

What is the one thing that you can do to attract a greater variety of wildlife to your habitat, regardless of the size of your property?

The answer is... add water.

Add Water and They Will Come



Often when we want to attract more birds or animals, we think in terms of offering additional food sources. While this is certainly entertaining for us and appreciated by wildlife, there are frequently other food supplies in the area, such as berries and seeds, or insects and smaller mammals.

Generally speaking, a species will limit its population in a locality according to the food supply that is available. In addition, most species can survive a certain amount of time without food when supplies are short. Water is a very different matter.

We, like our household pets, need water all year around, and cannot survive for very long without it. The same thing is true of all living things, including those in the wild.

When development fills in or pollutes wetlands and ponds, or a drought dries up vernal pools and there are no rain puddles or drops of moisture on leaves, or a long stretch of very cold weather freezes the usual water sources, then the stress on wildlife is tremendous.

By providing a clean, dependable supply of water you will attract and benefit a far broader spectrum of wildlife than with any type of food.

This means that you will attract birds that don't eat seed and won't appear at your feeders, animals which are normally too shy to appear in the open, and creatures that you usually don't think about

feeding but which are very beneficial, such as frogs and butterflies.

When trying to create an ecosystem in a limited area, water is your most important resource.

If you are trying to provide water for a wide variety of creatures, then you should present it in several different ways. The first consideration is height. Water at ground level, at the height of a standard bird bath, and still higher above the ground, perhaps in a tree, will meet the needs of many species.

Then you can think about size, depth, still or moving water, solid or earth-bottom, clear or containing plants and rocks, and so on with endless possibilities.

Small Spaces

If you don't have much space, many common containers can hold water, plus some plants, a

"Of all the garden developments you can undertake to increase habitat diversity, ponds are probably the most effective and the most gratifying. If you have the space, a large pond offers a wide range of possibilities, but even a tiny pool can make a noticeable difference."

– *The Natural Garden Book*
Peter Harper

fountain, and even a few fish. Ideas would include large terra cotta pots, half barrels, stone troughs – you are only limited by your imagination.

Containers which aren't waterproof can be lined to make them suitable. The depth of the container will determine what plants you can grow, and whether or not it is useful for amphibians or birds.

In colder climates these containers may freeze in winter, killing the plants and fish and possibly splitting the container itself. Sometimes a heater can be added, or they can be brought indoors until warmer weather returns.

Sunshine can also be a problem, since the water in containers can overheat easily, so if your climate is very hot, provide some shade, especially if you are including fish.

Think about the wildlife that you hope to attract, how much space you have, and whether you want the water to merge with your living space or be somewhat removed.

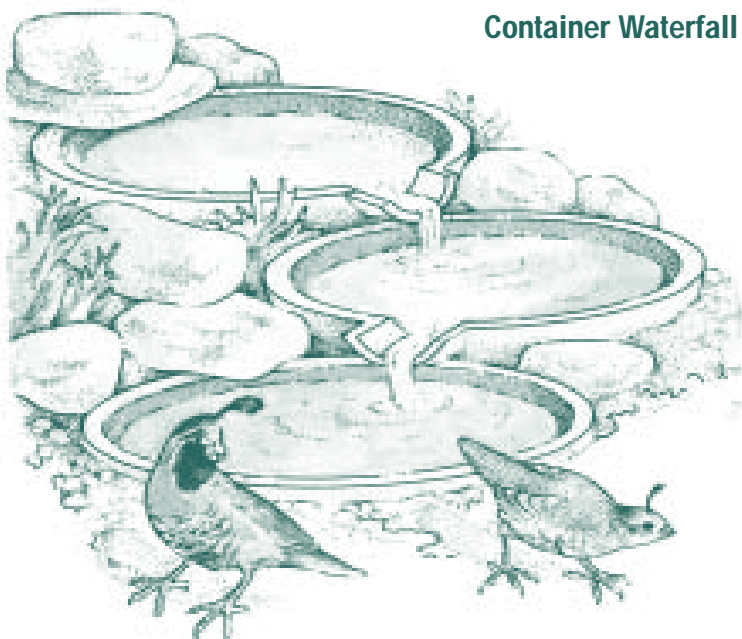
Many people begin with a standard bird bath on a pedestal. There are many styles on the market, or you can make your own. Whatever you choose should gradually slope to no more than 3 in. deep and should have a rough surface.

Birds fear deep water because they can easily drown, and smooth surfaces allow them to slip and lose control. If it's at least 24 in. to 36 in. wide it will allow several birds to drink and bathe at the same time.

Bird baths should be out in the open, about 15 ft. from shrubs or trees. This allows the birds to see approaching predators and gives them a safe place to which they can escape.

Be Creative

Once you have the basic bird bath installed, think about variations. By sinking a bird bath bowl – or a garbage can lid



Container Waterfall

or similar object – into the ground so that the lip extends up a couple of inches (to keep dirt from washing in), you can create an instant drinking pool.

Depending on its location, this type of arrangement can also attract reptiles and amphibians, insects, and small mammals. If you are striving for a completely natural look, consider a large stone with a depression that can hold water, or a log that has been partially hollowed out.

There are also bird baths which can hang from tree branches or from brackets attached to a deck railing or wall. These are excellent for apartment dwellers, or anyone who has limited yard space. Some even use suction cups to attach to windows, allowing you to have a close-up view of the action.

Whatever water source you provide, it needs to be kept clean, filled, and free of any chemicals. For winter use, there are heated bird baths, or separate heating elements that can be added to any small water feature.

Birds in particular are fond of moving water, and the sound alone is often enough to attract them. Some bird baths provide fountains, and there are kits to create your own fountains in other containers. There are also special misting attachments that can be added.

If you are working with a limited budget, a hose draped over a tree branch and allowed to drip very, very slowly into a container of water will provide the desired effect.

A similar solution would be to replace the hose with a bucket, plastic jug, or other watertight container with a tiny hole in the bottom, just large enough to let the water drip out slowly .

A series of half-barrels or other containers at different heights, plus a recirculating pump, can create the illusion of a waterfall as the liquid flows through spouts or other connectors from one level into the next.

Maintaining a packed area of moist soil, or providing a shallow container of damp

sand, will attract butterflies. They not only need water to drink, but also require minerals from the wet dirt.

Larger Bodies of Water

Now that the birds and insects are provided for, you can think about other creatures which will appreciate larger and deeper sources of drinking water. Ponds have been recognized for the beauty that they add to any home landscape.

As a result, there is a wealth of information available on building ponds of all sizes, as well as kits to make your job easier.

This publication will primarily give you an overview of the basics of building and maintaining an informal pond designed to attract and serve wildlife. Any bookstore, library, large home improvement store or nursery, or your Cooperative Extension Service can provide you with seemingly endless books and information on more elaborate construction techniques.

Most pond construction books will give guidelines about waterfalls, elevation and excavation, water tables, and liner and pump sizes. If that type of pond is your goal, taking time to do the research now will mean far few problems in the future.

Your first step should be to analyze your space and decide where you want to locate your pond. To get the most enjoyment, it should be visible from the house and customary outdoor living area such as a deck or patio.

“All too often, gardeners, when confronted with wet areas, attempt to alter the habitat by drainage or fill, with the purpose of creating lawns or planting shrubs in an attempt to shape a landscape into a scene resembling every other developed landscape...”

Why not work within the parameters of the existing environment, making use of water to create a landscape of both stability and beauty. Use the assets of the site, such as its natural moisture for a pool or a marshy habitat rather than fighting nature. The creation of a wet habitat also offers unexpected pleasures in the form of the wild species that may appear naturally or be brought in by migrating birds.”

*– Gardening with Native Wild Flowers
Samuel Jones and Leonard Foote*

Situated closer to the house, you will have the relaxing sound of the water, and a constant view of the flowers, fish, insects, and small creatures that are attracted to the pond. Larger mammals are more cautious and will be more likely to visit a water source that is farther from human activity, although it can certainly still be in easy view.

Unless you are fortunate enough to have a large "farm pond" which is spring-fed or can rely on rainfall, your pond needs to be in reach of a hose for filling and cleaning.

The surrounding area can get very moist and soggy when rainfall is heavy, so providing for paths or stepping stones will add to your enjoyment.

To appreciate the peace and serenity that your pond will bring to your yard, include some kind of seating arrangement where you can relax and contemplate the beauty around you.

If you take a photo of your yard and get inexpensive paper photocopies made, you can draw many variations of your ideas until you're happy with the results.

Simple or Elaborate?

The style of your pond is a very personal choice, and it can be simple or elaborate, casual or formal. Safety, however, is critical. Some localities have specific zoning ordinances relating to water features, and anything deeper than 2 ft. may be designated a "pool," so be sure that you are meeting any requirements such as fencing.

Also check for any restrictions in your homeowner's insurance policy. Utility companies will usually come to your home at no charge to mark the location of underground pipes and wires.

If you have children in the family, or even in neighboring houses, water depth is an important factor. Although it is possible to drown in just a couple of inches of water,

shallower is certainly safer than deeper.

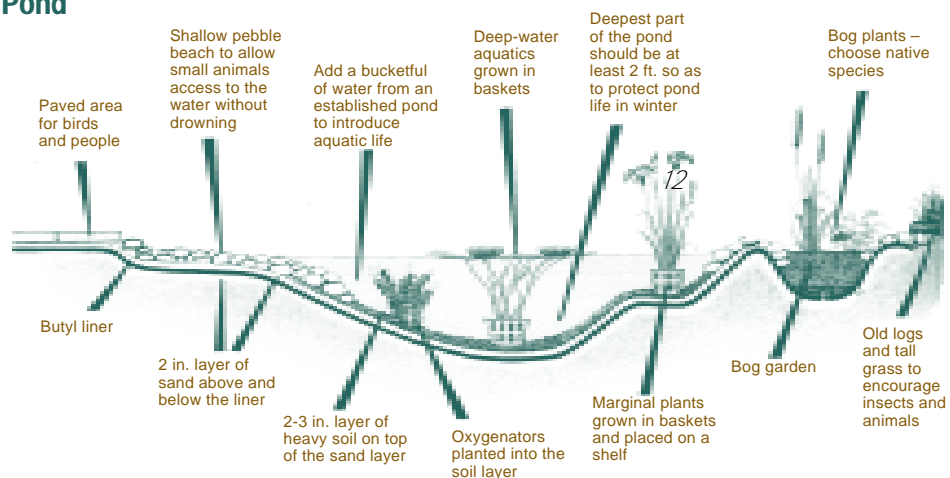
Try to visit a number of different ponds in private yards, public places or botanic gardens to get a feel for the style and features that you'd like to incorporate.

When it comes to ponds, larger is generally better. Professionals say that they are often called in to enlarge a pond, but never to make one smaller! Larger ponds tend to stay cleaner and the water temperature fluctuates less, placing less stress on the fish and plants.

Although any water in your yard is better than none, if you have sufficient space try for a pond that is at least 6 by 8 ft.

Lay out your design with a piece of rope or hose so that you can easily experiment with shape and dimension before you actually start digging. Unless you need a geometric shape for a specific formal plan, use curving lines and avoid sharp

Wildlife Pond



– *The Rock and Water Garden Expert*
Dr. D. G. Hessayon

corners – they won't look natural and will have a tendency to collect debris.

Know in advance where you are going to put the dirt that you remove. Some suggestions are to use it for a berm around the pond, to form an island, or to create a new garden (perhaps a raised bed) elsewhere on the property.

Consider Climate

Find out the anticipated freezing depth for your area. In most climates, 2 ft. is sufficient for small fish and plants to survive the winter (but plan on at least 1 ft. deeper than the usually thickest ice).

Adequate depth is also important in warm climates, since it is dangerous for fish and plants if the water gets too hot.

Ledges at various depths (starting at about 10 in. below the surface for marginal plants in pots) are recommended for different species of plants, with the shallowest one at least 1 ft. wide.

Pond Ledge

Shelf for marginal plants



– *The Rock and Water Garden Expert*
Dr. D. G. Hessayon

Some ponders use sand bags to form ledges. Many people choose to add electrical elements to their pond design, such as pumps, filters, heaters, and lights.

The most common filters are either mechanical (pulling the water through filter pads) or biological (passing the water over cleansing bacteria living in a contained space).

The details about filters, as well as different types of pumps, are available in most pond construction books. With anything electrical, you need to research local regulations, and be sure that any lines are safely buried and that everything is grounded and intended for use outdoors and around water.

Although you can choose a shady site, remember that you will have to remove falling leaves in the autumn so that they aren't sinking and decomposing in the water or clogging a filter system. Tree roots can also puncture liners.

On the other hand, if your pond is very shallow, shade will reduce evaporation and overheating of the water. If you want to grow a variety of flowering plants in and around the water, you will need to be sure that the site receives at least five hours of sun per day.

Unless you are designing a formal pond to be incorporated into a specific landscape style, choose a site where the pond will look natural.

You wouldn't expect to see a body of water sitting on the top slope of a hill in nature, and it won't look right in your yard either.

At the same time, don't choose the lowest site on your property. If it is too low, you may have problems with contamination from debris or pollution from runoff.

Creating a berm, or raised mound, around the edges of the pond will help prevent this. The more level the site, the easier it will be to correctly dig the pond.

If there is any slope, be sure that the low side faces away from the house or other area where overflow could cause problems. If your water supply is chlorinated or treated with ammonia, you will have to neutralize it since these chemicals can be toxic to wildlife.

Treatments are available through companies which sell fish or water plants. Before treating, you will need to know the water capacity of the pond, which can be determined by multiplying the length x width x depth x 7.5 gallons/cubic ft.

Bottoms Up

The bottom of some ponds consists of packed earth, while others depend on cement, a rigid plastic form, or some kind of flexible liner. If you have clay soil, digging a depression and packing down the earth may be all that you need to do.

If you have soil that drains rapidly, or you want to be sure that the soil stays really wet all the time in order to support water-loving plants, then you will need to add a liner. Other than an earth bottom, a flexible liner is the most versatile since it will fit any shape that you choose to dig.

Polyethylene liners are lowest in cost but don't last very long (perhaps up to 10 years); PVC liners are mid-range in price but are stronger and may be reinforced with netting; and Butyl sheeting is the most expensive but also the strongest, tolerating both sunlight and frost. It can be expected to last 20-50 years.

Beware of using swimming pool liners or other materials not designed for ponds, because often they have been treated with chemicals which can be toxic to wildlife and plants. Look for products marked "fish safe."

When using a flexible liner, pad the ground first with a thick layer of newspaper and/or sand to protect the plastic from being punctured by small stones.

To determine the size of liner needed, measure the length and width of the pond, adding an additional foot to each for overlap on the top edge, then multiply the maximum depth times two and add it to the first figures.

Let the water settle before trimming away any excess, but leave enough material to fold some over the sand or rocks that are holding the edges in place as you fill the pond. Hide the remaining visible edge material with additional rocks.

Leaving some excess will let you make adjustments in the future, if necessary. Using stones and plants around the edges, putting some smooth gravel in the water, and using a dark-colored liner will all serve to make the pond look more natural.

Pond Maintenance

Clean out debris regularly, because it can rob the pond of oxygen as it decomposes. Some owners use netting to catch falling leaves in autumn before they enter the water.

Destructive insects should be washed off the plants or the affected leaves should be removed. Don't use any pesticides.

In winter, discard tropical plants and move hardy ones to a depth of 18 in. or more. Stop feeding any fish when the temperature no longer goes above 50 degrees. They have no digestive systems and rely on the bacteria that only grows in warmer weather.

The fish will instinctively move to the deepest part of the pond. When temperatures go below freezing, it is necessary to let oxygen into the water and also to let any gasses caused by leaf decomposition escape, or else the fish will suffocate.

A heater or deicer can be used to keep a small portion of water unfrozen, or you can drill 1/2 in. holes along the length of a piece of 4 in. PVC pipe and sink it at the deep end with 4 in. of the pipe extending above the water surface.

"...a small informal wildlife pond can be accommodated in most gardens, as it is the natural population rather than the pond itself which is the main attraction."

*– The Rock and Water Garden Expert
Dr. D.G. Hessayon*

If you have an unexpected freeze, you can repeatedly place a hot pot on the ice until it melts a hole (keeping control of it so that it doesn't sink!). Don't hammer on the ice to make an opening because the vibrations could kill the fish.

Water Color

The color of the water is significant. If your pond is healthy, the water should actually be amber rather than clear, indicating the presence of beneficial organisms. Green water indicates the growth of algae and is normal during the first few weeks after filling the pond.

The fish and submerged plants will help the pond come into balance. Brown water is due to particles of sediment stirred up by the fish, or by strongly moving water. This can be reduced by removing some of the debris which has settled to the bottom.

Black water means that tree leaves are decaying in the water, and they need to be removed since they can release toxic gases.

Decaying water lily leaves can leave a film of oil on the surface which can be removed by placing a sheet of newspaper on top of the water and then pulling it off. If the water has a white, cloudy appearance, look for and remove dead fish or other animals which may have drowned.

Types of Plants

There are several kinds of pond vegetation. The most common are submerged plants, marginal plants, water lilies, and floaters. As a general rule,

plants should cover about 60% of the water's surface to keep algae growth under control.

Many aquatic plants, provided with a constant supply of water and nutrients, can be very vigorous, and are often grown in submerged perforated containers to keep them within reasonable bounds.

As a rule, use good garden soil without organic matter and low in nutrients, since these things will encourage algae growth.

The plant species which grow underwater are called oxygenators and they keep the pond clean by removing excess nutrients, thus starving the algae. They also provide hiding places for fish and other underwater creatures.

Generally speaking, to keep the water healthy, plan on planting 12 cuttings of submerged plants for each sq. ft. of pond surface.

These are planted directly into the soil at the bottom of the pond. A layer of pea gravel will help to keep fish from disturbing them. If possible, let plants become established before introducing fish.

Marginal plants are the ones that you will place on the ledge of the pond, or plant in your bog garden. While they enjoy constant moisture on their roots, they don't want to be deep in the water.

If you pot them yourself, don't use peat moss or commercial "soil-less" mixes because those substances will float and pollute the water. Use regular garden soil,

especially if it has a high clay content. Small gravel on the top will hold the soil in place.

Water lilies prefer quiet water, so they are not compatible with fountains. Tropical species cannot survive winter temperatures, but hardy varieties will live if the foliage is cut back and the pot placed in the deepest part of the pond.

They are called "rooted floating aquatics" because they are planted in soil but their stems stretch to the water's surface.

Floating plants don't anchor in pots or dirt, but rather let their roots dangle in the water. Like water lilies, their leaves cut back the sunlight, and thus the algae, and their roots consume excess nutrients.

Many of these are very vigorous growers and can take over a pond, so be prepared to scoop some out as necessary.

The removed plants add good nutrients to a compost pile, and the water is great fertilizer for flower beds if you ever have to drain your pond for maintenance.

Sometimes aquatic vegetation can get out of control and threaten the health of the pond. Often this is due to an excess of nutrients, perhaps the result of runoff from lawn fertilizers or farm animal waste products.

Lowering the water level allows you to pull the weeds by hand. Any biological or herbicidal controls should only be used as a last resort and with careful supervision.

NATIVE PLANTS SUITABLE FOR PONDS, BOGS, OR WETLANDS

Floating Rooted Aquatics

- Floating Heart (Nymphoides aquatica)
- American Lotus (Nelumbo lutea)
- Water Lily (Nymphaea odorata)
- Spatterdock (Nuphar advena)

Free-floating Aquatics

- Mosquito Fern (Azolla caroliniana)
- Water Spangles (Salvinia minima)
- Large Duckweed (Spirodela polyrhiza)
- Inflated Bladderwort (Utricularia inflata)

Submerged Oxygenators

- Fanwort (Cabomba caroliniana)
- Eel Grass (Vallisneria americana)
- Waterweed (Elodea canadensis)
- Common Water Nymph (Najas guadalupensis)
- Hornwort (Ceratophyllum demersum)

Marginal Plants

- Duck Potato (Sagittaria latifolia)
- Arrow Arum (Peltandra virginica)
- Three Way Sedge (Dulichium arundinaceum)
- Blue Flag (Iris versicolor)
- Water Horsetail (Equisetum fluviatile)
- Wild Rice (Zizania aquatica)
- Swamp Lily (Crinum americanum)
- Pickerelweed (Pontederia cordata)

Wetland Plants

- Soft Rush (Juncus effusus)
- Lizard's Tail (Saururus cernuus)
- Woolgrass (Scirpus cyperinus)
- Cardinal Flower (Lobelia cardinalis)
- New York Ironweed (Vernonia noveboracensis)
- Water Willow (Decodon verticillatus)
- Wild Red Mallow (Hibiscus coccineus)
- Swamp Pink (Helonias bullata)

Never use any chemicals in streams or ponds that connect to or overflow into estuaries.

Create a Bog

While they don't get the amount of public attention that ponds do, many naturalists prefer to create bogs in their habitat.

These provide water and support a range of wildlife and plants, yet don't have the safety concerns of electricity or deep water, and don't require the more intensive commitment of time and money for construction.

They can also do well in partial shade, and don't have as many problems with tree roots. As before, start with a depression about 18 in. deep.

If the bog area is large enough, create some mounds to accommodate acid-loving shrubs like blueberries and pussy willows which appreciate constant moisture but don't like to live in standing water.

Add a liner if your soil doesn't naturally retain moisture, but this time poke some small holes in the liner and fill the depression with a mixture of sand, humus, some soil and water.

The formula recommended by Ken Druse in *The Natural Garden* is "three parts acidic humus, such as peat moss or oak leaves, to two parts sand, to one part loam – good topsoil."

Placing a soaker hose (one with tiny perforations along its length) at the bottom of the bog, with one end sealed and the connecting end sticking out enough to be accessible, will let you add water as needed without disturbing the surface.

Some people also choose to create bog areas around a more traditional pond, thus accommodating any overflow from heavy rain, while at the same time creating another distinct habitat environment.

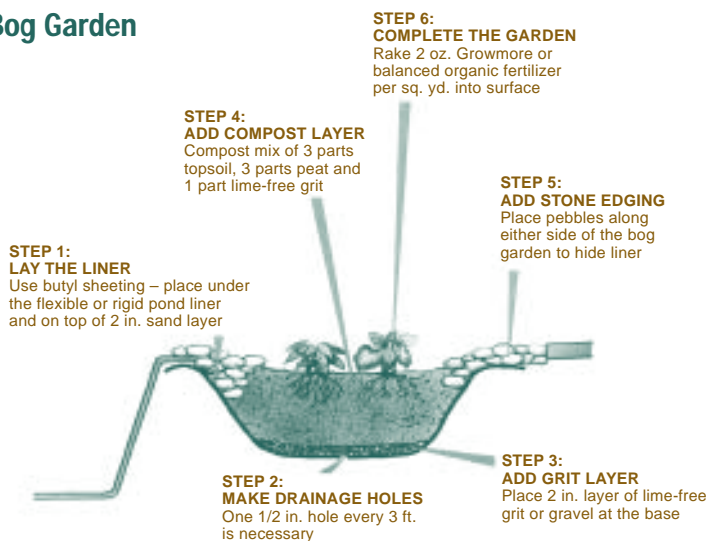
If you live in an area with cold winters, mulch bog plants well. The additional moisture in the soil can cause severe "frost heaves" which may kill your perennials if they aren't protected.

If you already have wet areas on your property, enhance them rather than try to overcome them. Drainage ditches can be deepened and lined (if necessary) and then planted to become lovely stream features.

Low-lying ground that never seems to dry out can become a valuable bog or wetland area. If you can locate the source of the water – possibly an underground spring – then you can center a pond there, and surround it with a bog garden.

The constant moisture will allow you to plant flowers that wouldn't grow well under normal garden conditions. Some thoughtful landscaping can turn what seemed like a negative feature into the focal point of your yard.

Bog Garden



– *The Rock and Water Garden Expert*
Dr. D. G. Hessayon

Attracting Wildlife

Toads and frogs will be happy if the sides of your pond slope gently and are covered with pebbles. Avoid purchasing tadpoles, since they usually end up being bullfrogs which will displace smaller, native frogs.

Many amphibians appreciate protection in the form of bushes, lily leaves, rock piles, or an upside-down flowerpot with a broken-out "doorway."

Branches which overhang the pond allow tree frogs to lay eggs and have them drop right into the water.

For winter cover you can create a hibernacula by digging a pit (3 ft. wide by 6 ft. long and up to 18 in. deep is ideal) and filling it with loosely packed sticks and rocks. Leave lots of spaces and layer with leaves and wood chips. Add a layer of soil and mulch and top with straw or wood chips.

Salamanders and newts will look for daytime hiding places such as dead logs. Dragonflies will come if the water is kept clean, and bees will be attracted by the flowering plants. Like the frogs, many insects which are attracted to water environments, including water beetles and damsel flies, will make your life more pleasant by eating many mosquito larvae.

The toads are especially helpful in cutting down on populations of harmful garden pests.

Birds will also come to the pond, and if you have flocks of 30 or more you should consider a pond at least 8 by 15 ft., so that it doesn't become overly contaminated by their droppings.

As discussed previously, be sure that part of the pond is very shallow and has rocks just below the surface for perching if you want to attract birds.

How About Fish?

Many pond owners choose to add fish, but you need to consider some of their drawbacks as well as their beauty. While they eat mosquito larvae, they also eat the eggs of amphibians and insects.

They will provide easy meals for herons and raccoons, an important consideration if you have spent a lot of money on the fish. Don't overstock your pond or it will be out of balance ecologically.

Wait several weeks to let the pond settle before introducing any fish, and plan on only one inch of fish per five gallons or per sq. ft. of water surface unless you are using pumps and filters.

Overfeeding will also pollute the water. Don't give them more than they can consume in five to ten minutes. Once the pond is stabilized and balanced with plants, there shouldn't be much need to feed the fish at all.

Feeder goldfish are hardy and inexpensive, compared to koi which cost a great deal, need water at least 4 ft. deep, and require a lot of care and attention. Species such as *Gambusia* (mosquito fish), Rosy Minnows, or Three-spined

Sticklebacks are more appropriate if you want to maintain a native ecosystem.

Sometimes construction techniques and materials can seem overwhelming to nature lovers who just want to provide water for the local fauna.

To illustrate how feasible a simpler approach is, we have only to look at the experience of one WindStar Master Wildlife Habitat Naturalist. He fully intended to build an elaborate pond system, complete with waterfall, in his suburban yard, but he had to stop temporarily after only digging a shallow depression in the ground.

Before long deer, rabbits, frogs, birds, and a variety of other creatures were appearing regularly to take advantage of the rain water that collected there! Pond aesthetics are geared to people; wildlife just needs the water.

This article was written by Maryland Master Wildlife Habitat Naturalist Cathy Gilleland.

For more information or for the name of a Master Wildlife Habitat Naturalist in your area, please contact:

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WindStar Wildlife Institute is a national, non-profit, conservation organization whose mission is to help individuals and families establish or improve the wildlife habitat on their properties.

RESOURCES

- *The Complete Pond Builder*, Helen Nash (recommended by many pond owners)
- *How to Attract Birds*, Ortho Books (creative birdbath ideas)
- *Garden Ponds*, David Squire
- *Water Gardening*, Ken Druse
- *The Rock and Water Garden Expert*, Dr. D. G. Hessayon
- *Gardening with Native Wild Flowers*, Samuel Jones and Leonard Foote (good list of native aquatic plants)