consume small and intermediate bream.
 5. *Bass Removal* – Removal of 25 to 50 adult bass (1/2 pound to 1½ pounds each) can frequently correct bass overpopulations.
- D. Controlling disease and parasites - The diagnosis of diseases and parasites must be done by a well-trained fish pathologist. Obtain specifications for each impoundment from Auburn University Department of Fisheries.
- E. Correcting oxygen deficiencies
1. *Cloudy summer weather* - Check each morning at daybreak and just before dark. If fish are breaking the surface of the water, or otherwise showing distress, either aerate the water at once or partly drain and refill with

fresh water. Contact your State fishery biologist.

2. *Storm turnover* - Aerate the water at once. Contact your State fishery biologist.
3. *Excessive plankton blooms* - Contact your State fishery biologist, NRCS biologist, or Extension System fishery biologist.
4. *Changes in watercolor* - Same as for storm turnover.

- F. Clearing muddy water - Occasionally impounded water becomes muddy because of wave action, heavy rains, eroding spots in the watershed, road construction, and other causes. If caused by sedimentation, control by treating the source, if possible.

Sustained problems with muddy water can also be treated by applying 75 pounds of cottonseed meal and either 25 pounds of superphosphate (15 to 25 percent) or its equivalent per surface area. Apply over the entire impoundment at 2 to 3-week intervals until the water clears.

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.

- G. Liming – Pond water should be tested for pH or total alkalinity. Water ranging from a pH of 6.5 to 9.0 at daybreak or an alkalinity of ≥ 20 parts per million CaCO_3 is most desirable for fish production. Water that has a pH or total alkalinity outside of those ranges will not respond well to fertilization, if at all.

It is easiest to apply lime before a pond is filled for the first time or when it has been drained for maintenance. Unlike fertilizer, lime does best when broadcast as evenly as possible across the pond. If testing reveals the need for lime, then a minimum of 1 to 2 tons per acre should be applied.

- J. Fertilization – Total alkalinity of pond water should be checked before a fertilization program is begun. This is critical for fertilization to provide the proper results. See

section I, above, on liming or Biology Reference, Liming Fishponds.

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. If fishing is infrequent, fertilization may not be practical. Once begun, a fertilization program should continue for the entire growing season every year.

Ponds having surface spillways, which flow more often than every three weeks during the growing season can be impractical to fertilize. The added fertilizer is washed out through the spillway during heavy rain. Delay fertilizing these ponds until heavy springtime flows subside. Ponds with severe weed problems should not be fertilized until the weed problems are controlled.

Start applying fertilizer during the first warm weather of early spring, usually in mid March. Apply 100 pounds of 8-8-2, 40 pounds of 20-20-5, or their equivalent per acre. Make the first three applications at 2-week intervals. After that, make additional applications whenever a white object can be clearly seen at 18 inches below the surface. Apply as needed until water becomes cold in October.

After a pond has been properly fertilized (as above) for 3 to 5 years, it may require only phosphate fertilizer. If so, apply 40 pounds of superphosphate (0-20-0) or 18 pounds of triple superphosphate (0-46-0) per acre for each application. If phosphate is used and the water does not "green up" within a week, then nitrogen should be added. Add a complete fertilizer containing nitrogen or simply add ammonium nitrate (34-0-0). Ammonium nitrate can be added at a rate of 5 to 10 pounds per acre, with 10 pounds per acre the absolute maximum. Higher levels may cause mortality of fish and other aquatic species.

It is most efficient to place the fertilizer on a platform 12 to 18 inches under the water. One platform will fertilize the surrounding 5 acres of water. Another method is to place bags in shallow water (1 to 2 feet deep) directly on the pond bottom. Cut an "x" across the upper face of the bag to expose the fertilizer to the water and leave the rest of the bag intact. It is best to secure the bag with a long nail or wire to keep it from floating off into the pond after all fertilizer has been dissolved. The bag will keep fertilizer from

contacting the mud and natural wave action will dissolve and distribute the fertilizer. Never broadcast granular fertilizer. The fertilizer will rapidly sink to the bottom and be tied up in the soil rather than being dissolved in the water.

Liquid fertilizer should be diluted with two parts water before application. In small ponds, liquid fertilizer can be sprayed from the bank with handheld sprayers. Boats make application easy in larger ponds. Diluted fertilizer can be sprayed over the water surface or poured behind the boat to be mixed by the propeller. Never apply undiluted liquid fertilizer. Having a higher density than water, it will sink to the bottom and be tied up in the bottom mud instead of becoming dissolved.

Criteria Applicable to Bass, Bluegill, and Redear Sunfish (Conventional)

A. Fertilized ponds

1. *Stocking* - Stock a total of 1,000 bluegills and redear sunfish (combined) per acre between November 1 and March 31. The bluegill-redear combination should be about 85 percent bluegill and 15 percent redear sunfish. Add 100 bass fingerlings per acre during the following April or May. Applications for fish may be obtained from your District Fisheries Biologist, Alabama Department of Conservation and Natural Resources.
2. *Fishing* - Start fishing 1 year from the day the bass are stocked. Distribute catch as evenly as possible throughout the year. *It is very important to maintain a harvest ratio of roughly 10 pounds of bream for every 1 pound of bass removed.* Because of this, good record keeping is an absolute necessity.

Unfertilized ponds

1. *Stocking* - Stock 500 bluegill and redear sunfish (combined) and 50 bass fingerlings per acre.
2. *Fishing* - Start fishing 1 year from the day the bass are stocked. Distribute catch as evenly as possible throughout the year. *It is very important to maintain ratio of 10 pounds bream removed for each pound of bass.* Because of this, good record keeping is an absolute necessity.

Criteria Applicable to Bass, Bluegill, Redear Sunfish, and Channel Catfish

A. Fertilized ponds

1. *Stocking* - Stock 1,000 bluegills and redear sunfish (combined) per acre between November 1 and March 31. The bluegill-redear combination should be about 85 percent bluegill and 15 percent redear sunfish. Stock 100 channel fingerlings (4 to 6 inches) per acre between October 15 and March 1. Add 100 bass fingerlings per acre during the following April or May.
2. *Fishing* - Start fishing 1 year from the day bass are stocked. Distribute catch as evenly as possible throughout the year. *It is very important to maintain a ratio of 10 pounds bream removed for each pound of bass.* Because of this, good record keeping is an absolute necessity.
3. *Restocking* - Stocking with larger catfish fingerlings (at least 7 or 8 inches) every year or two is necessary in order to maintain good fishing for catfish. Keeping good catch records will make it easier to determine catfish restocking needs.

B. Unfertilized ponds

1. *Stocking* - Reduce stocking rates by one-half.
2. *Fishing* - Start fishing 1 year from the date bass are stocked. Distribute catch as evenly as possible throughout the year. *It is very important to maintain ratio of 10 pounds bream removed for each pound of bass.* Because of this, good record keeping is an absolute necessity.
3. *Restocking* - Same as for fertilized ponds.

Criteria Applicable to Channel Catfish

A. Cage culture

1. *Stocking* - Stock 100 to 500 channel catfish fingerlings (at least 5 inches) in a floating pen, basket, or cage. Stock no more than 2,000 fingerlings per surface acre unless there is a high rate of water exchange. See Biology Reference, Homegrown Fish from Cages.
2. *Fertilizing* - Not recommended.

3. *Size of cages* - Dimensions may be variable. A convenient size is 40" x 40" x 36 or a cage 48" high and 48" in diameter.
4. *Placing cages* - Either float the cages or attach them rigidly to a pier or walkway, well away from obstructions that prevent water circulation. Leave about 3 inches of the cage above water. Suspend cages off the bottom by at least 18 inches. Space cages at least 3 feet apart.
5. *Feeding* - Feed a floating, nutritionally complete feed every day during warm weather (water temperature 54 degrees F. and above) until fish reach harvestable size. Common commercial catfish feeds are not suited--they are not complete. Most trout feeds are complete and there is a cage ration for catfish. Feed about 3 percent of their body weight per day. Determine average weight by weekly sampling. Avoid feeding over 35 pounds per acre per day unless there is a high rate of water exchange.
6. *Harvesting* - Harvest when fish reach harvestable size. Six-inch fingerlings reach an average weight of 1 pound in about 180 days.

B. Commercial production in ponds

1. *Stocking* - Stock 3,000 channel catfish fingerlings (4 to 8 inches) per acre. Stocking between October 15 and March 1 is recommended, but they may be stocked at any time of the year. There are some that stock more than 3,000 fish per acre. However, the risk of loss increases with higher numbers.
2. *Fertilizing* -Not recommended.
3. *Feeding* - If stocked before March 1, feed 1 percent of body weight either on alternate days or when the water 3 feet below the surface is 54 degrees F. or warmer. Begin daily feeding on March 1 and continue through October or until water cools below 54 degrees F. in the fall. Use pelleted catfish food. Feed about 3 percent of their body weight per acre per day. Avoid feeding over 35 pounds of feed per acre per day. Table 1 gives a suggested feeding schedule

based on 5-inch fingerlings. You may substitute weight of fish used.

4. *Harvesting* - Lower water level to harvest basin and seine. If pond is a seine-through design, harvest without lowering water.
5. *Restocking* - Restock with channel catfish fingerlings.

C. Fingerling production

1. *Spawning*

- a. *Pond method* - Stock up to 20 or more pairs of brood fish per acre. Stock about equal numbers of males and females. Place about three spawning receptacles (10-gallon milk cans, nail kegs, earthenware crocks, etc.) in pond for every four pairs of brood fish. Place spawning receptacles in water up to 4 feet deep. Either transfer newly hatched fry to another pond or leave them in the pond where hatched. See Biology Reference, Second Report to the Fish Farmers.
- b. *Pen method* - Place a pair of brood fish and a spawning receptacle into spawning pens (about 5 feet x 10 feet). Pens should be imbedded in the pond bottom and should extend 12 to 24 inches above the surface of the water. Pens can be made of wood, concrete blocks, wire fencing, or other material. Water in pens should be about 3 feet deep. After spawning, remove eggs or fry and parents and place another pair of brood fish into pens. Or remove female as soon as egg mass is found and allow male to hatch the eggs. The egg mass may be removed and hatched in troughs equipped with paddle wheels.

2. *Rearing*

- a. *Stocking* - Stock up to 150,000 fry per surface acre. To some extent, stocking rate determines the size of fingerlings at harvest time. Where stocked at 15,000 per acre and managed correctly, spring-hatched fry may be 6 inches long by November 1.
- b. *Feeding* - Begin feeding a finely ground, nutritionally complete meal. Use 1 pound of feed for each 2 acres of water. Gradually increase feed to the amount that fish will eat during 20 to 30 minutes.

After fry are feeding well, increase feed to at least 5 percent of the weight of fish in the pond. Determine weight by weekly sampling.

Change to crumbles when fish are 1 inch long. Feeding at the rate of .5 percent of their weight every 4 or 5 days when the water temperature is below 45 degrees F. Increase feeding rate gradually to 3 percent of weight as water temperature rises to 65 degrees F. and above. See Biology Reference, Channel Catfish Production Ponds.

- D. *Raceways (semi-impoundment)* - Stock 1,500 to 2,000 channel catfish fingerlings (4 to 6 inches) per 100-foot section of raceway where the water exchange rate is two times per hour. Fingerlings may be stocked at any time of the year, but stocking before March 1 is recommended. No fertilizer is required. Feed pelleted, complete feed at the average rate of 3 percent of their body weight per day. Harvest when fish reach marketable size. Restock with 4- to 6-inch fingerlings.

Criteria Applicable to Channel Catfish, Bass, and Fathead Minnow

A. *Sport-fishing* –_with feeding

1. *Stocking* - Stock 2,000 to 3,000 channel catfish fingerlings (4 to 8 inches) and 1,000 fathead minnows per acre between October 15 and March 1. Add 50 to 100 bass fingerlings per acre during the following April or May.
2. *Fertilizing* - Same as for Channel Catfish, Commercial Production in Ponds.
3. *Feeding* - If stocked before March 1, feed 1 percent of body weight either on alternate days or when the water 3 feet below the surface is 54 degrees F. or warmer. Begin daily feeding by March 1 and continue through October or until water cools below 54 degrees F. in the fall. Use pelleted catfish feed. Start feeding at the rate of 3 pounds per acre. Increase to a maximum of 25 to 30 pounds per acre per day in September and October of the first year. Feed 10 to 15 pounds per acre per day during the second year. Reduce feed gradually as fish are caught.

4. *Fishing* - Start fishing for catfish when they reach harvestable size (about $\frac{3}{4}$ pounds). Four-inch fingerlings stocked at 3,000 per acre in February and fed correctly reach an average size of .7 pound by October; 8-inch fingerlings reach that size by August.

5. *Drainage and restocking* - Ponds must be drained periodically and restocked, usually every 2 to 3 years. If fished heavily (50 percent or more of the fish caught during the first year), it may be best to drain the pond in November or December, sell the remaining fish, and restock by March 1. If fished lightly, ponds provide good fishing for several years without draining and restocking.

B. *Sport-fishing* – without feeding

1. *Stocking* - Stock 500 channel catfish fingerlings (at least 4 inches) and 1,000 fathead minnows per acre between October 15 and March 1. Add 50 to 100 bass fingerlings per acre during the following April or May.

2. *Fertilizing* - Same as for Bass, Bluegill, and Redear Sunfish (conventional).

3. *Fishing* - Start fishing for catfish when they reach $\frac{1}{2}$ pound or more in size. Four-inch fingerlings stocked before March 1 reach that size in September. Bass should not be caught until after they spawn, usually the second June after they are stocked.

4. *Restocking* - After 2 or 3 years, depending upon fishing activity and success, ponds must be either drained and restocked or restocked without draining. If restocked without draining, add large catfish fingerlings (at least 7 or 8 inches). Bass will eat smaller catfish fingerlings.

Criteria Applicable to Trout

A. *Cold-water ponds* - Obtain specifications from a NRCS biologist, Alabama Department of Conservation and Natural Resources, Auburn University, U.S. Fish and Wildlife Service, or other qualified professionals.

B. *Raceways (semi-impoundments)* - Same as for cold-water ponds.

Criteria Applicable to Bait Fish

Same as for cold-water ponds

Criteria Applicable to Other Aquatic Animals

Same as for cold-water ponds

CONSIDERATIONS

Incompatible species – *White and black crappie are not compatible with bass and bream in farm pond situations. Both species of crappie should be limited to lakes that are at least 25 acres in size.*

Water Quality – The following shall be considered:

- effects of pesticide and nutrient use and fish feeding on surface and ground water
- effects on the movement of dissolved substances to ground water
- effects on wetlands or other water-related wildlife habitats
- effects on the visual quality of water resources

Water Quantity – effects on the water budget.

Livestock – The exclusion of livestock shall be considered when possible.

Cultural Resources - Consider effects on cultural resources. This practice has the potential to adversely affect cultural resources and compliance with GM 420; Part 401 during the planning process is necessary. Where appropriate, local cultural values shall be incorporated into a practice design in a technically sound manner. Compliance with all applicable federal, state, and local laws and regulations, including permits, permissions, or notifications is required.

OPERATION AND MAINTENANCE

The plan for operation and maintenance at a minimum should include monitoring pond species and management of structural measures. Also biological control of undesirable plant species and pests (e.g., using predator or parasitic species) shall be implemented where applicable and available.

TABLE 1 – Recommended Feeding Schedule for Channel Catfish

Date	Water Temp °F	Fish size lb.	Feed allowance per day, percent of fish weight lb.
4-15	68	0.04	2.2
4-30	72	0.06	2.8
5-15	78	0.11	3.0
5-30	80	0.16	3.0
6-15	83	0.21	3.0
6-30	84	0.28	3.0
7-15	85	0.35	3.0
7-30	85	0.42	2.8
8-15	86	0.60	2.4
8-30	86	0.75	2.0
9-15	83	0.89	1.8
9-30	79	1.01	1.6
10-15	73	1.10	1.2