

What should you know before building a fish pond?

Pond design depends on intended use. If constructing a fish pond, Kansas Department of Wildlife, Parks, and Tourism suggests the following:

- **Pond size:** Ideal fishponds cover from two to five acres. Without exacting harvest restrictions, ponds smaller than 1 acre are suitable for catfish but are usually unsatisfactory for bass and bluegill due to the potential for over harvest of bass. Ponds over five acres can provide angling to greater numbers of fishermen, but if problems occur, management is usually more difficult and expensive.
- **Pond depth:** Recommended minimum depths vary depending on the site and location. Adequate depth is necessary for continued fish survival. Ponds that are spring fed should be at least 8' deep over at least one-quarter of the impounded area. Ponds which have surface runoff as their primary source of water should be 15' deep over one-quarter of the impounded area in western Kansas and at least 10' deep in eastern Kansas. Not more than one-fifth of the impounded area should have a water depth of less than 2'. Slopes along the shoreline for two-thirds of the distance from the dam to the upper end of the impounded area should be no flatter than 3' horizontal for every 1' vertical. Deep water protects fish from winterkill and discourages excessive growth of aquatic vegetation. A pond over 15' deep are rarely used by fish in the summer and do not add to the pounds of fish produced in the pond.
- **Site preparation:** Construction of a pond alters the environment and thus affects associated wildlife. Negative impacts on wildlife can be minimized if stabilized draws leading into and out of what will be a pond are left unchanged. Trees and other plants growing along such areas serve as wildlife habitat while detaining silt. The dam or foundation area should always be cleared of trees, boulders, stumps, roots, sod and rubbish. Brush and trees in the fill could lead to leakage through the dam. Brush and trees can be left for fish cover in upper end and side drain pool areas of larger ponds containing bass. Topsoil containing organic matter should be stockpiled for later use. After construction is complete, this topsoil should be spread over the dam and spillway to help the growth of grasses, and over the basin to increase the productivity of the pond. Small ponds should have all brush and trees removed from the pool area. This is necessary in small ponds because the majority of soil removed from the impounded area will likely be needed to construct the dam. Brush and trees need to be removed from catfish-only ponds because catfish typically overpopulate in the absence of bass predation if brush and trees are available as spawning sites. Pond bottoms should be left rough or irregular to create fish habitat in bass-bluegill-catfish ponds. In addition, drop-offs, islands and trenches should be constructed in the basin when feasible. Catfish-only ponds should have a smooth bottom, again to discourage excessive spawning which could produce an overpopulation of small catfish.
- **Potentially leaky ponds:** Soils in some pond sites must be sealed to prevent potential leakage. These sites should be used for a pond location only if there is no alternate site, because most methods of sealing ponds are expensive. Professional advice should be obtained before attempting to seal a potentially leaky pond.
- **Dam:** Material in the dam should be tied to the soil in the foundation. A cutoff trench should run lengthwise along the dam. This cutoff or core trench should be backfilled with clay-type material compacted in layers. Failure to install a core trench may result in seepage and even loss of the dam. The dam should be constructed of impervious moist material that is compacted in continuous horizontal layers as it is installed. Dams pushed up with a dozer and not compacted have a greater chance of failure. The

dam should be constructed with slopes that will not slump or slide. The steepness of the slope on the pond side of the dam should not exceed 3' horizontal to 1' vertical; and the steepness of the slope on the downstream side should not be greater than 2 ½' horizontal to 1' vertical. The recommended top width is 10' for a dam less than 20' in height. This width should be increased an extra 2' for each 5' of dam height over 20'. All dams should have extra height or freeboard to prevent floodwater and waves from topping the dam. The minimum elevation of the top of a dam should be 1' higher than peak flow of water in the emergency spillway or 3' higher than the non-flowing elevation of the emergency spillway.

- **Spillways:** All embankment ponds require one or more spillways for overflow water. It is common to have a vegetated earthen emergency spillway around one end of the dam for flood flows and a pipe spillway through the dam for normal flows. The stand pipe or trickle tube should be installed a foot or more below the level of the earthen emergency spillway. Anti-seepage collars are needed along the pipe through the dam to help prevent the pipe from washing out. A trash guard should be installed on the stand pipe for safety purposes and to prevent clogging with debris. Design capacity and type of materials needed for both the emergency and pipe spillways are variable for different pond sizes and watersheds. Technical advice should be obtained from the Natural Resources Conservation Service or a civil or agricultural engineer for this portion of the pond design.
- **Drain pipes:** All fishponds should have a drain so that the pond can be emptied if undesirable fish populations develop. The drainpipe may be a separate installation or incorporated as a valve in the stand pipe. A separate drainpipe that runs through the dam should meet loading pressures and have anti-seepage collars.
- **Banks:** Shorelines should have 3:1 slopes to reduce the chance of aquatic vegetation problems. Slopes that are too steep (more than 2:1) can be a safety hazard for people and livestock and could slump or slide into the pond. Shaping of the banks during pond construction may cost extra but can save money in the long run by reducing aquatic vegetation problems. The dam should be protected from wave action and erosion. Rock riprap or special purpose grasses are commonly used on dams for wave protection.
- **Maintenance:** Proper maintenance of the pond is as important as good design and construction. The pond should be checked on a regular basis for erosion, pipe damage and obstruction, and fencing. Timely maintenance usually prevents expensive repairs or possible failure of the dam. It is much easier to shape small eroded areas and keep pipes free of trash than it is to replace the dam.

For additional information, contact Kansas Department of Wildlife, Parks, and Tourism from which this fact sheet was adapted.