



See You Out There

NEBRASKA POND GUIDE



Private Waters
Program



Management Assistance for
Lakes, Ponds, Pits & Streams

RESOLVING COMMON MAINTENANCE PROBLEMS SHORELINE EROSION, LEAKAGE, & EXCESSIVE SEDIMENTATION

SHORELINE EROSION

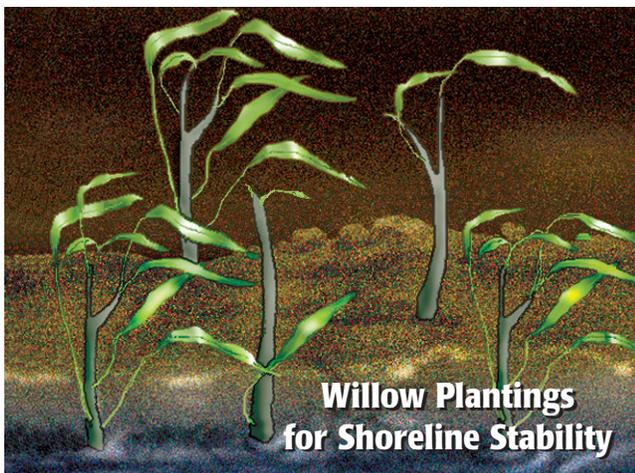
Ponds are best protected from shoreline erosion by establishment of submergent and emergent vegetation. Where terrestrial grass or aquatic vegetation isn't sufficient to protect a shoreline, rock rip-rap should be used. Football-sized rocks or pieces of broken concrete can be placed along the dam, or other eroding shorelines, several feet above and below the water line. A steep, eroded bank may first have to be graded and engineering cloth laid to create a stable base for the rip-rap; otherwise, erosion could persist and cause continued erosion of the soil behind and below the rip-rap and eventual collapse of rip-rap into the pond.

Logs, rocks, or trees placed several feet out in the water and parallel to shore, will absorb the energy of waves and prevent shoreline erosion, or facilitate healing of eroded areas. Emergent plants and willows should be used to expedite healing. During early spring, rootstock from emergent plants can be dug

up, cut or pulled apart into sections and planted in combination with 18-inch long willow sections between the shoreline and wave-absorbing materials.

Emergents (rigid, shoreline plants with the bulk of plant above the water surface) can become established naturally or transplanted to speed colonization. Or, top soil from a nearby wetland (when permitted) can be transported to the new pond site and spread out so that the seed present in it can establish wetland plants. Most emergents (especially cattail, bulrush, and arrowhead) transplant easily. Transplanting should be done in the spring when new growth starts. Rootstock can be dug up, cut or pulled apart with at least two new shoots/nodes per section (especially for cattails), and planted along the shoreline. Some of the sections should be planted at and immediately above the water line, with others planted in water less than 10 inches deep. Emergents can also be planted on the tops of pond basin fish habitats (underwater terraces, humps, and land projections) that are within 2 to 3 feet of the water surface. They will become a vegetative breakwater and create slack water that should lessen the severity of shoreline erosion and provide additional habitat for a multitude of organisms. Keep in mind cattails are very aggressive and can spread extensively. They may need to be eliminated with chemical or mechanical means in wading, swimming, and some fishing areas.

Even though submergents (non-rigid plants, typically completely submerged and attached to the bottom) can also be transplanted, they usually become naturally established by waterfowl trans-



**Willow Plantings
for Shoreline Stability**



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porting seeds and/or incoming water transporting seeds and plant fragments. Ideally there should be a band of aquatic vegetation around the majority of the pond – starting with emergents immediately along the shoreline and transitioning into submergents that extend a short distance out into the pond.

LEAKAGE

Some water loss can be expected in new ponds until the basin and immediate shoreline become saturated. In older ponds, a 6-inch to 1-foot loss due to evaporation during a dry month is normal. If your pond loses more than a foot of water in a month and there is no withdrawal of water from the pond or nearby well, you should look for a leak. Ponds usually leak through a porous layer of sand, gravel, or broken rock extending under the dam. The water may come to the surface some distance below the dam. If you find places below the dam that are often soggy, even in dry weather, investigate further. Keep in mind the seepage could be due to a spring, unrelated to your pond. Leaks are difficult to locate. If the water level stops dropping, you can assume that the leak originates at or above that water level and efforts to seal the leak can be concentrated there.

The best way to avoid pond leaks is to choose a good site and use proper dam construction techniques. Pond dams with a well compacted clay core tied into an existing clay substrate rarely leak. One cause of leakage is a failure to place anti-seep collars on drainpipes through the dam. These collars prevent water from seeping alongside the drainpipes.

Repair of a leaky dam or pond bottom often is difficult, expensive, and usually requires draining the pond. Adding a blanket of clay or bentonite to the bottom normally seals leaks. A bulldozer can be used to remove material in a problem area and then add and compact 1 to 2 feet of soil that has a high clay content. Or, bentonite can be used, since it can expand up to 20 times its original size when moistened and forms a seal. For best results, bentonite should be

spread evenly over the dry pond bottom at 1 to 3 pounds per square foot of pond bottom (the higher amount in deep water areas and sandy soils), mixed into the top 4 to 6 inches of existing soil with a disc, moistened, and then compacted with a roller. If feasible, a layer of clay can then be placed over the bentonite/soil mixture. Keep in mind a bentonite sealed bottom will crack and likely leak if the water level drops and it is exposed to air. Spreading a bentonite slurry or granular bentonite uniformly across the pond surface can also form a seal. This is often less successful than an application to a dry pond because of uneven settling onto the bottom.

Ponds may also be sealed by installing a liner of flexible plastic or rubber sheeting made of polyethylene, vinyl, or butyl at least 2 mm thick. To protect against punctures or tears, the pond liner should be covered by at least six inches of fine clay soil which can also facilitate sealing. If clay soil is unavailable, or there is the likelihood the clay may get disturbed/suspended and cause the water to be turbid due to excessive pond shallowness and wind action, other onsite soils can be used instead.

Livestock can also be used to seal a pond. When fenced into the dry basin for several months, their activity will compact a mixture of soil, manure, and waste feed into the bottom, sometimes producing a seal. Once a repaired pond fills, livestock need to be excluded or their hooves may break the seal or puncture liners.

An emulsion of oil-soluble resinous polymers can be used to seal a pond without draining. The effectiveness of this material varies with condition and character of the soil, water, and climate, as well as the manner of application. It is expensive and toxic to fish, but a pond can be restocked a few days after the water has cleared.

Your local Natural Resources Conservation Service (NRCS) can help determine the best way to stop leaks based on the soil types found at your pond. You can also contact the Private Waters Specialist or area



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Commission district office for a list of companies and products available for pond sealing.

EXCESSIVE SEDIMENTATION

As they age, ponds accumulate sediment, debris, and decaying vegetation, eventually becoming marshes, and finally dry land. Ponds that have filled with sediment through the years can be rehabilitated, but the process is expensive. It is often easier to build a new pond if a good site is available. If you wish to deepen the existing pond, you can remove sediment with a drag line. A cheaper method is to drain the pond by breaching the dam with a backhoe or to pump it dry. Once the pond has dried for several months, the bottom should be firm enough that a bulldozer or backhoe can be used to remove sediment from the basin. Compacted layers of clay should be used to patch a breached dam. Soil should also be pushed up against the pond side of the dam to ensure the dam is resealed. Contact your local NRCS office to discuss the feasibility of breaching your dam.

Perhaps your old pond is no longer suitable for producing viable bluegill, largemouth bass, and channel catfish populations and you do not want to spend the time or money to correct environmental problems. The pond can still be managed in ways to provide enjoyment or possibly profit. Some of these uses are:

- raising crayfish, salamanders, or minnows for bait
- providing habitat for frogs, turtles, snakes, and assorted bugs and birds
- creating a marsh or waterfowl area.

Raising koi is another option for small ponds no longer suitable for producing a viable bass/bluegill/catfish fishery. Koi are a fancy version of the common carp. Through years of breeding, hobbyists have produced an amazing array of color variations and patterns on these fish and no two look exactly alike.

Raising them can be a fascinating and relaxing hobby or they can even be entered into contests. Koi will reach 18 inches in 3 to 4 years and a maximum length of about 3 feet. The average life span of koi is 25 to 35 years, but some live much longer. Koi ponds may need to be aerated due to their shallowness and a feeding program may also be necessary. Koi can be costly – goldfish are less expensive and just as hardy.

Keep in mind koi and goldfish can reproduce in a pond. If their numbers are not controlled, they can become overpopulated and negatively affect water quality. Their bottom feeding activity can stir up sediment and cause the pond to become muddy. Their feeding activity can also prevent establishment of desirable aquatic plants with the available nutrients likely causing algal blooms, especially if the fish are fed an excessive amount of an artificial diet. Be mindful of neighboring waters if koi and goldfish are being considered for a pond. Runoff events can result in fish movement – upstream and especially downstream. Escaped fish could then jeopardize someone else's pond.

Mosquito control in small waters can be accomplished by stocking fathead minnows, small bluegills, or green sunfish to consume the larvae. Keep in mind that fathead minnows can reproduce in these smaller ponds, and possibly attain a high enough population to interfere with water quality and any other fish species present.

Contacts: Jeff Blaser, Private Waters Specialist
Nebraska Game and Parks Commission
2200 North 33rd Street, Lincoln, NE 68503
402-471-5435
or area Commission fisheries biologist.



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TECHNICAL ASSISTANCE CONTACTS

Nebraska Game and Parks Commission (Commission)

2200 N 33rd Street PO Box 30370
Lincoln, NE 68503
Private Waters Specialist 402-471-5435
Natural Heritage Program 402-471-5419

Northwest (NW) District - Alliance

Game and Parks Commission
299 Husker Road PO Box 725
Alliance, NE 69301
308-763-2940
Fisheries Division or
Wildlife Habitat Partners Section

Northwest (NW) Field Office - Valentine

Valentine State Fish Hatchery
90164 Hatchery Road
Valentine, NE 69201
402-376-8080 or 402-376-2244

Southeast (SE) District - Lincoln

Game and Parks Commission
2200 N 33rd Street PO Box 30370
Lincoln, NE 68503
402-471-7651 or 402-471-5561
Fisheries Division or
Wildlife Habitat Partners Section

Northeast (NE) District - Norfolk

Game and Parks Commission
2201 N 13th Street
Norfolk, NE 68701
402-370-3374
Fisheries Division or
Wildlife Habitat Partners Section

Northeast (NE) Field Office - Bassett

Game and Parks Commission
524 Panzer Street PO Box 508
Bassett, NE 68714
402-684-2921
Fisheries Division or
Wildlife Habitat Partners Section

Southwest (SW) District - Kearney

Game and Parks Commission
1617 First Avenue
Kearney, NE 68847
308-865-5310
Fisheries Division or
Wildlife Habitat Partners Section

Southwest (SW) Field Office - North Platte

Game and Parks Commission
301 East State Farm Road
North Platte, NE 69101
308-535-8025
Fisheries Division or
Wildlife Habitat Partners Section



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United States Department of Agriculture - Natural Resources Conservation Service (NRCS)

Federal Building, Room 152
100 Centennial Mall North
Lincoln, NE 68508
Statewide Wildlife Biologist
402-437-4100
or contact Local County Office

University of Nebraska - Lincoln, Cooperative Extension

211 Agricultural Hall - UNL East Campus
Lincoln, NE 68583
Main Office 402-472-2966
or contact Local County Office;
Water Quality Questions 402-643-2981, ext. 115

Nebraska Department of Natural Resources (DNR)

301 Centennial Mall South, PO Box 94676
Lincoln, NE 68509
Water Storage Permits 402-471-2363 or
Dam Safety Guidelines 402-471-1222

U.S. Army Corps of Engineers (ACOE)

8901 S. 154th Street, Suite 1
Omaha, NE 68138 402-896-0723
or contact the Kearney office at:
1430 Central Avenue
Kearney, NE 68847
308-234-1403

Nebraska Department of Environmental Quality (NDEQ)

1200 N Street, PO Box 98922
The Atrium, Suite 400
Lincoln, NE 68509
402-471-0096

Nebraska Association of Resources Districts (NARD)

601 S. 12th Street, Suite 201
Lincoln, NE 68508
402-471-7670
or contact your local Natural Resources District (NRD)
listed in White Pages of the phone book