

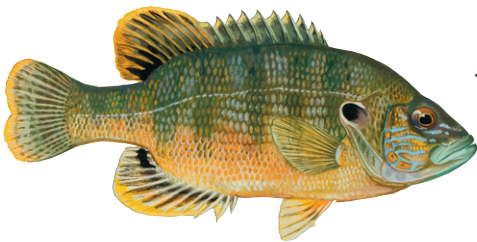
# NEBRASKA POND GUIDE


**Private Waters  
Program**

 Management Assistance for  
Lakes, Ponds, Pits & Streams

## REMOVING or CONTROLLING UNWANTED FISH SPECIES

Bullhead

Common  
CarpGreen  
Sunfish

If a new pond already has bullheads, carp, and/or green sunfish established, or there are plans for restoring an old pond containing these same fish species, it will be very difficult to establish or restore a balanced bass-bluegill fishery. The easiest and quickest way to resolve either problem will be to eliminate all the fish in the pond and start over with the appropriate pond species – largemouth bass, bluegill, and channel catfish.

If there is no concern with contaminating downstream fish populations with the fish from the pond, it can be drained or pumped dry; however, keep in mind that a downstream neighbor may not appreciate fish rotting on their land. Renovating the pond by killing fish with a chemical is another option. Even if the pond cannot be drained completely, lowering it just a few feet will reduce the amount of chemical needed and save you money, provided pumping costs are not substantial.

Fish renovations should be undertaken only in ponds with: adequate depth (10-12 feet), sufficient size (half acre or larger), controlled watersheds, and undesirable fish populations. Fish population

improvements in ponds with marginal habitat or poor water quality would be short-lived. If fish are already present in the new pond site due to a live or intermittent stream, or from a pond above it, the new pond should be renovated as soon as the dam is completed. Especially if there is no possibility of additional unwanted fish entering before desirable fish can be stocked. Any undesirable fish in the pond's watershed should also be eliminated, if feasible – provided Threatened and Endangered fish species are not present.

Rotenone is a chemical which kills fish by making it impossible for their gills to absorb dissolved oxygen from the water. Within a few minutes of application, fish can be seen struggling at the surface and dying. It is not toxic to most warm-blooded mammals (one exception is pigs) at prescribed concentrations. Rotenone is a naturally occurring organic compound extracted from the roots of certain tropical plants. It can be purchased either as a powder or liquid. The liquid is recommended because of its easier application. Rotenone with 5% active ingredient (or 2.5% synergized) is recommended, especially for eliminating carp and bullheads.

**Pond owners must obtain authorization from the Commission to use rotenone.** Since rotenone is a restricted use pesticide, it can only be purchased and applied by an applicator licensed through the Department of Agriculture. Contact Commission

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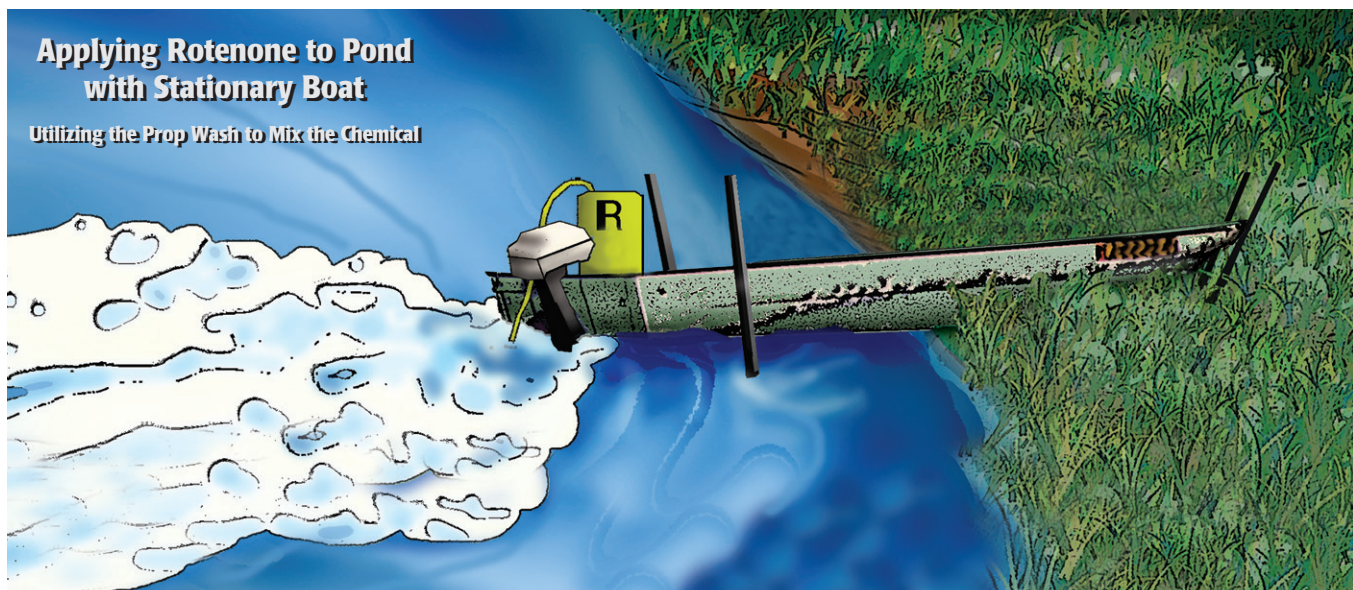
fisheries personnel regarding the permit process, chemical purchasing, and application.

To determine how much rotenone is needed, the volume of the pond has to be calculated, which can be found by multiplying the number of surface acres by the average depth of the pond. Average depth can be estimated by multiplying the maximum depth by 0.4. Volume is expressed as acre-feet of water. One acre-foot of water will cover one surface acre with one foot of water. For example, a 5-acre pond with an average depth of 4 feet has a volume of 20 acre-feet. Liquid rotenone should be applied at a rate of one gallon per acre-foot of water. Additional examples of volume and surface area determinations are presented at the end of this guide.

One way to apply rotenone is to drive around on the pond in a boat with an outboard motor and slowly pour or spray diluted rotenone into the water near the prop wash. Be sure to cover the entire pond and make extra passes over deep water. If a large portion of the pond contains depths of 8 feet or more, a pump or portable sprayer with a weighted hose should be used to get the chemical down to the bottom.

A more effective method, particularly in smaller ponds, is mixing the chemical into the water by utilizing the prop wash from a stationary outboard motor. Point the front end of a small boat toward the bank. If there are no solid objects to restrain the boat, the front and sides can be tied to stakes driven into the pond bottom or shore to prevent the boat from running up the bank. Run the outboard motor in forward gear as fast as safely possible and slowly pour or spray diluted rotenone into the prop wash. This will circulate the chemical to all depths of the pond. The location of the boat should be changed several times so the chemical can be mixed into all areas of the pond. A portable sprayer should be used along the shoreline for applying chemical in shallow water areas where both prop wash techniques may not have distributed the chemical effectively.

The best renovation results are achieved in August. This is when water temperature is at its highest and water level is normally at its lowest so as no treated water exits the pond. Ponds with outflows will have to be partially drained or pumped down prior to chemical application to ensure no treated water escapes. Wait at least 2 to 4 weeks





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before restocking. This will allow enough time for the chemical to detoxify. To ensure the pond has detoxified, leave a bait bucket containing some minnows in the pond overnight. If they survive, the pond is safe to restock.

A pond owner may not want to kill all the fish in a pond to get rid of the undesirable fish. If the pond is spring-fed or has a large inflow, rotenone may not be a viable option due to the likelihood of chemical dilution; or in the case of large ponds, the chemical may be cost-prohibitive. In these situations, the owner may have to live with what is present.

To make the best of a non-renovation situation, either learn to enjoy harvesting carp, bullheads, and green sunfish, or use management techniques to reduce their numbers. The best thing to do with numerous little bullheads and green sunfish is to convert them into bigger, more desirable sport fish. Largemouth bass, northern pike, walleye, large catfish, and other predators all eat these unwanted species and can be experimentally stocked if the pond is of sufficient size and contains appropriate habitat. Depending on availability and cost, the predators should be introduced by stocking 20 to 50 sub-adults, 8 to 12 inches or longer, per acre of water. If protected from harvest, the predators should reduce the numbers of undesirable

fish. Eventually the pond may even produce some trophy-size fish that anglers can enjoy catching. Once bullheads, carp, and green sunfish are controlled, or if bass appear to be getting skinny, stock 4- to 6-inch bluegills at 50 to 100 per acre if they are not already present. Bluegills will eventually provide adequate prey to support an expanded, desirable bass fishery.

While stocking predators can be a way to control carp, bullheads, and green sunfish, they have to be able to see these fish in order to eat them. In some cases, the unwanted fish may keep the water so stirred up that sight feeding predators can't detect their prey effectively. Turbid ponds are usually the best candidates for draining, excavating, and restocking. If that's not possible, various techniques can be used to clear muddy water, as discussed in **PG13-8**, or possibly stock adult flathead catfish, a very effective predator even in turbid water.

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

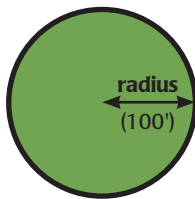
Surface area/volume calculations and diagrams are on the following pages.



## CALCULATING THE SURFACE AREA AND VOLUME OF A POND

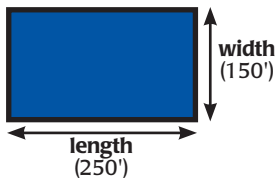
Presented below are formulas for calculating the **surface area** of a pond. Pick a shape that most closely resembles the pond and measure the necessary distances in feet. Put these measurements into the appropriate equation and multiply to find the surface area in square feet. Surface area in acres is simply obtained by dividing the surface area by the number of square feet in an acre (43,560). If a pond is irregular in shape, the best thing to do is divide it into workable shapes and then add the areas of the smaller units together to get the area of the whole.

**CIRCLE =  $3.14 \times \text{radius}^2$**



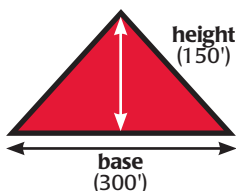
EXAMPLE: pond radius 100 feet x 100 feet x 3.14 = 31,400 square feet total surface area ÷ 43,560 = .72 surface acre

**RECTANGLE = length x width**



EXAMPLE: pond length 250 feet x width 150 feet = 37,500 square feet total surface area ÷ 43,560 = .86 surface acre

**TRIANGLE =  $\frac{\text{base} \times \text{height}}{2}$**



EXAMPLE: pond base 300 feet x height 150 feet = 45,000 square feet ÷ 2 = 22,500 total surface area ÷ 43,560 = .52 surface acre

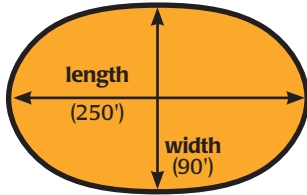


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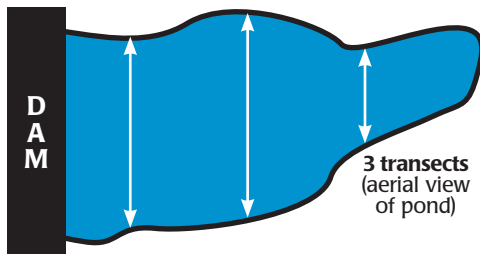
**ELLIPSE = length x width x 0.8**



EXAMPLE: pond length 250 feet x pond width 90 x 0.8 = 18,000 square feet total surface area  
 $\div 43,560 = .41$  surface acre

The formula for calculating a pond's **volume** is surface area (acres) x average depth (feet). Average pond depth can be estimated by measuring the depth of the water in a number of places throughout the pond, adding these measures together to get a total, and then dividing the total by the number of measurements. Several transects should be established across the pond (from one side straight across to the other side). Depth measurements should be taken/recorded every 40 feet with an electronic depth finder or a weight attached to a string marked in feet.

**VOLUME (acre-feet) = surface area (acres) x average depth (feet)**



EXAMPLE: forty measurements were taken while conducting three transects across the surface of a .75 acre pond; average depth calculated to be 4 feet; therefore,  $.75 \times 4 = 3$  acre-feet

NOTE: Average depth can be estimated by multiplying the maximum depth by 0.4

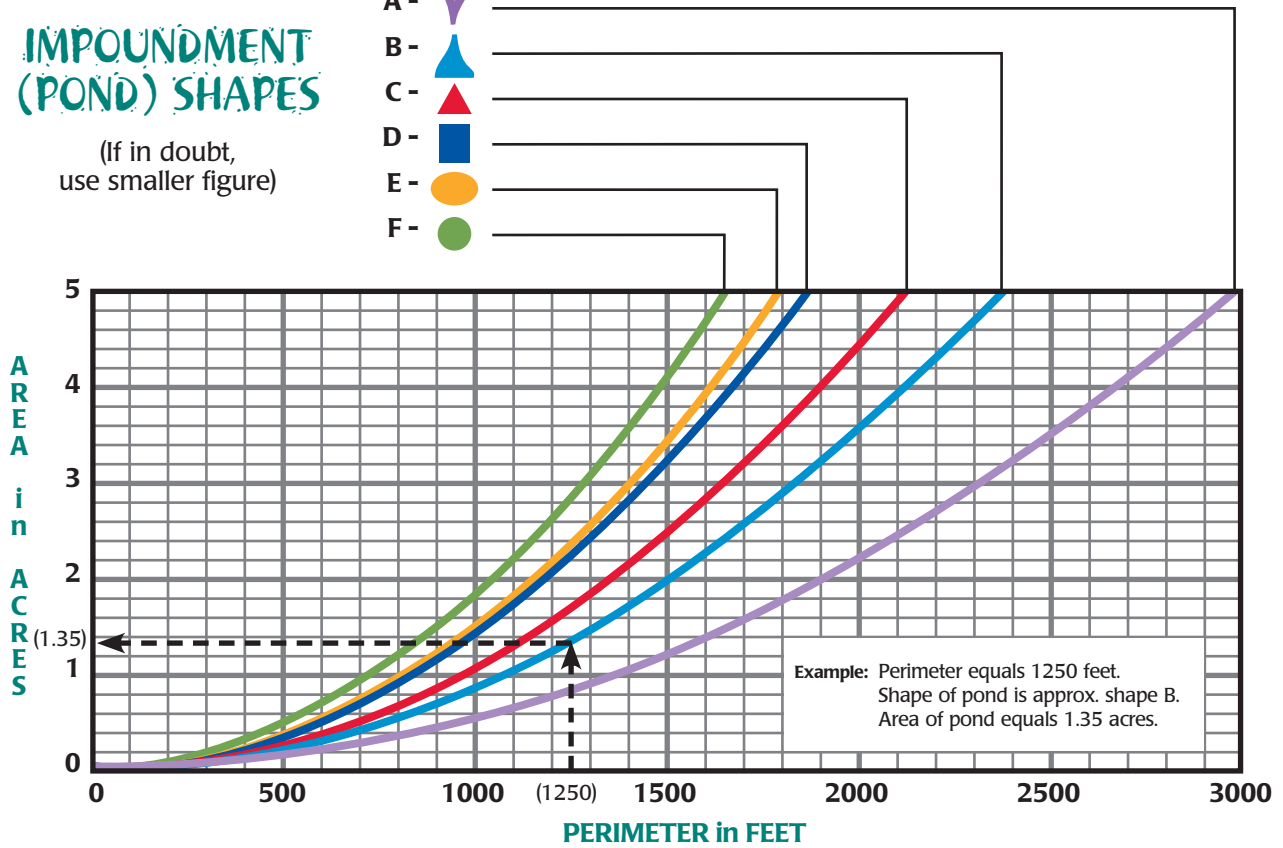
# POND AREA ESTIMATOR

If the distance around the entire pond can be measured, this pond estimator can be used.

## IMPOUNDMENT (POND) SHAPES

(If in doubt, use smaller figure)

- A - 
- B - 
- C - 
- D - 
- E - 
- F - 





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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