



# Water Hole Development



Constructing a pond on your property is a relatively simple and inexpensive way to attract a wide diversity of wildlife. Water holes can provide you and your family with endless enjoyment and educational opportunities, while providing for species that are in need of water to fulfill life requirements.

Wildlife habitat is comprised of three basic requirements: food, water and cover. By constructing a water hole, or pond, you can provide one, if not all, of these requirements for many species of wildlife that will visit your property. Many birds and mammals will use the water hole as a place to find food and water, including small mammals, deer and turkeys. If you provide a shallow area, birds will use it as a bath. Amphibians such as frogs, toads, newts and salamanders will also be drawn to the water. Toads, salamanders and some frogs may only use the pond for reproductive purposes, whereas, some frogs will stay year round. In addition to all of these large inhabitants, many aquatic insects and invertebrates will use the pond, providing the base of the food chain for many wildlife species.

There are four basic pond categories: earthen, preformed, cement, and lined. Choosing which type is best depends upon your individual needs and property characteristics. The local Natural Resource Conservation Service (NRCS) office may be consulted to assist on a pond project and will be able to check soil types for suitability of pond construction. An important part of the planning stage is to determine if there are any buried utilities on your property. Most local utility companies have a free service in which they will come to your property and mark the placement of any buried gas, electric, phone, cable, water and other lines.

## Earthen Ponds

Good habitat consists of two permanent water sources for every square mile. A pond 1/10 acre in size and 5 or 6 feet deep will suffice in providing a permanent water source. If you live in an area where the water table is close to the ground surface, or the soil will hold water, you can simply dig a hole, and it will fill with water. One precaution--if the water table fluctuates during the year, or the soil type does not hold water well, your pond may dry up during periods of drought. A seasonal pond will support certain wildlife species, but it will not attract as many species as a permanent pond, and of course, it will not provide water during periods of drought when wildlife most need it. If you are digging a water-table pond, then you will need to put the pond in a low area of your property where the water table should be closest to the ground surface.

If you are providing water on a ridge, you can build a levee at the head of a ravine or draw, or build a levee around a shallow dug pond. If you dig deep into the soil, there is the possibility of hitting bedrock making the pond unable to hold water. Always check the soil type to make sure your location will hold water. Levees and dams should always be kept free of trees and brush. If you notice muskrat activity in your pond, you should trap the muskrats to prevent erosion problems and potential loss of the dam. If the watershed supplying water to the pond is large you will need to provide an outlet pipe, and an emergency spillway. In that case you should check with the NRCS office for technical advice. This is not necessary for the small water holes described here.

If water already stands in an area for several months of the year, perhaps all that is required is to deepen that area. Again, your local NRCS conservationist can tell if the soil on your property is suitable for this type of pond. This is, by far, the most wildlife-beneficial construction where it is possible. But, don't be discouraged if this type of pond will not work for you, or you do not have enough property to install a large earthen pond. Small backyard ponds can be constructed which will benefit wildlife, and pond liners and forms are available for construction.

## Preformed Ponds

Preformed ponds are available in a variety of shapes, usually constructed using fiberglass or molded plastic. These ponds can be placed above or below ground and are almost indestructible. The hardiness of these ponds makes them desirable, although, they limit your creativity in designing a pond and even the largest preformed ponds are relatively small. These disadvantages are somewhat overcome by the fact that more and more shapes and sizes are becoming available as interest in backyard ponds increases. Another drawback for preformed ponds is the cost. They are about twice as expensive as the flexible liners.

## Cement Ponds

A cement pond is fairly simple to construct. After digging the pond, line the inside with cement to seal it. The cement should be at least 4 inches thick and reinforced with chicken wire or hardware cloth. The advantages of cement are that design options are almost unlimited, and it is very durable. Disadvantages are that cement ponds are permanent or at least hard to remove, and can be expensive. Also, cement ponds may eventually crack and need relining with a flexible liner.

## Lined Ponds

There are several companies in the United States that manufacture pond liners from materials such as plastic and rubber. It is essential not to use swimming pool liners for this because many contain materials toxic to frogs and toads. Also, pool liners are designed for the pH normally used in swimming pools, and break down very quickly otherwise. The pond liners are flexible, and like cement, allow for almost unlimited design creativity. After the pond hole is dug, the liner is stretched across the top, and filled with water. The fact that the liner conforms to the hole you dig makes the possibilities for shape and design almost limitless. The main disadvantage is that the liner can be punctured. If, after the hole is dug, there are root stubs or jagged, rocky edges, old carpet can be laid down prior to applying the liner, to help protect against puncture.

The main limitation with this type of pond is the available liner size. They come in rolls up to 100 feet wide and long, though larger, custom-sizes can be ordered. Plastic liners are the cheapest but the plastic becomes brittle over time. Rubber is a little more expensive, but will last a lifetime. Catalogs will give you an idea of the costs you can expect and liner sizes available, both hard and flexible. For a typical pond with flexible liner, the following formula will help in calculating the amount of liner necessary for your pond.

$$\begin{aligned}\text{Length} &= \text{Length of rectangle} + (2 \text{ times desired maximum depth}) + (2 \text{ times edge allowance}) \\ \text{Width} &= \text{Width of rectangle} + (2 \text{ times desired maximum depth}) + (2 \text{ times edge allowance})\end{aligned}$$

## Pond Size & Depth

A backyard habitat pond does not have to be large if supplying a water source for wildlife is the goal; even in limited spaces, a 3-foot diameter, 6-inch deep "pond" will attract a lot of animals. However, if you wish to provide a place for aquatic wildlife to live, make the pond as large as possible. In addition to size, a pond with varying depths will be utilized by a wider variety of wildlife. Toads, wood frogs and spring peepers will breed in small pond of just a few square feet surface area. Dragonflies will also breed in small water holes if some emergent plants are made available. Larger frogs, however, are unlikely to remain in an area less than 15 ft<sup>2</sup>.

Depth is another consideration. If the pond is deep enough that it will not freeze to the bottom during winter (>3ft), it will support a greater variety of species than if it is shallow. Fish, bullfrogs, green frogs, leopard frogs, and turtles require permanent, deep water. All of these species, however, eat small frogs and tadpoles; so smaller amphibians prefer shallow water for breeding.

## Providing Habitat in the Pond

A healthy pond has some earth on the bottom and emergent vegetation, such as rushes, sedges or cattails. There is usually no need to plant vegetation in earthen ponds. Plants will naturally colonize the pond edge and provide food, and cover for wildlife as well as needed substrate for invertebrates. If, however, you wish to provide some additional plants beneficial to wildlife, they may be purchased from aquatic nurseries. Wildlife will almost immediately begin using the pond. Once there, the animals should return yearly to your pond to breed, and their presence will attract other wildlife.

Wildlife has to survive all year around your pond, and only insect eggs can withstand freezing. Toads require loose soils (sandy is best) in which they can dig down below the frost line and over winter. Most small frogs (spring peepers and chorus frogs) prefer leaf litter. To give added cover for small frogs and tadpoles, put some leaves and branches in your pond. Some frog and toad species need a substrate on which to attach eggs. Branches and leaves will provide structure, as well as add nutrients for small tadpoles and frogs. Piles of rocks placed in shallow water, and healthy vegetation, are also important to provide perching places for frogs and birds, and other pond life, such as dragonflies.

Artificial houses for wood ducks, purple martins, bats and other birds and mammals may be provided near the pond. If the pond is large enough and the landowner wishes, a small island or nesting structure for Canada geese may attract a nesting pair.

## **Buffer Zones**

To prevent your pond from filling with soil and receiving too many nutrients, it is important to prevent direct runoff from the surrounding areas. This can be achieved by providing a buffer strip by not mowing the grass directly surrounding the pond. The grasses act as a filter system to remove sediments from the water before it reaches the pond. For a buffer strip that provides even greater habitat benefits, plant native warm season grasses around the perimeter. This not only improves the pond water quality, but the wildlife habitat as well, by providing good cover for wildlife year round.

In addition to keeping soil and excess nutrients out, chemical run-off into your pond is something else you want to consider when you are deciding where to build your pond. Herbicides have relatively little affect on amphibians, but all insecticides, and most fungicides, are fatal even in tiny doses.

The habitat in most areas can be improved by providing a water source for wildlife. Even small water holes can be beneficial to a variety of wildlife species, and can add to the enjoyment of viewing wildlife on your property.

### ***Related Habitat Management Fact Sheets:***

Forest Habitat Improvement  
Forest Openings  
Waterfowl Nesting Structures  
Artificial Nesting Cavities

Prepared by the Indiana Department of Natural Resources, Division of Fish and Wildlife. For up-to-date information concerning the Indiana Division of Fish and Wildlife, or for information on the location of your District Wildlife Biologist, visit our website at [www.state.in.us/dnr/fishwild/index2.htm](http://www.state.in.us/dnr/fishwild/index2.htm)

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