



Water Gardening: Getting Started

In the world of landscape, nothing is more continually interesting than a water garden. Water features attract birds and other wildlife while stimulating the senses with the sound of gurgling water. Enjoyment of plants and fish, and aesthetics created with beautiful accents and landscaped surroundings, make water gardens a year-round focal point in a landscape.

Pond maintenance should not be a deterrent. It is relatively simple. If well designed and installed, a pond should create few problems and provide years of enjoyment. Once the pond's ecosystem is in balance, the water garden becomes easy to maintain. Plants are the key to success, but water quality begins in the planning stage.

Design depends on space and the water gardener's lifestyle. Is the goal to pursue an interest in aquatic plants or raise fish? Garden-pond friendly fish such as goldfish, comets, and

shubunkins are compatible with aquatic plants and smaller water gardens. Fish consume oxygen and give off carbon dioxide and ammonia, eat insects, and stir the water — all of which play an important role in the pond's ecosystem.

Koi, on the other hand, often eat plants and burrow into pots. The filtration system and pond size will need to be enhanced if the goal is keeping these larger, more aggressive fish.

Water Garden Construction: Planning and Layout

Locate the pond where it will provide the most enjoyment, such as close to the living area or in good view from the home. Most flowering aquatics require a minimum of 4 hours of direct sun for optimum growth and blooming. A shaded area is good for fish pools and streambeds or small ponds. Large trees near the pond can

provide needed shade but also can become a maintenance problem in the fall when leaves drop.

The pond should be built with slightly raised edges so lawn runoff does not empty into the pool, carrying chemicals toxic to plants and fish. Soil grading may be necessary to allow pond overflow to escape and drain from areas around the pond in the case of heavy rains.

Accessories such as pumps, lighting, and de-icers need electricity. The National Electric Code requires electrical outlets used for water features to be protected with a ground fault circuit interrupter and located 5 to 20 feet from the edge.

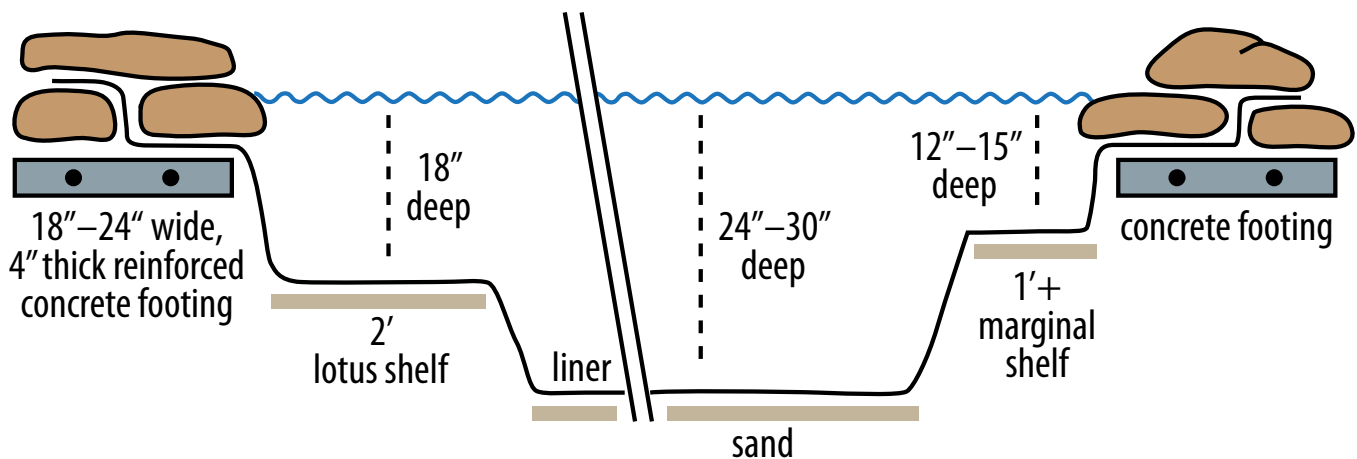
Pond design is a matter of personal taste. The water feature can be formal, informal, naturalistic, small, or grand with multiple levels, streams, and falls. Begin by laying out a preliminary shape. Use garden hoses or rope to determine shape and size.

Allow an 18- to 24-inch margin for the edge of the pond. This allows the liner to overlap the edge and be secured with stone. Avoid sharp curves and angles so the liner lays smoothly. Before digging, stand back and be sure it is the desired shape. Once the pond has been completed, it is difficult to change.

Mark the edge with paint and begin the plan for shelves inside the pond where aquatic plants will be located. Shelves should be a minimum of 12 to



Pond profile



18 inches wide to accommodate pots. They can be dug at different depths, depending on plant requirements. Mark shelves with paint and determine where footings will need to be excavated for waterfalls, pump placement, and skimmer, if used. The garden pond will need a deep water area at least 24 to 30 inches deep for overwintering plants and fish. This area also keeps water cooler in the summer. Hardy water lilies live at this depth year-round.

A marginal shelf 12 to 18 inches deep will hold shallow or bog plants. If large lotus plants are in the plan, a shelf 18 inches deep and at least 2 feet wide will be needed. Always dig the hole before buying the pond liner.

Excavation

Before you dig, call 1-800-DIGSAFE and request flagging of underground utilities.

Dig a rough version of the pond. Remove the soil, taking out no more than needed. It is not a good idea to remove soil and then try to add it back. This results in sunken spots as water weight compacts loose soil.

Since water seeks level, take time to make sure the water level and depths are where you want them. Do not cut corners in excavating. Use a laser level or a wooden two-by-four and a 4-foot level to level the pond. Construct

the margin with a poured reinforced concrete ring to give a solid footing for the marginal stone. This will insure stability and prevent erosion.

After pouring the concrete ring, remove the forms and fine tune the excavation. Smooth and level the pond base and shelves. Shape sides at a slight angle toward the outside and remove stones, roots, or sharp objects from the dug pond. Cover the bottom with enough sand to fill shovel divots and level. Cover with a sheet of underlayment fabric bringing it up the sides as needed on the walls.

Sizing and Laying the Liner

Use the following formula to determine the size of liner needed, adjusting for hills and waterfalls:

- Pond length (widest spot) + $(2 \times \text{depth}) + 2 \text{ feet} = \text{liner length}$
- Pond width (widest spot) + $(2 \times \text{depth}) + 2 \text{ feet} = \text{liner width}$.

Water garden liners are made of 40 to 45 mil flexible, UV-treated rubber. They can be purchased from garden centers that carry or specialize in water garden supplies.

Carefully lay the liner in the pond, giving it plenty of slack. Be sure the liner overlaps the margin evenly and fits into the corners. There will be folds in the liner, but they can be minimized by making a few larger

folds out of view. This will be less obvious than numerous smaller folds.

Begin filling the pond with water. As the water level rises, continue making necessary folds, smoothing the liner. Lay the stone border, bringing the liner slightly higher than the grade of the surrounding ground. Raise the border by putting a layer of stone down first, then the liner and another layer of stone. Be sure the liner is in place and secure before trimming liner edges. Ponds also can be made of plastic or fiberglass preformed liners or concrete.

Experts disagree on whether or not to add decorative rocks in the bottom of ponds. Generally, they are attractive at first, but as the pond naturally grows bacteria and debris accumulates in the bottom, rocks are covered and become invisible. Rock in the bottom makes dredging (cleaning) debris difficult and complicates maintenance.

Sizing Pumps and Filters

Circulating water helps add oxygen and creates interest. Housing areas for the pump can be built into the pond as well as waterfall reservoirs. The tubing from the pump to the falls can be placed either inside or outside the pond. Pump size will depend on water volume and the height and distance it travels. To estimate how many gallons of water there are in the pond,



Digging the hole



Laying the liner



Placing the large rocks



Placing the small rocks



Filling with water



The completed pond with mature plants

multiply, using feet (average length x average width x average depth) $\times 7.5 =$ gallons of water.

Below are guidelines to help determine what size pump to purchase for a waterfall to circulate the water. The goal is to turn the volume of water one to four times per hour. Pump selection is also determined by how much water flow is necessary to meet visual requirements. For pump sizing specifics, contact your local water garden store.

Take the full width of waterfall in inches and multiply it times one of the following:

- ¼-inch water flow depth (trickle), 50 to 75 gallons per hour
- ½- to ¾-inch water flow depth (low flow), 100 to 150 gallons per hour
- 1- to 1½-inch water flow depth (high flow), 200 to 300 gallons per hour.

Water can travel through filter systems made of shredded plastic, fiber mesh sheets, or lava rock. All work well and often in combination. The difference is weight, the amount of surface area and how long it will last.

Filtering systems are designed to reduce pond maintenance. Skimmers and filters keep the water clean and allow for growth of beneficial bacteria. Plants make excellent filtration systems by using excess nutrients and shading the surface of the pond to prevent algae growth caused by photosynthesis.

Ponds can be constructed with waterfalls, streams, biofilter systems, pumps, and fountains depending on how elaborate a pond is desired. Equipment for do-it-yourself construction can be purchased from companies that specialize in aquatics.

While designing the water garden, plan for landscapes surrounding the pond. Go for texture and year-round interest. Ornamental grasses, small trees, and colorful flowers and foliage can truly enhance the pond experience.

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