

# Fish Pond and Stream Management Practices

## Construct Fish Pond

### General description

Fish ponds can be created using dams, dikes, and levees to provide relatively permanent water for fish. Pond design varies, depending on the purpose for constructing the pond and the ecoregion where it is constructed. Ponds with a high-shoreline length to surface-area ratio provide maximum access to the pond by anglers. The local Extension office or Natural Resource Conservation Service office can provide design details.

This practice should be recommended when creating new fish ponds with relatively permanent water or when an existing old pond has filled in with sediment and no longer holds sufficient water. When constructing ponds, artificial reefs can be included for additional cover. These structures are usually constructed of rock piles, sections of plastic or cement pipe (a minimum of 6 inches in diameter and 18 inches long), and brush piles. Artificial reefs are normally recommended only for ponds larger than 10 surface acres.

**NOTE:** *Restock Fish Pond* should not be checked when *Construct Fish Pond* is recommended.

### Effect of practice

- Ponds provide habitat for some fish and wildlife species.

**NOTE:** Although many wildlife species may use ponds for various reasons, this practice and the other *Fish Pond* practices are intended primarily for fish habitat. For the purposes of this contest, when additional water or wetland habitat is needed for wildlife species, *Water Developments for Wildlife* should be recommended. This distinction avoids management conflicts when both fish and wildlife species are managed on the same property. For example, steep-sloping sides help reduce aquatic vegetation and favor balanced fish populations, whereas gentle-sloping banks with abundant emergent aquatic vegetation benefit various wildlife species, such as American bittern or wood duck.

## Control Aquatic Vegetation

### General description

Aquatic vegetation should be controlled when it begins to limit use of a fish pond for recreation or interferes with access. As surface area coverage by vegetation exceeds 33 percent, the ability of predator species (such as largemouth bass) to access forage species (such as bluegill) may become reduced and therefore negatively impact the balance of the fish populations. Prevention of rooted aquatic vegetation growth can be accomplished two ways: 1) deepening the edges of the pond to a minimum of two to three feet with steep side slopes, which minimizes shallow water areas exposed to sunlight. Pond edges can be deepened in drained ponds with a bulldozer or tractor with rear blade or in existing ponds with a backhoe. The soil removed can be piled on the bank or levee and smoothed for planting with native grasses and forbs, and 2) initiating a spring-through-fall fertility program, which reduces light transmission and prevents rooted submerged plants from becoming established (see *Fertilize/Lime Fish Pond* for more information). Existing aquatic vegetation can be controlled chemically, biologically, or mechanically. Chemical control is accomplished by applying a labeled aquatic herbicide following identification of the targeted plant species. Biological control also is plant species specific. Potential biological control agents for aquatic vegetation include fish species (such as white amur/grass carp, tilapia) and insects (such as salvinia weevil). Regulations as to which biological control agents may be used vary from state to state. Mechanical control includes physically removing existing vegetation by seining, dragging with chains or ropes, cutting, raking and pulling up rooted vegetation.



Billy Higginbotham

*Filamentous algae and cattails must be controlled in this pond before fertilization is possible. Dense cattails also can provide cover for many small fish and lead to an imbalanced fish pond.*

**NOTE: Control Aquatic Vegetation** includes nonnative vegetation. Thus **Control Nonnative Invasive Vegetation** is not applicable for fish ponds.

### Effect of practice

- Reduces aquatic vegetation within and around the edge of a pond, making prey more easily available to predator fish.

## Fertilize/Lime Fish Pond

### General description

Fish ponds can be fertilized to increase natural food organisms (phytoplankton and zooplankton) and prevent rooted aquatic weeds from becoming established. However, every pond should not be fertilized. Fertilization should **not** be used in ponds infested with weeds, ponds with excessive water flow, turbid (muddy) ponds, or ponds that will not be fished heavily. If ponds are infested with weeds, fertilization will only increase weed growth and spread. If ponds have excessive water flow, fertilization will be diluted. Suspended mud in ponds blocks sunlight, and prevents an algae bloom. If ponds are not fished sufficiently, the fish population will become out of balance and growth will become stunted.

Fertilization is needed in fish ponds with water clear enough that you can see clearly to 18 inches below the water surface. Total alkalinity (the measured of total bases expressed as carbonates) and pH of the pond water should be tested before beginning a fertilization program. Total alkalinity should be at least 20 parts per million (ppm) with a pH of 6.5 to 9.0. Total alkalinity and pH can be assessed by collecting water samples; pH also can be measured by collecting samples of the pond bottom (substrate) and having them tested. Agricultural limestone (calcium carbonate) should be applied evenly over the pond surface area per recommended rate.

Fish ponds should be fertilized in the spring when the water temperature reaches 60 F. For ponds with moderate hardness (50 mg/l to 100 mg/l calcium hardness), apply 15 pounds of 12-52-4 (or its equivalent) powder, or one gallon of 11-37-0 liquid fertilizer, or 15 pounds of granular 0-46-0 per acre at two-week intervals, or until a good green color (phytoplankton bloom) develops in the pond. Make additional fertilizer applications (at the same rate per surface acre) every three to four weeks, or if/when the water clears (becomes less green). Fertilization may be continued until water temperatures drop below 60 F in the fall. Methods for applying fertilizer vary with the type of fertilizer used.

Granular fertilizer must be distributed from a fertilizer platform. Liquid fertilizer should be mixed with pond water and broadcast from a boat for large ponds or from the bank of small ponds. Water-soluble powdered fertilizers can be broadcast from a boat or from the bank. Ponds that are extremely turbid because of clay particles should not be fertilized.

### Effect of practice

- Pond fertilization stimulates phytoplankton production, which is the first step in the food chain of a fish pond.

## Reduce Turbidity in Fish Pond

### General description

Turbid or muddy water limits fish production because natural food organisms need sunlight to grow. Turbidity can be caused by sediment being washed in from the pond banks or watershed, cattle using the pond, feeding activities of bottom-dwelling fish, such as carp or buffalo fish, or negatively charged clay particles suspended in the water column.

Turbidity is most often caused by sedimentation (erosion) from the watershed or the pond bottom (cattle or fish) and will usually clear in a relatively short period of time. Reducing erosion in the watershed is best accomplished by reseeding relatively large bare areas of soil around the pond where there is evidence of erosion. Turbidity from pond sediments can be controlled by restricting cattle to a small area of the pond and eliminating bottom-dwelling fish. Ponds managed for channel catfish may be turbid because of action from the catfish. This practice should be recommended for catfish ponds only when it is obvious that erosion and sedimentation are causing or contributing to turbidity.

Turbidity from suspension of negatively charged clay particles is a more difficult problem. The addition of positively charged compounds, such as limestone, gypsum, or alum crystals, can cause the clay particles to settle.

**NOTE:** if cattle are causing turbid water, **Livestock Management** should be recommended, not **Reduce Turbidity in Fish Pond**.

### Effect of practice

- Improves water quality by removing or settling silt.
- Allows sunlight to stimulate phytoplankton.

## Restock Fish Pond

### General description

Restocking a fish pond is a drastic measure and should only be considered after other management approaches have been attempted. Ponds containing wild fish species, such as carp, shad, green sunfish, or bullhead catfish, should be restocked with a balanced predator-prey combination. Restocking should be done only after all fish in the pond have been removed, either by draining or applying a fish toxicant. In warm-water ponds, bluegill fingerlings should be stocked in late fall and bass fingerlings are stocked the following June. Although various states have different stocking recommendations, typical stocking rates are 1,000 bluegill and 100 largemouth bass per surface acre if the pond is to be fertilized, or 500 bluegill and 50 largemouth bass per surface acre if the pond will not be fertilized. Channel catfish stocking rates vary from 100 to 300 per surface acre depending on whether the pond is unfertilized or fertilized.

### Effect of practice

- Draining ponds and using fish toxicants remove unbalanced fish populations and allow establishment of desirable balanced fish populations.

## Streams: Create Pools

### General description

Pools and riffles are important habitat features for various fishes that inhabit streams. Stream flow varies with elevation change and width of channel. Stream flow is faster where there is more elevation change and tends to be slower where the stream channel is wider. Flowing water carries material, such as gravel, sediment, and debris, and redistributes them along the stream course. Where the stream is wider and the water flow is reduced, the material is deposited and forms riffles. Riffles are preferred areas for spawning for many fish species and some fish species occur primarily in riffles.

Topography restricts stream channels and causes a stream to bend. Where this occurs, pools are created. Pools are deeper than the stream channel and the water flow is slower. Pools provide areas for fish to feed and find refuge from fast-moving water that requires more energy for swimming. Some fish species occur primarily in pools.

Large boulders, rocks, or logs can be placed strategically in streams to create pools and enhance habitat for some

fish species where there are considerably more riffles than pools and the amount of pools in the stream is limiting for a species. Rocks must be large enough so small floods will not move them. Any structures put in a stream have the potential to alter stream currents in an undesirable manner. It is important that fish have the ability to move freely between pools and riffles. The placement and design of such structures should be done with advice from experts. Although some species can complete their life cycle within a small portion of the stream, other species, such as salmon, must migrate to the ocean and return to the stream to spawn.

### Effect of practice

- Used to create pools for various fish to hide, feed, and rest.
- If designed properly, can be used to reduce some kinds of stream erosion.

## Streams: Remove Fish Barriers

### General description

Remove or replace culverts or dams that prevent fish passage upstream. Culverts with great drops below them or with water flowing too fast through them can block fish from going upstream. These culverts can be replaced with arched or bottomless culverts or with bridges. In some cases, “fish ladders” or steplog structures can allow fish passage around barriers.

### Effect of practice

- Allow fish to access and migrate within the stream system and between the stream and ocean to complete their life cycles.