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# Create a Garden Pond for Wildlife

*S. Lamb and N. Allen*

Of all the habitat features that can attract wildlife to your yard, a pond could be the most rewarding. Most animals need water to drink, and many use water for feeding, bathing, breeding, regulating body heat, resting, and cover. In the Pacific Northwest, the species you are likely to attract include amphibians, reptiles, raccoons, deer, dragonflies, songbirds, jays, some waterfowl, and great blue herons.

A pond creates natural beauty for your landscape. The more natural features your pond has, the more attractive it is to wildlife. Ponds can be any shape or size. They can be still or have running water or fountains. Many species are attracted to moving water. Moving water also discourages mosquitoes.

This publication describes how to build a simple pond to attract wildlife, and how to keep it safe and healthy for wildlife and for you.

## Planning

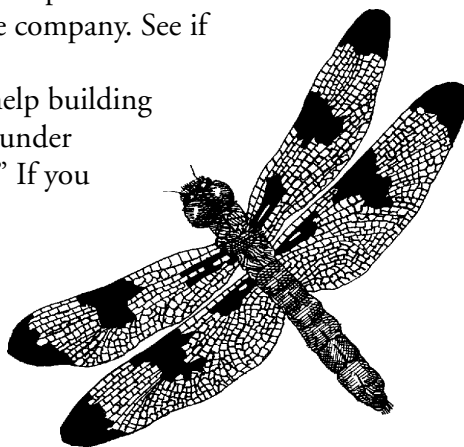
Before you begin to build your pond, check with your local zoning or planning office. Be sure that your pond will be safe and legal. Find out if you need to get any permits. There might be restrictions on the size, depth, or even the location of your pond.

Also, check with your insurance company. See if they have other safety requirements.

If you would like professional help building your pond, look in the Yellow Pages under "Ponds" or "Landscape Contractors." If you know people who have a pond, ask them for advice. Ask what worked well for them, and about any problems they encountered.

## Size

Your pond should fit in with the natural landscape of the land and have a curved, irregular shape. For smaller yards, a 3- by 5-foot pond is a good size. A larger yard could hold a 5- by 8-foot or larger pond.



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The pond should be at least 20 inches deep at the deepest part. There should be shallow water around the edge or at one end that includes plant shelves. Plant shelves (Figure 1) provide habitat for wildlife and a place for planting marginal plants (see “What to plant,” p. 5). The shelves should be about 8 to 10 inches deep and 8 to 12 inches wide (from the side of the pond), and extend around the perimeter of the pond as long as you want. Plan another shelf 6 inches from the top around the perimeter for rocks to edge the pond.

One side of your pond should have a gradual slope. A good slope is a drop of 6 inches for every 3 horizontal feet.

### **Location**

Consider all underground utilities, tree roots, and other potential obstacles.

Keep your pond above the water table to prevent damage to your liner. You can check the high water line in winter. Dig a small hole the same depth as your proposed pond and observe it for 24 hours. If the hole fills with water on a day with no rain, your water table is high in this spot. Be sure your pond depth is above this level.

Plan where your pond will drain when it overflows from rain or when you clean it. You

can channel water to your yard or down a hill, or you can create a small wetland to collect the excess water.

To see how your pond will look in different locations, you can use a garden hose or string to make an outline. Make sure you can see it from the house or from wherever you want to view it.

Most ponds, unless they are very shallow, should get at least 5 to 6 hours of sunlight per day. This allows enough sunlight for plants to grow but enough shade to help prevent excess growth of algae.

Don't place your pond directly under trees or over-hanging shrubs. Leaves fallen into the pond can make the water too acidic for aquatic life. Leaves decomposing in the pond use up oxygen and can cause odors.

It is important that wildlife can travel safely to your pond. Be sure there is habitat such as tall grass surrounding or next to it. See “Travel corridors,” p. 7.

If you need to fill and change the water, place your pond near a water supply. Filling and changing the water will be easier.

If you plan to have running water and/or a pump and filter, you need to place your pond close to a supply of electricity.

### **Pumps and filters**

If you are going to have fish in your pond, it is a good idea to install a filter and pump. The pump enriches the water with oxygen by “turning the water over,” and filters help clean the water. If you want a waterfall or fountain, you need a pump.

There are two kinds of electric pumps: submersible and surface. Submersible pumps are less expensive and quieter, but they are not as powerful as surface pumps. You must have a surface pump for a larger pond.

Solar pumps and panels are a good choice. But, they only work when there is enough sunlight.

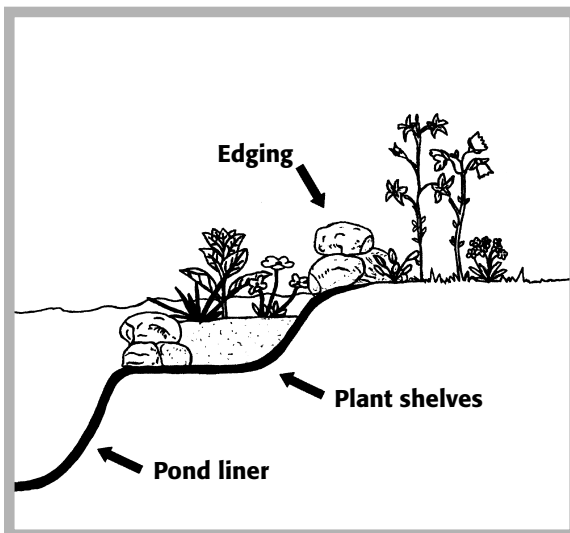


Figure 1. Diagram of plant shelves.

If you use an electric pump, choose a water-cooled pump rather than an oil-cooled one. Oil-cooled pumps can cause oil slicks in your pond if the seal on the motor leaks.

Each pump has its specifications printed on the box. These can help you decide which pump is right for you. Pump capacity and filter depend on the size of your pond. A commercial pump dealer can help you decide which pump is best for your pond.

Whether to place your pump under water or on land depends on the type and brand of pump you buy. Follow the manufacturer's recommendations to ensure the best performance from your pump and filter.

## Choosing a liner

After you have planned the size of your pond and chosen the location, the next step is to decide which type of liner to use. There are several types of liners you can use for garden ponds. **To attract wildlife, polyvinyl chloride liners are the best choice.**

### ***Polyvinyl chloride (PVC)***

This is the most popular choice for ponds. The material is very flexible and durable, and conforms easily to any shape. If you do not buy a liner that is made specifically for ponds, make sure the words "fish friendly" appear on the packaging or the liner itself. Other types of plastic might give off chemicals toxic to plants and animals.

The thicker the liner, the longer it will last. A 45-mil liner lasts up to 50 years, 32-mil lasts 20 years, and a 20-mil liner lasts 7 to 10 years.

Use a black or dark brown liner so it is less visible when the pond is filled with water. Lighter-colored liners will give your pond the look of a swimming pool.

### **Concrete**

This type of lining is rigid and difficult to build. Concrete requires on-going repair to

any cracks and crumbling that may occur. It also must be leached before you can introduce fish and plants. This type of lining is generally not very practical. We do **not** recommend concrete for wildlife ponds.

### ***Molded fiberglass***

This liner is impractical for most garden ponds. It is expensive, heavy, and difficult to install. We do **not** recommend molded fiberglass for wildlife ponds.

### ***Prefabricated polyethylene shell***

These liners are durable and easy to install. But, their slopes can be steep and slippery, so they are not good habitat for wildlife. They are more expensive than PVC liners. We do **not** recommend prefabricated polyethylene shells for wildlife ponds.

### ***Butyl rubber***

This is similar to PVC, but more expensive. We do **not** recommend butyl rubber for wildlife ponds.

### ***Kiddie pools***

These are too shallow and may contain toxic chemicals. We do **not** recommend them for ponds containing wildlife or fish.

## Installing a PVC liner

### ***How much do you need?***

You can figure out how much liner you need with the following method:

Multiply the depth of the pond by three. Add that figure to the length and to the width. This will allow enough material for an apron around the edge of your pond.

For example, suppose your pond is 15 feet long, 10 feet wide, and 2 feet deep.

$$3 \times 2 \text{ ft} = 6$$

$$15 \text{ ft long} + 6 = 21 \text{ ft long}$$

$$10 \text{ ft wide} + 6 = 16 \text{ ft wide}$$

You need a piece of liner 21 feet long and 16 feet wide.

## **Excavation**

Mark out the shape of your pond with stakes and string, paint, chalk, or a garden hose. If your pond is small, or you don't mind lots of physical labor, you can dig the pond by hand. Otherwise, you can hire someone to dig it for you with a backhoe (look in the Yellow Pages under "Landscape Contractors"). Be sure the place you've chosen for your pond is accessible to machinery.

Before you break ground, decide where you want the excavated dirt to go. You can use it to landscape around your pond or somewhere else in your yard, or you can haul it away. Put the dirt on tarps to make moving it easier or if you want to protect grass.

## **Preparing the hole**

After the hole is dug, make sure the perimeter is level. You can place a level on top of a straight board. Or, use a water level if your pond is too wide for a board.

Remove any rocks or other sharp objects that could puncture the liner. Then, add 1 to 2 inches of damp sand on the plant shelves and bottom. You can put old carpet or newspaper on the vertical surfaces to help protect the liner also.

## **Placing the liner**

Spread the liner out in the sun for about an hour before you install it. It will be softer and easier to work with.

It's easier to place the liner with two people. Place the liner over the excavated hole with overlap equal on all edges. Let it sag naturally into the bottom. Put bricks or rocks on the outside edges of the liner to hold it in place.

One person takes off her or his shoes and gets inside the pool, while the other person adjusts the rocks holding down the liner to make sure the liner fits snugly against the ground. Together, fold and tuck the liner to make it as smooth as possible and to reduce the number of wrinkles. Don't worry about removing all the wrinkles. They won't harm the liner.

## **Filling the pond**

Place the water hose on the liner so the center fills first. As it fills, the water will pull the sides down. Eventually, the liner will "hit" the plant shelves and sink to the bottom, gradually filling in all the contours. While the pond is filling, keep checking the bricks or stones to make sure they are sliding evenly.

If you use chlorinated water, use a dechlorinator, or let the water sit for 2 or 3 days so the chlorine can evaporate before you introduce wildlife or vegetation. Stir the water vigorously with a stick to speed up evaporation.

After the pond is full, let it settle for a day. Then, install your edging and trim the apron.

## **Edging**

You can use rocks or stones as edging to make your pond look more natural. They also hide the liner, keep it in place, and protect the liner from ultraviolet deterioration. You can vary the width and length of the rocks for a more natural look, but make sure they are heavy enough to stay in place.

Sandstone, slate, and granite are excellent choices for edging. Do not use limestone. Lime can leach into the water and be hazardous to wildlife.

Put one stone slightly lower than the others. This is where water will run off when the pond overflows.

## **Finishing touches**

Put sand or small rocks in the shallow areas to provide footing for wildlife. A muddy, beach-like area is important for many species of wildlife. Songbirds drink and bathe in this shallow area. Tadpoles, insects, and other aquatic creatures use this area for cover, basking, and nesting. Some nesting birds use mud. Butterflies get moisture and nutrients from mud.

Encourage wildlife to come to your pond by adding vegetation, floating logs, protruding branches, rockpiles, and brushpiles in or next to your pond (Figure 2). Many species use

rocks, logs, and fallen limbs that protrude out of the water as natural basking sites. A ceramic pipe on the floor of the pond creates a hiding place for aquatic species. For larger ponds, you can build a floating platform and anchor it in the middle of the pond.

## Pond plants

Plants are an important part of the wild habitat. They provide cover, oxygen, relief from hot or cold, and breeding sites for wildlife. They also provide food and habitat for the insects and other invertebrates that animals eat.

### What to plant

Include a mix of submerged, floating, and marginal plants in your pond (Table 1). Submerged plants grow completely under the water. They release oxygen into the water rather than into the air. Submerged plants provide egg-laying sites, hiding places, and food for a variety of aquatic organisms.

Floating plants also provide excellent habitat for wildlife.

Put marginal plants around your pond and on the plant shelves. They soften the edge of the pond by camouflaging the liner, and create a transition between the water and the edging. They also make a barrier against cats, raccoons, and other land predators.

Put in native plants. They are more familiar to wildlife and are well adapted to the environment. Many non-native species, such as purple loosestrife (*Lythrum salicaria*) and reed-canary grass (*Phalaris arundinacea*), are invasive and aggressive and will out-compete other plants.

The best ratio is half plants to half open water. No more than 65 percent of your pond should be covered with plants during the summer months.

### Algae

Plants help control the growth of algae by shading out the sun. Algae creates oxygen and food for tadpoles. It establishes itself in your pond using nutrients and sunlight. But, too much sun or nutrients (such as decayed vegetation or fertilizer) can cause outbreaks of algae called “blooms.” Algae blooms also

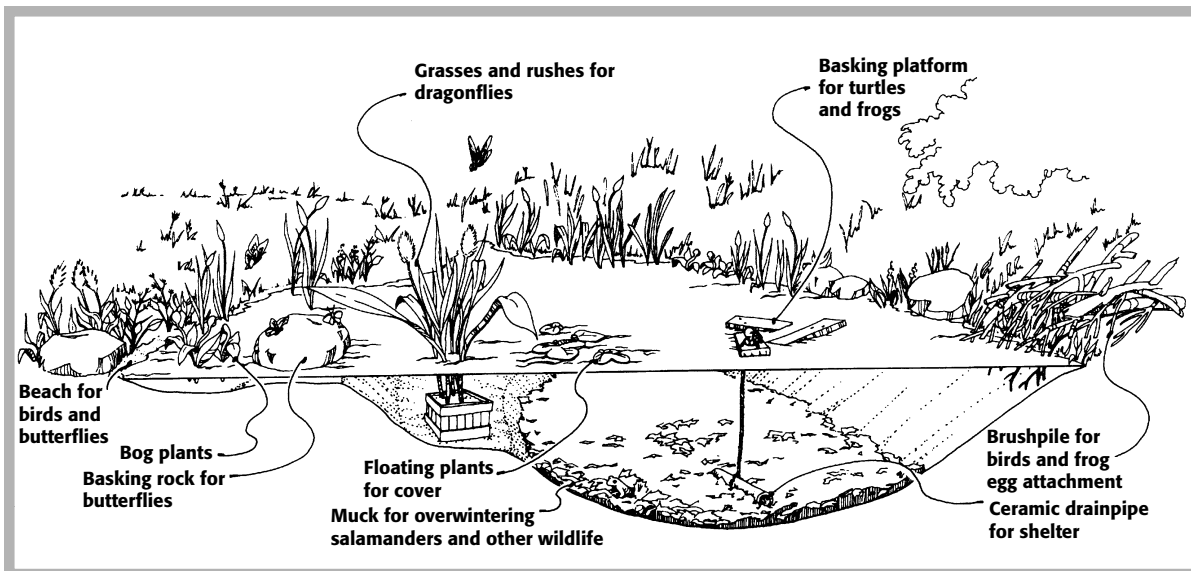


Figure 2. Habitat features in and around a pond.

(From: *Landscaping for Wildlife in the Pacific Northwest*, University of Washington Press and Washington Department of Wildlife.)

occur in new ponds and in the spring before plants get big enough to shade the water. If algae blooms persist, you might need to clean your pond or plant more vegetation.

### **Taking care of plants**

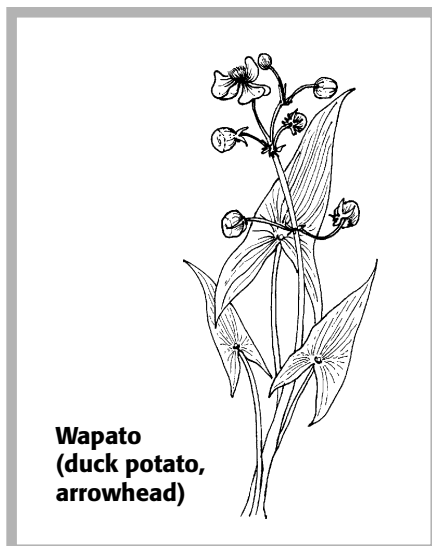
You can make it easier to take care of your pond if you pot the plants in plastic containers. It's simpler to thin, replant, and winterize the plants. Fall is the best time for this. Thin plants if they become too big, or replant them in larger containers. Winterize plants by bringing them inside to stay green *or* putting them in a protected, dark place to go dormant for winter.

Put a heavy rock in the bottom to keep the pots upright. Fill them with regular topsoil or a mixture of ¼ sand, ¼ compost, and ½ garden loam. Be careful not to use materials that float (such as vermiculite or perlite), or you will have a big mess. Put 1 or 2 inches of coarse sand or pea gravel on top of the potting mix to keep the soil in the pots.

## **Wildlife**

### **Introducing species**

To keep your pond healthy and diverse, you need to include microscopic life and small invertebrates. An easy way to introduce them



**Wapato  
(duck potato,  
arrowhead)**

into your pond is to collect a bucket full of water and mud from a local pond that appears to have a healthy ecosystem, and dump it into your pond. Soon, your pond will establish its own microscopic and invertebrate life.

If you introduce fish, you reduce the number of wildlife species that can survive. Fish eat eggs and larvae of amphibians, dragonflies, and other aquatic species.

Even if you stock your pond with native wildlife species, the habitat you have created may not be suitable for them. You might be putting them at risk if they decide to leave. Or, worse yet, they could die if the conditions are not right. It's best to let wildlife, including reptiles and amphibians, find your pond on their own.

If you are thinking of introducing fish or other species to your pond, contact your local office of the Department of Fish and Wildlife for information on native species.

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### **Table 1. Native plants for ponds.**

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#### **Submerged plants**

Coontail, *Ceratophyllum demersum*  
Elodea, *Elodea canadensis*

#### **Floating leaf plants**

Water fern, *Azolla mexicana*  
Watershield, *Brasenia schreberi*  
Duckweed, *Lemna minor*

#### **Marginal plants**

Great water-plantain, *Alisma plantago-aquatica*  
Inflated sedge, *Carex vesicaria*  
Spike rush, *Eleocharis palustris*  
Wapato (duck potato, arrowhead), *Sagittaria latifolia*  
Hardstem bulrush, *Scirpus acutus*  
Wool grass, *Scirpus cyperinus*  
Small-fruited bulrush, *Scirpus microcarpus*  
Soft-stem bulrush, *Scirpus validus*  
Cattail, *Typha latifolia*

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### **Travel corridors**

To attract and maintain a breeding population of amphibians, your pond should be within ½ mile of another pond or wetland that already has breeding amphibians. There must be an undisturbed, natural pathway from other ponds to yours. This is called a **travel corridor**. Travel corridors are an important element in attracting wildlife.

Because of the barriers to travel created by urban development, it may be difficult for some species to make it to your property. It might take 1 to several years before you see any in your yard. Their ability to move into your yard depends upon whether neighboring landscapes offer safe travel corridors, too.

### **Predators**

Raccoons raid ponds in search of insects, fish, frogs, snails, and turtles. You can put wire mesh around or over your pond to prevent damage. Make sure the holes in the mesh are large enough to let birds, reptiles, and amphibians move freely in and out of the pond. An electric fence also keeps out unwanted animals.

### **Exotic species**

It is illegal to release non-native species. Do not release exotic or pet store species into your yard.

Exotics can be extremely detrimental to native species of plants and animals. For example, the bullfrog eats the young of snakes, frogs, fish, turtles, ducks, and small mammals. This has a very negative effect on their populations.

Furthermore, many exotics die if released. They are not able to tolerate the environmental conditions in the Pacific Northwest.

## **Taking care of your pond**

Caring for your pond could include removing debris, controlling vegetation, and

dividing and repotting plants. The best time to clean and make repairs is in the fall, because you will disturb plants and wildlife less.

You can place netting over your pond to catch falling leaves. Collect floating-leaf plants with a garden rake. Let the collected vegetation sit at the pond's edge overnight, so excess water can drain and any aquatic wildlife can escape.

Don't worry about keeping the pond totally free of leaves. A 3-inch layer of debris settling on the bottom is welcome. It gives wildlife a place to burrow in the winter.

If you keep your pond free from excess vegetation, you might never need to empty it. But, if you do need to empty your pond, make sure you remove plants and wildlife. Keep them in a non-toxic container with pond water or a mixture of 1 part new to 3 parts old pond water.

After you refill the pond, remember to use a dechlorinator, or let the water sit for a few days for chlorine to evaporate before you return the plants and wildlife.

## **Coexisting with pond wildlife**

To help protect and maintain a healthy pond for wildlife on your property, you must establish a successful coexistence between pond species and humans.

1. Do not use chemicals such as fertilizers and pesticides on your property. This is especially important for amphibians, because their skin is extremely sensitive to environmental chemicals. Excess nutrients from fertilizers that get into your pond will cause algae blooms.
2. Talk to your neighbors. Let them know what you're doing and why, so they will be more likely to help protect habitat. Encourage them to create habitat for wildlife, too. You'll increase your chances of attracting it.

3. Teach children about wild creatures, so they will respect and admire them and be less likely to harass or harm them. Make sure they understand not to play in the pond, for their own safety and the health of the wildlife there.
4. Protect wildlife from pets. Cats and dogs often attack wild creatures. Either train your pets, or keep them in restricted sections of your property.
5. Instead of using fish to help control mosquitoes, place bird and bat boxes near your pond. Other species that eat mosquitoes or their larvae are dragonfly larvae, water striders, snakes, toads, and frogs.

The more habitat features you have on your property that provide food, water, and shelter, the more likely it is that you will attract and maintain wildlife there. Enjoy the beauty you have created and the excitement of watching the wildlife that comes to your new garden pond.

## For more information

### **OSU Extension publications**

See these other publications in The Wildlife Garden set:

*Attract Hummingbirds to Your Garden*,  
EC 1541 (2002). \$1.50

*Attract Reptiles and Amphibians to Your Yard*,  
EC 1542 (2002). \$2.00

*Create a Butterfly Garden*, EC 1549 (2002). \$1.50

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### **Other publications**

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