

## FARM POND CONSTRUCTION AND MANAGEMENT

BY

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Recent surveys have shown that farm ponds and small lakes are used substantially by fishermen throughout the nation. Proper construction and employment of certain preliminary management practices have been found to be of utmost importance in permitting survival, growth and harvest of the game fish stocked.

The objectives of any good management program are to control the species of fish present and to provide conditions for good fishing. The management practices which best achieve these objectives are 1) construction designed to avoid the introduction of unwanted fish by preventing overflow through the use of overflow tubes or water falls; 2) installation of a drain pipe; 3) preparation of the pond bottom; 4) eradication of wild or native fish in the lake basin prior to impoundment, and 5) proper stocking. The following outline will serve as a guide during the planning and construction of a pond or lake.

In selecting a suitable pond site consideration should be given to 1) "the lay of the land"; 2) a subsoil that contains sufficient clay; 3) adequate but not excessive amount of water.

In taking advantage of the natural features of the land to form three sides of the pond, cost of construction is greatly reduced. At least one third of the pond area should contain water a minimum 12 feet in depth.

Deep water assures a permanent supply especially during a drought, and will prevent aquatic plants from taking over the pond. Fish will also take advantage of the deeper area for hiding and to escape the warmer temperatures during the summer months. However, depths more than 20 feet should be avoided, since dams higher than that are expensive to build and the amount of fish food produced in the deeper water is relatively small.

Subsoil containing clay is essential in the construction of the pond in order to reduce seepage to a minimum. The subsoil within the dam site should be checked to be certain sufficient clay is present. The test for suitable clay is to take a handful of moist soil from the test hole and compress it into a firm ball. The soil contains enough clay if the ball does not crumble. Commercial clay products can sometimes be used to seal a pond where needed, but this adds to the cost of construction.

There should be enough water to fill the pond and maintain a water level that does not

fluctuate more than a few feet during the dry months. However, there should not be such a volume of water as to cause a large, continuous overflow from the pond. Excess water washes nutrients out of the pond and reduces productivity. A diversion ditch is sometimes needed to carry excess water from heavy rains around the pond if heavy overflow occurs. Before construction, it is desirable to have the water tested to learn if the quality of water is suitable for fish life.

### **TIME TO BUILD**

The completion date should be considered when the pond is planned. The most desirable time for completion of the dam and filling the pond is early fall. Sunfish and catfish are available from hatcheries during this period and their release at this time - prior to the stocking of bass - will allow good survival. Further, lower water temperatures during the fall to prevent reproduction of native fish that might be present on the watershed or in the lake basin. Ponds that are completed in the summer usually present the greatest problem of management. Many times native fish will reproduce before hatchery fish are stocked, thereby reducing the survival of the game fish. Also, if the pond does not fill promptly regrowth of brush and trees may fill the pond basin, requiring a second cutting.

### **DAM CONSTRUCTION AND SPILLWAY REQUIREMENTS**

Prior to construction a permit to impound water must be secured from the Texas Water Right Commission if the pond volume is in excess of 200 acre-feet or used other than for domestic or livestock purposes. It is suggested that the Soil Conservation Service be contacted for specific details regarding dam construction. Minimum construction requirements are outlined below, to aid in plans and specifications.

All trees and brush should be removed from the dam site and the area staked. Topsoil is then removed to bond the above ground portion of the dam to the subsoil and allow digging of a core trench. The core should extend at least 3 feet into the subsoil as well as each to the top of the dam. Soil to build the levee should be applied to layers 8 inches at a time and packed with heavy equipment.

The most economical slope for a low dam is 2 feet of slope for every 1 foot of height on both the upstream and downstream side. Dams having a height greater than 20 feet should have a 3 to 1 slope on the upstream side. The width of the crown should be at least 6 feet plus one-fifth the height of the dam.

Ponds should have ample spillway to take care of expected floods. The width, length and type of spillway best suited for a pond is determined by the watershed area, average rainfall, topography, vegetative cover and soil type. An important feature concerning the spillway is

control of the upstream movement of native fish into the pond. A successful method in controlling this upstream movement is to put a waterfall at or just below the spillway. The fall must have a lip or overhang so that water actually falls through the air for several feet. If the water runs down a sloping or even straight wall fish may still enter the pond. The required height of the fall depends on the volume of water expected. Approximately a 2-foot drop should be allowed for every inch of water at the top of the structure. Thus, the wider the fall the shorter the distance the water needs to drop. If the fall is built at the spillway it should be wide enough to spread the water into thin sheets, allowing only a few inches of water to overflow. This will not only prevent native fish entering the pond but will keep larger game fish from leaving the pond during a heavy overflow.

It is not necessary to screen a properly constructed spillway. Screens usually become clogged with trash which could result in damage to the dam. If screens are employed daily inspection is necessary and they should be constructed to permit easy removal of debris.

#### **DRAINPIPE**

No pond or lake should be built without a drainpipe since this feature plays a very important role in the management of the pond. Because native fish as well as certain species of game fish sometimes do overpopulate a pond or small lake, renovation is usually the quickest method of restoring good fishing. Renovation can best be accomplished by draining the lake as low as possible and treating the remaining water to kill all fish. To reduce cost of treating a lake at normal elevation, lake owners often have built large syphons or have even cut the dam to reduce the total water volume. Thus, it is important to install a drainpipe during construction of the dam. Other important management practices that can be gained by installing a large drainpipe are 1) prevention of overflow; 2) aquatic plant control; 3) fish population control; 4) increase in water fertility; 5) replacement of spawning devices and fish shelters; 6) repair of dam, piers and boat docks, and 7) dredging of the pond basin if siltation is excessive. Size of the drainpipe depends on the size of the pond and amount of water running into the pond. A 4 to 6 inch drain will normally be satisfactory for ponds up to 3 acres, while 6 and 12 inch drains will be necessary for larger ponds up to 15 to 20 acres. Seepage through the dam along the drainpipe can be prevented by concrete or metal seepage collars installed at 15-foot intervals along the pipe. Clay should be packed tightly around the collars and along the pipe.

Often an overflow or trickle tube is incorporated with the installation of the drainpipe. This structure will aid in maintaining a normal lake level and is especially desirable for lakes having a continuous overflow due to springs. Such features are most important in preventing overflow at the spillway, thereby stopping upward migration of native fish. The overflow tube can be designed to remove excess water from the bottom of the lake rather than permitting

the more fertile surface water being washed from the lake. For small lakes a trickle tube, built on the downstream side of the dam, serves quite adequately in removing excess water.

#### **CLEARING TIMBER AND INSTALLING FISH SHELTER**

The pond area should be cleared of most brush and trees. Many times management practices to control aquatic plant and rough fish have been hampered or even prevented because boating was too restricted due to the abundant timber and brush left standing. Further, adequate harvest of the game fish is prevented when too much brush is left in the lake. In fact, game fish harvest can be increased if the timber and brush are cleared and fish shelters selectively placed about the lake basin. In this manner fish are then concentrated in areas easily located by fishermen, thereby permitting a larger harvest.

Many items such as brush, logs and rocks are used to construct fish shelters. Large trees, when pushed over, the tops removed and the roots left anchored, provide very good bass cover. Automobile tires, tied together so as to remain upright, have been found to make excellent bass shelters. Brush piles are especially recommended for crappie. Shelters should be placed at various depths of water ranging from 2 feet to the deepest water and marked so as to be easily located by fishermen.

#### **SHAPE OF SHORELINE**

Avoid too much shallow water in any new lake. Shallow water encourages troublesome plants, leads to overpopulation of sunfish and restricts lake management. The pond or lake edge should be at least 2 feet deep. Excess dirt removed while shaping the shoreline can be used on the dam or placed above the waterline to give higher banks. Construction of fishing peninsulas with the excess dirt is most beneficial to encourage bank fishing. The deeper edged permit the larger predators to stay near the shoreline and thus allow a better harvest of these game fish.

#### **SPAWNING AIDS**

While some species of game fish will overpopulate a lake, others such as channel catfish have certain requirements to reproduce. Concrete road culvert pipes or crocks can be placed around the lake to be used as spawning aids by channel catfish. These spawning devices should be placed at a level that will not be over 4 feet deep after the lake fills. If the lake bottom does not contain sand or gravel it would be wise to construct spawning beds with this material for largemouth bass. The gravel beds should be 10 to 15 feet in diameter and at a depth of 2 to 4 feet. If the bottom is soft and automobile tires laid on their side and filled with sand or gravel will make excellent spawning beds of bass.

## **COVER CROP**

**Before filling the lake, planting a fast-growing crop in the lake basin is often permitted. If construction is completed in the fall and the lake is not expected to completely fill for 2 or 3 months, rye grass or oats can be broadcast over the lake bottom. This will greatly benefit the fertility of the water and serve to stabilize the bottom to aid in preventing turbid water.**

## **ERADICATION OF NATIVE FISH**

**Before impoundment of water it is most important to rid the lake basin and water shed, if possible, of all species of fish. Many lake owners would not consider that fish could live in a small stream only a few inches wide. Yet, numerous ponds and lakes have been built which later contain large populations of unwanted fish due to this false belief. Only a small volume of water is normally found above a newly constructed dam. The cost to eradicate native species prior to impoundment is very little compared to the cost to kill them after the lake has filled.**

**All water in the lake basin, regardless of how small the amount, should be chemically treated before impoundment and the release of hatchery fish. Fish eradication should be done immediately after the drain valve is closed and can be accomplished with 5 percent liquid rotenone at a rate of 1 gallon per acre-foot of water. If powdered rotenone is used, at least 10 pounds should be applied per acre-foot of water. The pond can be stocked with game fish 2 weeks following this rotenone treatment.**

## **STOCKING**

**The most common mistake made by lake owners is overstocking with fish. It is very important that correct species and ration of game fish be released into a new lake at the proper time.**

**As mentioned earlier, the best time for completion of the lake for filling and stocking is in the fall. This permits the release of fingerling channel catfish (100/acre) and redear sunfish (50/acre) prior to the stocking of bass fingerling (100/acre) in the spring. Bass should always be stocked during the first spring in the larger lakes as this predator/game fish is most important in controlling the spawn of the native species which can be expected to occur the first summer.**

**The release of a forage (food) fish such as treadfin shad, redhorse minnow or fathead minnow has proven most beneficial for the growth of young bass during their first summer. One of two thousand of either of the above forage species should be sufficient to establish a breeding population provided releases are made prior to the bass stocking.**

**Crappie should never be stocked in a small pond or even in large lakes if turbid water is expected to persist. This game fish is very prolific and will quickly overpopulate and become stunted.**

**Supplemental stocking with 10-inch channel catfish will be required in small clear water lakes with adult bass present. Bass are known to prey on the small catfish and little, if any, natural reproduction can be expected.**

**For the small ponds less than 1 acre, the best combination has been found to be channel catfish (100/acre) and hybrid sunfish (100/acre). Each of these species can be trained to take commercial catfish food and by so doing will achieve a large size in a short period.**

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