

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.

CRITERIACriteria Applicable to all Impoundment's

- A. Eradicating Wild Fish - Before stocking with desired fish, eliminate all unwanted fish in the impoundment area. See section C. 1. or section C.2. for more information on eradicating wild fish.
- B. Controlling Aquatic Weeds - 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. Triploid Grass Carp – Triploid 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. Caution should be used when conducting drawdowns because the soil in the pond may dry and crack resulting in a pond leak.

For more information on controlling aquatic weeds, see the Aquatic Vegetation and Aquatic Plant Control sections of the Kentucky Department Fish and Wildlife Resources (KDFWR) publication titled "A Guide to the Management of Farm Ponds in Kentucky".

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. Contact a biologist from the Fisheries Division of the KDFWR for rotenone application recommendations.

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. For assistance, contact a fisheries biologist from the KDFWR.

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 per acre between 1/2 pound to 2 pounds can frequently correct overpopulations by bluegill, 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 bluegill.

5. Bass Removal – Removal of 25 to 50 adult bass (1/2 pound to 2 pounds) per acre can frequently correct bass overpopulations.

For more information on Correcting Unbalanced Fish Populations see the Test Seining and Undesirable Species sections of

the KDFWR publication titled “A Guide to the Management of Farm Ponds in Kentucky”.

D. Controlling Disease and Parasites - The diagnosis of diseases and parasites must be done by a well-trained fish pathologist. Information on fish diseases may be obtained from Kentucky State University Aquaculture Program (KSUAP). The KDFWR publication titled “A Guide to the Management of Farm Ponds in Kentucky” provides some information on fish disease.

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 a KDFWR or KSUAP fishery biologist for additional assistance.

2. Turnover – A turnover occurs when the upper water layer high in oxygen mixes with a deeper water layer that is low in oxygen. This can occur with dramatic temperature changes or strong winds. If a turnover occurs or is expected, aerate the water at once. Contact a KDFWR or KSUAP fishery biologist for additional assistance.

3. Changes in watercolor - Same as for storm turnover.

More information on oxygen deficiencies can be found in the Fish Kill section of the KDFWR publication titled “A Guide to the Management of Farm Ponds in Kentucky”.

F. Clearing Muddy Water - Occasionally impounded water becomes muddy because of wave action, heavy rains, eroding spots in the watershed, road construction, certain fish species and other causes. If caused by erosion and sedimentation, muddiness may be controlled by treating the erosion. Critical areas contributing sediment to a pond may be treated using the NRCS Critical Area (342) practice standard. Muddy water can also be treated by the following methods:

1. Apply 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.

2. Apply 50 pounds per acre-foot of aluminum sulfate (alum).

3. 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.

4. Over-population of catfish and common carp will cause muddiness. Eradicate or reduce their numbers to allow silt to settle and the water to clear.

More information on how to correct muddy water conditions can be found in the Muddy Water Conditions sections of the KDFWR publication titled "A Guide to the Management of Farm Ponds in Kentucky".

- G. Crappie (white or black) – Do not stock in farm ponds and small lakes as these fish are not adapted to small bodies of water. Their early spawning and high reproductive rate usually causes serious problems with fish population imbalances. This generally requires complete pond renovation by draining and restocking within a few years of initial stocking.
- H. 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 below those figures 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. Apply agricultural lime during cold months. See the Application of Lime section in the KDFWR publication "A Guide to the Management of Farm Ponds in Kentucky" for more detailed information on liming.

- I. Fertilization – Total alkalinity of pond water should be checked before a fertilization program is begun. To provide effective

fertilization, the alkalinity level should be at least 20 mg per liter.

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 fish removal is infrequent, fertilization may not be practical.

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.

Fertilization of a pond should begin by mid-April when the water temperature reaches 60 to 65° F. Applications should be made every two weeks during April and early May. Treatments will be less often as water temperatures increase. After May, treatments should be regulated based on water transparency or clarity. Achieve and maintain a water clarity between 18 and 24 inches. After a fertilization program is started, it is important to continue until October, and every year thereafter.

Each fertilization should be done by applying liquid 9-18-9 or 6-18-6 at the rate of one gallon per acre of pond; dilute with pond water (half and half) when applying. 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.

See the Fertilization section in the KDFWR publication "A Guide to the Management of Farm Ponds in Kentucky" for more detailed information on fertilizing ponds or using granular fertilizers.

Criteria Applicable to Bass, Bluegill, and Redear Sunfish

1. Stocking - Stock a total of 500 bluegills per acre in October. If desired, forty percent

of the bluegills may be replaced with redear sunfish. Add 120 bass fingerlings per acre during the following April or May. Applications for fish may be obtained from your District Fisheries Biologist, Fisheries Division, Kentucky Department of Fish and Wildlife Resources (KDFWR). Note: redear sunfish are not provided by KDFWR and must be purchased from a private vendor.

2. Harvest - Start removing fish 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 bluegill and redear sunfish for every 1 pound of bass removed. Because of this, good record keeping is a must.

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

1. Stocking - Stock a total of 500 bluegills per acre in October. If desired, forty percent of the bluegills may be replaced with redear sunfish. Stock 50 channel fingerlings (4 to 6 inches) per acre in October. Add 120 bass fingerlings per acre during the following April or May.

2. Harvest - Start removing fish 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 a must.

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. Numbers stocked should coincide with numbers removed. Keeping good catch records will make it easier to determine catfish restocking needs.

Criteria Applicable to Channel Catfish, Bass, and Fathead Minnow

A. Sport-fishing – with feeding

1. Stocking - Stock up to 500 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 - See the Fertilization section above.

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 100 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 - See the Fertilization section above.

3. Fishing - Start fishing for catfish when they reach $\frac{3}{4}$ 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 Channel Catfish and Fathead Minnow

A. Sport-fishing – with feeding

1. Stocking - Stock 750 to 1,000 channel catfish fingerlings (4 to 8 inches) and 1,000 fat head minnows per acre between October 15 and March 1. Higher fish number may be stocked in ponds with adequate water supply or aeration. See the production aquaculture section of this standard for information on higher stocking rates associated with commercial production.

2. Fertilizing – See the Fertilization section above.

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).

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 100 channel catfish fingerlings (at least 4 inches) and 1,000 fathead minnows per acre between October 15 and March 1.

2. Fertilizing - See the Fertilization section above.

3. Fishing - Start fishing for catfish when they reach $\frac{3}{4}$ pound or more in size. Four-inch fingerlings stocked before March 1 reach that size in September.

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).

Criteria Applicable to Cage Culturing Channel Catfish

1. To be used for cage culture, a pond should:

- Be a minimum of a half acre in surface area;
- Be at least six feet deep over a sizable area of the pond;
- Not have a severe aquatic vegetation problem;
- Not have direct access by livestock or large numbers of livestock in the watershed, and
- Not have chronic oxygen problems or fish kills.

2. Stocking – Stock fingerling catfish (at least 6 inches) around the middle of April when the water temperature reaches 60° to 65° F. Between 300 and 600 catfish fingerlings can be stocked in a 4' by 4' cage.

3. Fertilizing - Not recommended.

4. Size of cages - Dimensions may be variable but a convenient size is 4' by 4'.

5. 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 6 inches of the cage above water. Suspend cages at least 2 feet off the bottom. Space cages at least 3 feet apart.

6. 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. Be sure that they contain at least 32% protein and vitamin and mineral supplements. 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. Another method is to feed them all they can eat in a 10 to 15 minute period once a day. Catfish should be fed six days a week at about the same time each day. Feeding between 10:00 a.m. and 4:00 p.m. is generally best.

7. Harvesting - Harvest when fish reach harvestable size. Six-inch fingerlings stocked at the middle of April typically reach an average weight of 1 pound by the middle of October.

See the Cage Culturing section in the KDFWR publication "A Guide to the Management of Farm Ponds in Kentucky" or contact the Kentucky State University Aquaculture Program for more detailed information on cage culturing catfish and trout.

Criteria Applicable to Production Aquaculture

Contact the Kentucky State University Aquaculture Program at <http://www.ksuaquaculture.org/> for information on production aquaculture.

CONSIDERATIONS

Water Quality – The following shall be considered:

- effects of pesticide and nutrient use and fish feeding on surface and ground water
 - Caution should be used when draining ponds that have been fertilized. Draining these ponds during low flow periods could result in downstream water quality problems.
- 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 – Livestock shall be excluded 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

References

Prather, Kerry, Kentucky Department of Fish and Wildlife Resources. A Guide to the Management of Farm Ponds in Kentucky. Second Edition 1995.

Durborow, Bob, Kentucky State University Aquaculture Program. Catfish Farming in Kentucky. 2000.

See <http://www.ksuaquaculture.org> for more information on production aquaculture.