

Pond Dam Stability: An Ounce of Prevention is Worth a Pound of Cure

By Danny Bowen, central region fisheries technician

Most Oklahoma landowners enjoy having a pond on their property. A pond increases the wildlife diversity and recreational potential of their land. It is pleasing to the eye and many people enjoy the challenge of creating a fishery in their own backyard. A pond is a man-made structure however, and requires periodic maintenance to function properly. One maintenance item that should be done annually is the removal of woody plants on or near the pond's dam. This prevents problems caused by water infiltration into the dam through water channels left by the decomposition of the plants' roots.

One of the best ways to head off any problems with a pond is to have a well thought out design. A pond should have a 3:1 slope out to a depth of three or four feet around the shoreline to control rooted aquatic vegetation. The pond dam should be at least 10 feet wide at the crest and have a 3:1 slope on the backside. These slopes should be adjusted according to soil type. In Oklahoma, the pond should also be at least 10 feet deep in at least a quarter of its area to ensure adequate water in dry years. It should also have a wide shallow spillway to cut down on erosion during periods when the pond is overflowing. This will also help prevent undesirable fish species from coming upstream into the pond at these times. Check with your local Natural Resource Conservation Service (NRCS) office for more information and assistance with new pond construction.

As soon as the dirt work is finished, all exposed soil should be seeded to establish ground cover to control erosion. This will reduce turbidity problems in the pond as it fills, and will help prevent woody plants from becoming established on the pond dam. For the first year or two, some minor erosion may occur but this will usually come under control by the grass as it becomes established.

Willows and cottonwoods are two types of woody plants that will establish themselves very quickly on a pond dam and

Never let woody plants become established on the pond dam. Each year, remove or kill any woody plants that are trying to grow and re-establish some type of grass as a ground cover.



The decaying roots of various woody tree species can create deep channels in a pond dam. These channels allow water to penetrate deep into the soil, which can cause the backside of the dam to slide. The root channels become exposed and the dam begins to leak.

around the shoreline. Their seeds are airborne and land on the pond's surface, then drift to the shoreline where conditions are favorable for them to grow (moist, exposed soil). Willows grow quickly and can tolerate flooding for up to one year. They also seem to die easily and their decaying roots are a major cause of dam problems. Cottonwoods also grow quickly. Both types are killed quite often due to damage from



beavers that feed on them. Buttonbrush, a woody shrub, also is easily established and its roots cause the same kind of problems when they die. Trees can be allowed to grow around other parts of the pond for shade and aesthetics, just keep them from growing on the dam.

The decaying roots of these and other woody species can create channels deep into a pond dam. These channels allow water to penetrate deeper into the dam than decaying grass roots do. Water in the pond dam can be good or bad, depending on the amount. A small amount of moisture in the soil is good as it acts as glue, holding the soil particles together because of the high surface tension of water. A higher amount of water in the dam can be bad because it increases the space between the soil particles, reducing friction between them. In this situation the water acts as a lubricant, allowing the pond dam to creep or slip downhill (a process called mass movement) due to the reduced friction and the increased weight of the additional water. Eventually, or sometimes instantly, the backside of the dam slides downhill. The root channels become exposed, and the dam begins to leak. The leak will likely worsen and the dam will wash out to that level or lower. It is possible to lose the whole pond in a worst-case scenario.

For decaying root problems, the old saying holds true that an ounce of prevention is worth a pound of cure. The best course of action is to never let woody plants become established on the pond dam. At least once a year, remove or kill any woody plants that are trying to grow on the dam. On new ponds, work hard to establish grasses on the dam so that it is difficult for woody plants to start growing. For pond dams that already have trees, shrubs and vines growing on them, kill or remove the plants, and try to re-establish some type of grass as a ground cover. Once the woody plants are removed, visually inspect the dam frequently, particularly after high rainfall events, to see if any leaks develop. These frequent inspections will need to be made for a few years until the majority of the roots have decayed.