

WILDLIFE

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Sealing Leaky Ponds

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Sealing leaky ponds is a challenge confronting some pond managers. In many situations, leaky ponds can be prevented by simply examining the local soil survey book before building a pond. The county soil survey book, which is available through the USDA Natural Resources Conservation Service, identifies the soil at a site and describes many of its physical properties such as suitability for reservoirs and embankments. The axiom “an ounce of prevention is worth a pound of cure” certainly applies here. It should be common sense, but some people do not search for a suitable soil site before building a pond.

People sometimes want ponds where they know good sites do not exist. In these cases, people should evaluate whether sealing potentially leaky ponds are worth the cost and trouble before constructing the ponds.

Several options exist for sealing leaky pond sites including natural siltation, mechanical compaction, livestock concentration, clay blanket, bentonite, sodium chemicals, flexible waterproof liners, organic material (gleization), cinders, concrete, or asphalt. Most of these techniques are expensive and/or involve considerable work.

Most sealing techniques are generally easier and more effective when performed during the construction phase before a pond begins to impound water. Before sealing a potential seepage area, woody plants should be removed and all holes and crevices should be filled. Areas exposed to flowing water should be sealed with riprap to prevent removal of treated soil or liner. Treated areas that might become exposed and dry during water level fluctuations should be sealed with 12 to 18 inches of gravel to prevent erosion, cracking, and perforation.

Ponds that seep a little may seal themselves through natural siltation. Slightly to moderately permeable soil with at least 10% clay content, with a wide range of particle sizes from small gravel to clay, and with no exposed rock layer, often can be sealed through disking and packing or by concentrating livestock on the site. When mechanically compacted, the soil should be disked and packed at least 12 inches thick where water depth is less than 10 feet. It should be thicker for water depths exceeding 10 feet.

When a source of soil containing at least 20% clay is available nearby, a clay blanket can be spread in 6- to 8-inch layers across the permeable area and packed. The clay blanket should be at least 1 foot thick in water depths less than 10 feet. The clay blanket should have at least 2 inches of additional thickness for every foot of water depth exceeding 10 feet.

Bentonite clay at 1 to 3 pounds per square foot can be used to seal permeable soils. It can be laid down in an uninterrupted layer between packed soil layers; it can be mixed and packed with at least 6 inches of surface soil; or it can be spread in granular or slurry form across the water surface. Water surface applications tend to be less effective than soil applications. The bentonite technique often does not work well in ponds subject to extreme water level fluctuations.

Clay and/or silt concentration can be greater than 50% in some soils that leak due to the arrangement of the clay particles in these soils. In such soils, sodium chemicals such as sodium polyphosphate, tetrasodium pyrophosphate, sodium tripolyphosphate, sodium carbonate (soda ash), or sodium chloride (common salt) can be applied at rates from 0.05 to 0.33 pounds per square foot to disperse the clay particles and seal the soil when the soil contains at least 15% clay. The rate depends upon the soil characteristics and the chemical. The sodium chemical should be evenly mixed and packed with soil in 6-inch layers. The packed sodium-soil layer should be at least 12 inches thick in water depths less than 10 feet and should have at least 2 inches of additional thickness for every foot of water exceeding 10 feet. This technique poses some environmental concerns due to potential contamination of ground water.

Properly installed flexible waterproof liners such as polyethylene, vinyl, butyl rubber, and asphalt-sealed fabric can virtually stop all seepage from a pond. One of their disadvantages is they are prone to punctures or tears. They should be covered with at least 9 inches of soil where hooved animals have access. The substrate should have no exposed sharp objects such as rocks or sticks. The edges should be anchored in a trench.

Much of this information is derived from the USDA Natural Resources Conservation Service Agricultural Handbook Number 590, *Ponds—Planning, Design, Construction*.