



# **Water Gardening in Containers**

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# Introduction

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Few of us can resist the natural attraction of water. Whether in a still pool reflecting the summer sky or the tinkling rush of a stream, water provides a cool oasis in our busy world. Gardening magazines are full of beautiful pictures and elaborate plans for creating ponds, streams, and even waterfalls in your backyard, and bookstores now have whole areas in the gardening section devoted to water gardening. With good reason. Water gardening is relatively simple, and once your water feature is set up, it is very easy to maintain. This is probably the only type of gardening that rewards you more for doing less. Water gardens suffer no weeds and few pests; additions from the world outside the garden are usually welcome. The downside is that most in-ground water features require yard space and a significant commitment of time, effort, materials, and money to do the job right.

So it's no wonder that, just as with soil gardening, most beginners wish to start small, with a more modest investment of their resources. And container water features are the best alternative for these beginners, as well as for people without yards who still wish to garden. A container large enough to hold a couple of plants and a few fish may be placed on a patio, on a porch or deck, on a sturdy table by a sunny window, at ground level, or even on a balcony or rooftop. It will support your favorite water plants, marginal and bog plants, and even fish. And because container water gardens present their own set of challenges, even experienced water gardeners may find this style of gardening interesting.



*A typical container water garden has room for plants and even fish.*

# Basic Considerations of Climate and Weather

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Large, in-ground water features have a couple of advantages over tub gardens: weather and water volume. Even in northern climates, a pond can sustain hardy plant and animal life throughout winter. This is because the pond usually won't freeze to the bottom, so plants that rest on the bottom will survive. Fish will become dormant and spend winter safely hidden below the ice and snow. And during the rest of the year, the larger volume of water in a pond will keep temperatures more consistent. Sun striking a small garden pond will heat it up much more quickly than it would heat a lake, and a lake's temperatures rise more rapidly in the summer sun than an ocean's do.

Containers, which are situated above ground and lack insulation, hold little water. During winter they may freeze completely. And because of their small size and water volume, containers cool more quickly at night and heat up more quickly during the day.

As you begin to stock your container garden, keep these cautions in mind. With a little preparation, hardy water plants can be overwintered. Or treat your container garden as an annual garden, emptying it in fall and restocking in spring. While this is more expensive, you do get to experiment with many different plants this way.

In water gardening, as you can already see, an appropriate and fairly consistent water temperature is every bit as important as soil temperature is to regular gardening. Water plants will suffer and many die from exposure to inhospitable temperatures. Water gardening in smaller containers should not be started until outdoor water temperatures stabilize at 60°F and above, well past danger of frost. Mail-order houses ship their plants to purchasers on a dated schedule based on average "safe" temperatures at the plants' destination. And since many local garden centers get their plants from the same mail-order sources you can, they may not have plants available until it is safe to use them.

# Choosing a Site for a Container Water Garden

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You can, of course, move your container water garden from season to season, but once you fill it with water each spring, that is where it should stay. It will be way too heavy to budge once it is filled, and emptying it to move it is very disruptive. You may already have a site in mind. Good. A few simple siting guidelines will ensure your success.

Most water plants require a minimum of 6 hours of sunlight daily. Wherever you site the water garden, make sure that it gets at least this much sun. If it gets less, some plants, especially water lilies, may not flower; others will not thrive. A location with late-morning and early-afternoon sun is generally the best for all plants within a feature. And the plants will do better if the container itself is not turned often, but is maintained in the same relative position to the sun.

As you look now for that sunny spot to place your container, consider the availability of water. You will have to fill the container, and then you may need to replenish its water often; in the heat of summer, the effects of evaporation will require almost-daily replenishment of some water in a feature of any size. If your container is truly small, this is no big deal. You will not need running water immediately adjacent to the container, though a hose will aid in cleanup. But consider a half barrel, the ideal container for a first experience: If placed in full sun, it may lose nearly a gallon of water a day. Maintaining a proper and consistent level of water is critical for plant life. The smaller the container, the greater the effects of loss of water level. So choose a site your garden hose will reach, if at all possible.

If you plan on lighting your water garden, adding a small fountain or waterfall, or using filters to maintain water quality, you will need access to electricity. And since water and electricity do not mix, the electrical circuit should have a ground fault circuit interrupter (GFCI). Under no circumstances should ordinary household extension cords be involved in the circuit. Not only are they dangerous, but they are un-sightly and can become a tripping hazard as well.

A water feature is best placed in a secure spot. Steps or ledges do not fit my idea of an accident-free location. If you are planning on adding a container water garden to your deck, make sure the deck is strong enough to support the container, all that water, and the plants. The surface on which you place a tub garden should be flat and must be level. And depending on the size of your container, keep in mind that it can be tripped over, kicked, stumbled upon, and otherwise disturbed by running children or unwary adults. So again, choose your site with care.

Consider safety when placing even the smallest feature, and then be watchful when children are near. Water, especially if it contains fish and other aquatic life, is even more attractive to children than to adults, and any water feature, no matter how small, presents a hazard to children. Those same children can also be a danger to your pond: In a small container, fish and snails cannot get away and may not be able to hide, and water plants of all sorts are easily damaged by being tugged, removed from the water, sunk, tipped over, or any of the other things a curious and active child can dream up. Supervision is the key. Also, check with your town officials. Although container water gardens are usually regulation-free, some towns have begun regulating garden ponds.

Any water feature is of more than passing interest to animals. Some, like frogs, turtles, and snails, are welcome additions. But be prepared for the questionable deeds of other animals and birds. Regardless of location, urban or rural, critters will find ways to slake their thirst and satisfy their hunger. Perhaps those in high-rise apartments will feel themselves secure against the squirrel, but birds are to be reckoned with anywhere. Animals all seem to delight in playing in water and even tipping an unstable container. There is plenty of technology available to help you

control incursions should your patience be worn thin by pesky varmints.

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# Selecting a Container

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Any watertight container can become a water feature. The first step in choosing a container is to decide what you want in it. A birdbath, an old crock, even the lid of a plastic trash can — all can become tiny water features in your yard. If you want a couple of plants and maybe a fish or two, however, bigger is better.

Your container must meet a few simple criteria. It should be deep enough to support water plants and maybe fish, it should have a surface area large enough for plants to spread out, and it should hold a large-enough volume of water to make day to night temperature swings moderate (a bare minimum of 10 gallons). It should be both sturdy and steady, waterproof, and should not hold any residue of past contents that might harm your garden. A half whiskey barrel, for example, has approximately 16 inches of depth with some 600-plus square inches of surface area. It holds nearly 30 gallons of water, so its various dimensions provide sufficient volume to support a respectable number and variety of plants — and animal life, too.

There are many other containers that generally meet the criteria I have described. There are plastic containers in great variety, though often developed with soil gardening in mind. Occasionally container designers have placed design elements before user needs. The increased popularity of water gardening has resulted in the production of plastic containers that match the half barrel closely in shape and form, though most I have seen are still missing an important characteristic or two. Some have shelves for plants that require different water depth — a handy feature, but one that sacrifices water quantity. Clay and terra-cotta containers are best sealed or lined before use, and that is a messy task. Your garden supply house can indicate the best specialty product for this purpose. If you choose clay, do seal it both inside and out, or the pot life will be significantly reduced. Most ceramic containers with a sealed surface will work well if all other factors are the same. My fear is that most ceramic containers are a bit fragile. Do not use any transparent container. Avoid containers whose top opening is narrower than the rest of the container. Such an arrangement restricts the light and air striking the water surface. The sun needs to work its magic on both water and plants. Should you come across a redwood or cedar container that looks good, put it out of your mind unless it can be lined somehow. Fresh redwood oils are hazardous to plant life, and cedar deteriorates ever-so-quickly.

The unspoken requirement of the container for your water feature is that it look good to you. No one can make it do the job or look good if you just don't like it.

## ***The Half Barrel***

Although they are now manufactured directly for the home garden, half barrels were traditionally recycled oaken wine, whiskey, or other alcohol casks that had been cut in half, creating two open tubs. Originally designed to hold liquids, they are ideal for water gardens. They are made from tightly fitting wooden staves held in place by three iron bands that circle the outside. They have relatively long lifetimes given reasonable care, and are available almost everywhere at a reasonable price.

Half barrels are flexible water features. Being wood, they allow other devices to be attached to them, inside or out. They are stable and resist tipping. Their inside bottoms are flat, so plant pots can be located anywhere on their significant bottom surface. A good one will have originated from a whole barrel with a bung hole at its immediate midsection. This hole is where the barrel was tapped for draining. When the barrel is cut in half, the resulting half of a bung hole provides a good overflow valve. Few other containers have this range of useful features.

Fortunately, the half barrel's popularity and resulting general use have prompted manufacturers to develop a companion plastic liner, which effectively eliminates the half barrel's worst attributes — leaking and contamination from past contents. The liner makes it possible to avoid nearly all barrel preparation, a real boon. I recommend its use to any beginner or other person with limited space for preparing a half barrel for use.

## Finding a Half Barrel

While most garden stores and variety merchandise outlets carry wooden half barrels, not all those barrels have the same quality. When you go shopping for one, evaluate the half barrels closely. Pose the following questions to yourself, and to the vendor too if necessary:

- Is the container truly an oaken half barrel? Because of their mushrooming gardening popularity, many half barrels are manufactured as garden containers. Some of these are quite satisfactory, especially if you use a liner, but others are clearly more decorative. Make sure that the barrel will suit your purposes.
- Is it more suitable for regular garden plantings, with drainage holes already present?
- Was a full barrel cut in half so that one half of the bung hole is present in each barrel half?
- Does the barrel bottom appear level and without major cracks?
- Is it level across the top?
- Do the staves form a reasonable circle on top?
- Are all three encircling steel rings in place?
- What does it smell like? Some barrels have the rather distinct odor of their previous contents! That will be gone rather quickly once water is involved. But don't pick a barrel with any oily smell or obvious coating. An unknown residue can kill your water plants easily.

## Preparing the Half Barrel

Once you have a barrel, you need to decide how to prepare it. The simplest way to prepare the barrel is to use a liner, and instructions for installation will be included with the liner.

If you want to use the barrel *sans* liner, proper preparation is required. Let's hope you have been fortunate enough to have purchased a half barrel that's almost ready for water. There are some out there! But if it is obvious that your barrel does need work, find a level place that can stand a good bit of dirt and water. Turn your half barrel bottom-up. If your barrel is very dry, watch out that staves do not release and cause the barrel to collapse. This may be a problem for barrels that have been sitting around for a while.

Examine the steel bands. On the two bands nearest the open end of the barrel, take out all the little T-shaped pins used to hold those bands in place. There are usually three pins in each band. Save the pins! If they are missing, be ready to replace them later with something else.

Using a flat-bladed chisel and a hammer, drive the two bands down on the barrel (toward its actual top), doing it so that they remain evenly spaced up and down and around. Don't be tempted to drive or force the bottom band up off the edge of the half-barrel bottom very far, but make sure the other two bands go as far toward the top as is reasonably possible. This tightens the staves

against each other so that, when the wood expands as it gets wet, it creates a watertight container.



*A half whiskey barrel makes a great water feature container. This one has a liner, which eliminates most of the work of preparing for planting.*

Now turn the barrel over on the level surface. Lightly tap on the individual staves with a hammer to make sure they are flat against the bands. They should form the best possible circle. Watch that none of the bands slips down. If any staves should loosen significantly, turn the barrel over and drive the bands down again.

Now locate the holes in the bands where the T-pins were and replace all those that you removed, or insert something else like them. This will keep the bands in place even when the barrel dries out in the off season.

Use a wire or other stiff brush to clean the inner surface, loosening the charcoal-like material that coats most half barrels. Do not run any tool up and down the cracks between the staves; this might actually create more problems getting the barrel sealed. Then dump that residue out. Fill the container with water. The barrel may leak profusely, or it may just drip a bit here and there. That's to be expected, since the staves are probably pretty dry. They will swell with the liquid they absorb during this and following actions. Keep filling until the leaking stops. Be patient! This could require a number of fillings.

Throw a few handfuls of good fine dirt into the water and stir it into a solution. This will speed the sealing process. Expansion of the staves through absorption will go on, perhaps for as long as 36 hours, ultimately sealing the container.

Once the leaking stops, tip the barrel and empty the mess out (more charcoal material will probably have come loose). Take the brush and clean off as much additional black material as you can. You will not get it all, but make a good effort to get the loosened crud off the sides and bottom. The charcoal will not harm anything later, but it is un-sightly. On any one of these refills, add 1/2 cup of household ammonia or bleach to dispel any persistent wine-sweet odor. Stir the solution around and empty the barrel once again. Rinse the barrel thoroughly, then move it to its chosen location.

Refill the container and let the new water season or age for a day before you add any plant or animal life. Keep checking for new leaks. If there are none, you are ready to move on. Do not hurry the process. It's a far bigger problem to deal with leaks after plants and animals have been added.

# Selecting Plants for a Small Feature

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You might want to visit a water garden plant supplier, and if you see something that looks good, just get it. A better idea is to look at pictures of water gardens and decide which of the hundreds of plants you especially like. Then make sure they will grow well in a container water garden. Make a list of possibilities and then visit the source or sit down with a catalog.

Start with three or four plants. If you really want more than that, consider planting the marginal and bog plants in separate containers and placing them adjacent to your main water garden. And don't be seduced by the exotic — especially if you're a first-time water gardener. There are hundreds of easy-to-grow water plants, all of which are common precisely because they're lovely and easy. If you find you love water gardening, you can always explore the unusual as you gain experience and have a chance to see what works well for you.

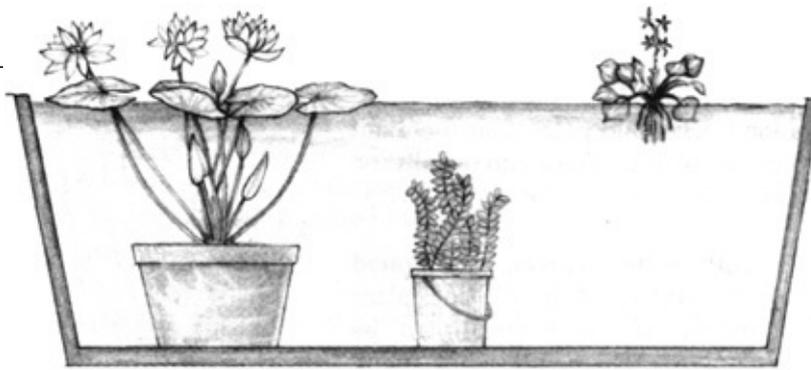
You may find that your local garden center has a limited selection of water plants, mostly geared toward the larger water garden. Don't despair of getting what you want. Simply consider catalog shopping. I have had extraordinary luck with mail-order water garden suppliers (they even mail fish!). And because the catalog suppliers are generally larger than your local garden center, they may offer better guarantees, as well as a larger selection. Some mail-order suppliers even offer complete kits, including the container, plants, pots, and fertilizer, not to mention fish and snails.

Don't forget the possibility of meeting some of your needs by using native plant life. If you do harvest from the wild, check with property owners and local environmental authorities before you collect. Do follow good environmental practices if you choose to claim any plants from a rural ditch or pond. And be aware that you could contaminate your water garden with pests, diseases, and other problems if you collect from nature. You might also contact other water gardeners in your area (there may even be a club; check with your garden center). They may have plants for sale at very reasonable prices. In a year-round water garden, water lilies, poppies, marginals, and other hardy plants will multiply, and gardeners may have enough to give some away, or to sell some.

Water garden plants come in four categories. **Bog** or **marginal plants** like having wet feet, but should not be completely submerged. **Floaters** do just that: float on the surface, with their roots hanging down in the water. **Aquatics** have their bases completely submerged and send leaves and flowers to the surface. These include primarily water lilies and lotuses. The fourth type is the **oxygenators**. They are usually planted in containers placed on the bottom of the water feature, and most live entirely underwater. They add oxygen to the water while acting as living filters.

## ***Marginal or Bog Plants***

**Arrowhead, dwarf** (*Sagittaria* spp.). A hardy bog or shallow-water plant, 12 to 18 inches tall, useful for filling the background of a feature. It needs a 6 inch pot, though a smaller pot can be used to restrain its size and growth. It is usually sold already potted. The plant crown should be situated just below the water surface. It does well in shade, and has beautiful foliage. But for good flowering (white, in late summer) it needs sun. It can be wintered over. New-season growth (turions) may sprout from last year's seeds. The larger varieties are useful as a companion plant and can sometimes be found in road ditches and on the margins of farm ponds.



This container features three of the four types of common water garden plants. On the left is a water lily (an aquatic) in a large pot. In the center is an oxygenator, which stays submerged. And on the right is a floating plant. Floaters are decorative, but they can also be oxygenators and often provide excellent breeding grounds, in their trailing root systems, for fish.

**Cattail, dwarf** (*Typha minima*). A 15 to 30 inch tall, hardy bog or marginal plant that can exist with its crown set at or 2 inches below the surface. It makes a good background plant, though it's not too showy until it produces the brown catkins, which are a stubby wiener shape. It is usually sold already potted in at least a 4-inch pot. It can be wintered over when kept above freezing.

**Cattail, common** (*Typha latifolia*). Hardy, with tall foliage (2 to 5 feet), it is almost too big for any container suggested herein. Instead, plant in a 5-gallon bucket and place near the main container feature. These can usually be found in any rural ditch!

**Four-leaf water clover, variegated** (*Marsilea mutica*). A hardy bog plant (*M. drummondii* is tropical), to be planted at a 2 to 6 inch depth. Usually sold bareroot, needing a 3- to 4-inch pot. It can be slightly invasive. Beautiful bicolor or single green foliage, often with some leaves that stand above the water's surface, spreading rapidly on their own from the base. Takes up some room, but it's a real display of the good luck icon. The hardy variety may be wintered over. A good choice for many containers.

**Papyrus, dwarf** (*Cyperus isocladius*). A tall (12 to 28 inches) multispiked plant with "mop tops" for what passes for blooms. The dwarf variety is a great addition to any grouping of plants when used in the background. It's usually sold in 4- to 6-inch pots. It forms new plantlets in addition to normal spreading at its base. It winters over nicely as a houseplant.



Common cattail

**Pickerel rush** (*Pontederia cordata*). A hardy, common sort of plant with 1 to 2 feet deep green

foliage. It should have 2 to 6 inches of water over its crown. It is a multi-blooming beauty, though a little big for anything but companion containers. It winters over easily if kept damp and from freezing.

**Rainbow plant** (*Houttuynia cordata*) 'Chameleon'). Hardy; can be planted at surface level in a small pot, producing bluish green, cream, gold, and carmine red leaves. It is a difficult bloomer, but can be brought inside in winter. Best as companion plant. Usually sold as a potted nursery plant.

**Sweet flag, dwarf** (*Acorus gramineus*). A hardy, iris- or reedlike plant, 9 to 18 inches tall, which needs no more than a couple of inches of water over its base. Sometimes it's sold as near-bareroot stock, but it's best purchased potted. Overwintering is possible. A good addition to a container, though not flashy. Variegated forms are also available.

**Umbrella plant, dwarf** (*Cyperus alternifolius*). A beautiful, 12 to 18 inch tropical plant with spiked, reedlike stems topped with whorls of green. A recommended tall addition as a background. Usually sold with at least a 6-inch pot. It can be overwintered as a houseplant. May be split or further propagated like a spider or papyrus plant.



Pickerel rush

## ***Floating Plants***

**Azolla or fairy moss** (*Azolla caroliniana*). A small floater, producing lacy green foliage only. It changes to an attractive brownish orange color in fall as daylight hours diminish. A must in any container. It will, however, quickly overgrow the surface and need to be thinned. Just scoop out a handful and dispose of it on your compost pile. Must be replaced annually in most cooler zones. Sold by the cup or handful!

**Duckweed** (*Lemna minor*). A perennial native; a very small, light green floater. Will overgrow the surface of containers. Sold by the handful, or may be found on the surface of many rural ponds. If you get it from a natural situation, be sure to wash it clean of any small predators. If you keep koi, it is great food.

**Salvinia** (*Salvinia rotundifolia*). A small tropical floater with two opposing rows of leaves. It is larger than duckweed and azolla, but will overgrow the surface much like them. Sold by the cup or handful. Salvinia also acts as an oxygenator.

**Water lettuce/shellflower** (*Pistia stratiotes*). A tropical floater, with long hanging roots that will anchor on a soil bottom if allowed. No blossoms, but the foliage itself looks like a green flower. Container size will restrain growth somewhat. Propagates on its own, with little babies shooting out from larger plants. Once it gets going, it will need to be removed to prevent crowding the surface. A

recommended addition to any-size container — I've even kept one in a brandy snifter for several months. When immature, it has some trouble with a full day's sun. Sold individually.

**Water hyacinth** (*Eichhornia crassipes*). A tropical floater that needs 15 inches of water depth to allow its drooping roots to spread down and, if any soil is present, to anchor itself. If anchored in soil it will bloom readily and beautifully. It can take up quite a bit of room, a factor that has discouraged my use of the hyacinth in smaller containers. And it grows like crazy! In temperate regions, this plant is incredibly invasive, and laws restrict its sale and shipping over state lines. It is shade tolerant and its roots are a good fish-breeding medium. Sold individually.



Water lettuce

## ***Aquatic Plants***

**Water lily, hardy pygmy** (*Nymphaea* spp.). A relatively small plant requiring 9 to 15 inches of water over the planting medium, and lots of sun for blooming. A 9 inch square by 6 inch deep crate for planting is a must. The leaves and blossoms rest on the water surface. Flowers are white, yellow, pink, red, or variable ('Paul Hariot' changes from yellow, when it opens, to an orangy red a couple of days later). Regular fertilization is necessary. It is reasonably expensive, with a limited number available. It demands special care to winter over. Lilies usually come with specific planting instructions.

**Water lily, tropical pygmy** (*Nymphaea* spp.). A relatively small plant needing a 9 to 18 inch water depth from its crown and lots of sun. It requires a rather large-size pot for good growth. Its leaves appear on the water surface, but its exquisite blooms stand above water (distinguishing it from the hardy variety). Its breeding is still quite special, with a small but ever-increasing number of cultivars of varying colors. It will do well with proper fertilization. All varieties are difficult to overwinter and so are best treated as annuals. It is quite expensive, discouraging me from yearly replacement. This plant is included only because many new water gardeners will want to have one, even though it's not particularly recommended as part of a first experience.



**Water poppy** (*Hydrocleys nymphoides*). A tropical, needing a 4 to 6 inch crown depth when started. Foliage appears on, or rises just above, the surface, with multiple yellow blossoms peeking out from the glossy leaves. A great plant that's always part of any of my containers! It will spread to the point of needing to be pruned back. Easy to propagate from cuttings. Sold as bareroot stock. I've had some success overwintering this plant.

**Water snowflake/floating-heart/water fringe** (*Nymphoides* spp.). A tropical deep-water plant whose leaves will reach the surface from almost any depth. A 4-inch pot is big enough for a start. Foliage is generally on the water surface, and its multiple blooms stand slightly above the surface. It may be propagated from any rooted section. Runners will seek places to hook onto, so I consider it rather invasive. Floating-heart is sometimes called false water lily or poor man's water lily. These plants are usually sold as bareroot stock. Occasionally found in the rough.

### ***Oxygenating Plants***

**Parrot's feather/water feather** (*Myriophyllum aquaticum*). A tropical, best restrained in a 4-inch pot placed on your container bottom. A prolific and invasive spreader producing beautiful fronds within and outside the container. It is super anywhere and always recommended! Usually it needs to be pruned regularly. It will aid in maintaining clear water and also helps oxygenate the water. Sold by the frond or small bunch. It can be wintered over if it does not freeze.

**Ribbon grass/water celery** (*Vallisneria americana*). A tender grass that will grow in water up to 2 feet deep. It can be potted in 4-inch pots, or will live if anchored in a bit of pea gravel. It has rosettes of green, ribbonlike leaves that will grow to up to 3 feet, depending on water depth. Spreads by forming runners with new plants at the tips. This grass is very common in aquariums and can be purchased at pet supply stores as well as from garden centers and catalogs. If you have an aquarium, you can winter over ribbon grass and have clumps ready for spring.

# General Potting Instructions

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Plants generally come as bareroot stock or potted. If they come potted, make sure there is sufficient pea gravel on the top to keep the soil in, then rinse well and go ahead and add them to your pond.

Which type of pot should you use for bareroot stock and replanting? The pots designed for water gardens look more like baskets with woven-style sides (like plastic laundry baskets). This allows nutrients and oxygen to reach the plant roots easily. Line the baskets with newspaper or burlap before adding soil, to keep the soil in the pot. The pots are a bit flimsy, and unless they're sitting squarely and directly on the bottom, they may lose their shape. The smaller, square ones are a bit easier to establish at varying levels within the container. They do weather well and can be used for several years without replacement.

I would not recommend that you use any clay pot. Better you should use the solid plastic pots that most plants come in from a garden center. These can be found in all sizes. These solid-sided pots are best for marginals and bog plants.

When choosing the size of pot for a particular plant, take into consideration the future size and shape of the plant's foliage and root structure. Some recommendations of pot size have already been provided in the plant listings. Too small a pot will sometimes hinder a plant's natural growth tendencies; too large a pot simply wastes container space.

The diameter of the pot should pretty much match its depth, except for a lily container. Water lilies do better in a pot or crate that is significantly wider than it is tall. Since each plant type should have a separate container, except perhaps for oxygenators, keep the number of potted plants in the pond to a minimum, especially if you will be adding fish.

At this time it's not a bad idea to consider how you are going to maintain any pot at the water level required for the plant it will contain. Most containers used for water gardens do not have shelves (which are built into most in-ground water gardens). The deep-water plant pot is no problem; it will rest on the bottom. But holding a marginal or bog plant to the proper height (the crown should be at or just below the water's surface) does call for some ingenuity. Using bricks or other materials as boosters means that the ultimate water quantity is reduced (you end up with less water). It is quite easy to make a hanger-wire, hardware cloth, or metal support. The holder might even be connected to the pot before you add the plant. Hardware stores carry rolled strips of metal that can be fashioned into hangers. Try to make your support hold the pot level. There are some ready-made devices on the market to assist in this task, but I prefer the homemade devices. Selecting a taller pot can be an alternative way to bring a plant up to its suggested water level, but if you do this, load the bottom couple of inches of the pot with rocks or pebbles; this will minimize tipping and allow you to use less soil for planting.



*A large water garden container with built-in ledges, large and small baskets, bowls, and pots are some options for containers.*

Do your actual potting in a shady, windless area. Direct sunlight will stress the bare roots, and the wind will dry the total plant excessively.

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Once you've selected a pot, regardless of the specimen to be potted you should line that pot with a layer or two of newspaper or burlap, or a single layer of a landscaping material that allows water to penetrate; any of these will keep soil from drifting into the solution. If the pot has a small bottom, I find something small and heavy to place there. An easily tipped pot will cause real troubles in water quality.

A "heavy" garden soil is the best planting medium. Avoid organic matter in any visible form, and under no circumstances should you use a potting soil of any variety (both can foul the water). There is a special ready-made water plant or aquatic medium sold and it has merit, but it's expensive. Completely chemical-free all-clay kitty litter can also be used as a planting medium. Both of these substitutes for garden soil require frequent additional fertilization of the plants, since neither has the mineral content necessary for plant growth. Their value comes from being available to people with no yard. They certainly are less messy!

If garden soil is to be used, locate as dry a soil as possible, or dry it enough to allow it to be screened before use. If it can't be screened, pick out the superhard lumps and all rocks. Prepare several quarts of planting medium — even if you have too much, you can tag it and save it for later. Further prepare each batch of soil by stirring in an additive of no less than a tablespoon of dry, low-nitrogen fertilizer per quart of soil. This will encourage root growth and blossoming, and not just foliage, since nitrogen aids lush leaf growth but does not assist flowering. Place an inch or two of the amended medium in the pot and press it firmly.

Carefully separate and extend the plant's roots as you place it in the pot. Pour the dry or damp soil through your fingers into the pot, filling in around the roots. Maintain the plant crown at the highest pot level. Press the medium firmly. When the pot is full, place it in another container of water, but don't totally immerse the pot. Allow the water to be absorbed. After removing the pot from the water, press the soil firmly around the plant roots again. Do not hurry this stage. If you do not have firm soil, the plant will not anchor itself firmly enough to grow well. More important, the loose soil will eventually ooze into the water, making it very difficult to maintain clarity. With the pot filled with soil to its top, set it away from wind and sun to drain.

After the pot has drained for several hours, you should be able to press the soil even more firmly into it. Add soil to top off the pot to within 1 inch of the rim. Add pea gravel (1/4 to 3/4-inch-diameter stones) up to the level of the plant's crown and the pot's upper edge. Don't use sand! The small stones help keep the soil in the pot. If you add fish, the stones will also prevent them from poking into the dirt in search of food. Then immerse the potted plant in water to wash off any loose material.

You can place soil directly on the bottom of a water feature container and plant directly into the medium, adding gravel or rocks on top to reduce water and soil contact. This mimics a natural pond or lake, but on a much smaller scale. This is a good method for the smaller outdoor feature if you're going to use only one or two small plants of a particular type. The major drawback is flexibility. An already-potted plant can be removed from a water feature and the bad water changed, but with this method, all you can do is remove everything and start all over again, disrupting the plants' growth.

Another variation on the theme is to make stones, sand, or soil the prime medium of the container, rather than water. This borders on creating a bog garden. The small amount of standing water that is present in such a feature does not allow fish to thrive, however, and also does not offer the same aesthetic values that standing water is said to offer.

It's just about time to sit back and enjoy the feature. The container has been selected and established in a good spot, the water is seasoned and clear, the selected plants are potted and installed and just waiting for the sun to work its magic. What remains?

## Adding Animal Life

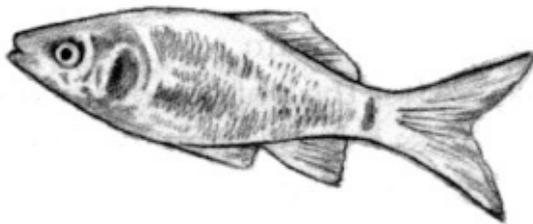
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Now that you have a living, breathing container water garden, you might want to add animals. The easiest and most popular is the gold fish. Other choices include different varieties of fish, pollywogs, snails, and even guppies.

Resist the urge to add fish and other animals until your pond is established (at least a week). This will give the water temperature and chemistry a chance to stabilize and your plants a chance to acclimate. If your water silted up at all during planting, it will settle out.

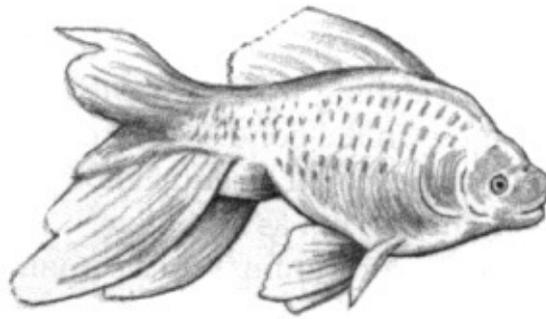
Common goldfish (comets) are the best choice. They are comfortable in small containers (remember the gallon glass bowls of childhood?), can stand the rather extreme daily variations in temperature that occur in the small container, and will grow only as large as the container will support. They are unobtrusive and do not bother plants much, although they love to nibble on certain floaters. They will clean some alga forms from plants and container sides. And they are very inexpensive. Buy them at any pet store that stocks fish. Don't be too alarmed if they're sold as "feeders" — food for larger fish. Feed your goldfish once or twice a day, using the flaked food available wherever fish are sold. Give them only what they will eat in 5 minutes. More will foul the water.

Slightly more expensive are the fancy goldfish. These include fan-tails, orandas, shubunkins, and calico goldfish. Fantails are the most common. They have shorter, fatter bodies than comets, and long, flowing fins and tails. They come in white, red, a white-and-red mix, and calico (white, red, and black). They are slower moving than comets, so if birds and other predators are common in your yard, you might stick with the comets.



Common goldfish

Koi are attractive fish, but I would not recommend any of them as part of your initial experience. Koi are a type of carp originally bred in Japan, where the breeding and raising of koi is a huge industry. They are considered very lucky, and can live for many years. But koi need quite a bit of running room, and even a half barrel is a bit confining for them. If you're tempted to add one or two, buy small ones (they are much more expensive than goldfish). The biggest drawback to koi is that they will munch on any plant. They are also inclined to keep the water stirred up all the time, mostly by blowing at the base of all plants as they search for a place from which to attack them. Like goldfish, koi will grow as large as the container will support. If you do decide to purchase koi, study before purchasing any, since they come in a bewildering variety of colors, grades, sizes, and types.



Fantail goldfish

Beyond guppies, tropical fish are best not introduced into this type of environment. Their usual environment has very stable temperatures, and the extremes of day-to-night temperature shifts stress tropical fish. Tropicals are also more prone to illness, and the recommended chemicals for treatment are flat-out killers of most plant life.

It has always been a family ritual for us to seek out a good farm pond in early June to find pollywogs to raise. (We find duckweed on this same trip.) These small creatures make good additions to any feature, and as metamorphosis occurs, the frogs or toads add entertainment value and, ultimately, bug-catching skills to the neighborhood. If you do not seek them out, expect them to find you anyway. Wherever they come from, I get frogs and newts every year in my water garden.

Snails are useful residents. They are among the better scavengers, cleaning up fish waste, algae, and other undesirable accumulations in the pond. The larger pet store snails are fun to watch as they perform their cleanup chores. The natural pond snail is equally good, though not as attractive.

How many animals in a container? Using the half barrel with its 25-gallon-plus capacity as an example, three goldfish of 2 to 4 inches in size is a reasonable number. With an aeration/filtration system and oxygenating plants, numbers can be doubled, but I would go easy — their waste and your overfeeding can create the ultimate water-quality problem. A couple of the large store-bought snails would be good, though I am inclined toward the farm pond variety. If you go the pollywog route, a great mess of pollywogs will thrive — most of them will be off and hopping soon enough!

One caveat. Fish are persistent, inquisitive, and dumb animals. If your water feature is filled to the brim, you may occasionally find “leapers” lying around the container. If it is a continuing problem, lower the water level slightly or add a guard around the edge.

# Maintaining Water Quality and Plant Health

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The hard part is over. One of the best parts of water gardening is that it's perfect for lazy gardeners. Once you are set up, and your water feature has a good balance of plants and animals, there is very little maintenance left. You have just a few things to check as you admire your feature (and feed your fish).

Do maintain a consistent water level. When you need to add less than a gallon to a 25-gallon water feature, you can just add it. If you have to add more, it's a good idea to spray the water in the air as you add it. This releases any chlorine and adds oxygen to the water. Another good way to release the chlorine is to let the water age in the sun in another container for several hours before you add it to your garden. Using chemical tablets to dechlorinate the water is not necessary, unless you know you have highly chlorinated water.

You should police your feature daily, removing any decaying or dead foliage from plants. Don't wait for that material to sink to the bottom. Remove any leaves that have drifted in from other sources. You don't need to deadhead spent blooms.

Quite early in my experience I found myself "playing" in my water features as I removed the refuse, shifting a pot to another place, maybe even changing the location of the total feature. Part of the fun of having a water garden is being able to play in it. Plus, as your garden grows, you will notice things that need changing. Maybe two pots are so close together that the fish can't pass through. Or maybe a fast-growing plant is overwhelming another. Don't be afraid to get in there and shift things around, but remember that every intrusion upsets the balance of the pond. Fish will dart about and try to hide, and silt will cloud the water with every adjustment.

## ***Filtration***

Reflecting on the silt problem, I am reminded of my aquarium experiences. There I used an air pump to filter the water. I ran air tubing for some distance between the pump and the actual filtering equipment in the aquarium to avoid safety problems. Voilà! I can do the same in my water feature, placing the pump in a safe spot and running an air line to the container.

For a container such as a half barrel, a normal medium-size aquarium-type air pump will suffice. The volume of air that the pump can produce is the key factor. Locate the most convenient outlet to connect the pump to; some pumps are weatherproof and may be located next to an exterior outlet. Or keep the pump indoors and connect it only when necessary. If your water feature is fairly close to the house, you can keep the pump indoors and run the air tubing out through a window or door to the filter in the water. Try keeping the tubing out of sight by burying it, or tacking it up beneath a deck or along an exterior wall.

Measure the approximate distance from the location of the pump to your feature, adding a few extra feet. Purchase this length of clear aquarium air-line tubing. If any of it needs to be buried, purchase a more rigid tubing (which is usually opaque) for that part of the distance. A good hardware store or aquarium supply store is a likely source for both types of tubing and connectors. Common staples (the sort used in construction, not household staples) can be used to fasten any run of tubing to a wooden surface.

Purchase and place a check valve in the tubing line close to the pump. This valve will keep water from running backward in the air tube should the power to the pump go off. If your feature is situated higher than the pump, this valve is vital!

Place an air regulator valve in the system close to the feature, since the pump is likely to

produce more air volume and bubbles than desired. You can observe the amount of water flow and then adjust the valve accordingly.

Filter boxes of varied characteristics are sold at most tropical fish and many general merchandise stores. Do not choose one built to fit over the edge of an actual aquarium; in a barrel or other similar container, the filter box should rest on the bottom. Look for a filter whose top can be removed and glass wool, or another filtering material, put inside. Check out the diagrams on the filter box packaging to learn how it comes apart and how the company suggests it be used. Use pillow fill or batting as a more reasonable substitute for the more expensive glass wool. Insert a fair amount of a filtering material. Be sure the top of the filter box stays on. I usually wrap a rubber band around the box.

With everything connected, place the filter box in the container, plug in the pump, and let the filter system go to work. If the filter floats, open its box and add a few flat washers to the inside bottom. Keep adding until the box sinks readily and stays where you place it!

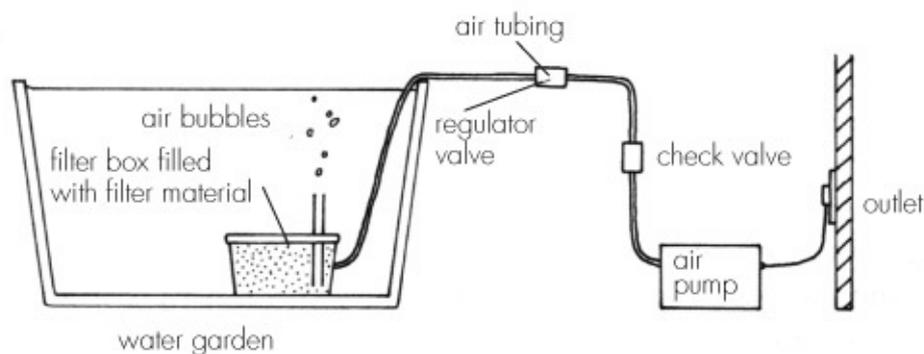
Here's how the system works: Air is pumped through the tubing to the filter box; in order for it to escape from there, it must carry water with it through the filtering material and out the larger tube of the filter box. Bubbles are an obvious by-product. You will need to do a bit of adjusting of air pressure. Too much water movement may bother both plants and you if the noise gets out of hand. A few plants are less tolerant of moving water than others.

The aeration that comes as a by-product of the filtration system is of great value. It assists in the carbon dioxide–oxygen exchange process, and also allows the introduction of additional animal life. Again, you don't need this system to have a successful water feature complete with fish, but the more oxygen in the water and the cleaner the water, the more plants and animals your container can support without loss of water quality and plant and animal health.

Should you want more than one water feature, you may consider purchasing additional filter boxes and a larger air pump. The air produced by the larger pump can be split with valves and shared by two or even more containers.

## A Simple Filter

Here's a simple system of filtration that will improve water conditions. Its parts are described in an order that follows the course of the air from the power location to within the water feature. All parts may be purchased at any local aquarium supply vendor. Keep in mind that this system is not a requirement. A well-set-up water garden of any size, with oxygenating plants in the recommended numbers, will develop its own ecology fairly quickly. Still, this system will help when you've disturbed the pond, and will provide extra oxygen for fish in the heat of the summer, when oxygen levels in the water dwindle.



## ***Plant and Water Care***

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Once established, plants will leaf out and begin encroaching on each other or gradually covering the entire surface area. Some plants, like parrot's feather, are invasive and will send runners into the pots of other plants. A rule of thumb is that no more than 25 percent of the surface area should be covered, so that the sun can do its expected tasks. If your container's surface area is being diminished by plant growth, prune a bit, or throw away the excess floating plants that are no doubt part of the problem. If a plant is spreading too rapidly or taking over the garden, start another water feature, remove the new plants, and offer them to a friend or just toss them on the compost heap.

**Never** release plants or animals into the environment! Many ecosystems across the country and the world have been severely damaged by the introduction of foreign plants and animals. Many of the waterways in the South are being choked and damaged by water hyacinth that has found its way from garden ponds into the wild, and up north, lakes are being choked to death by milfoil, which is transported from lake to lake on the propellers of boats. Even if you got snails or plants from a local pond, do not return them at the end of the season. Your water feature may have some algae, bacteria, or other problem that could kill an entire pond ecology.

Now let's say a month has passed, and your plants are growing profusely. Everything looks great! Suddenly the water turns green, and a slimy green coating appears on plants and the container's surfaces — all in all, a horrible mess. What you have is algae bloom. Growth is what you wanted . . . green slime you didn't! A couple of things may have happened to compound this particular water problem. You may have allowed an overaccumulation of dead or dying leaves to remain on the plants or to drop to the bottom of the container. Possibly there just is not enough sunlight for the plant load. Perhaps there is too much sunlight! Or too much of the container's surface is covered with plant life. Or the introduction of a great deal of rainwater may have altered the water composition. Maybe your container is overcrowded with animal life — that you have also overfed.

One experience with green water and you will develop good maintenance practices. But a quick cleanup of a container overrun by green slime is a necessity. Find another temporary container for plants and any animal life, empty the "green" container, scrub it out (do not use soap, which is harmful to plants and animals), and refill. Now aerate the new water, make sure the water temperature is reasonable (the temperature may need to stabilize over several hours or even a day), rinse off the plants well, and go on! Just another day of playing in the water. Take consolation from the fact that in-ground water gardens can also suffer algae blooms, and their owners have a much harder time getting rid of them.

On occasion, new plants bring with them other parasitic lower plant forms. One form, often seen, is hair alga, a filamentous grass. Its long, dark green strands grow on the pots and sides of the container rather profusely and continuously through the heat of the summer. If it's pulled off by hand regularly, its growth will be reduced, though perhaps not stopped entirely. Prevent this by carefully cleaning anything new you add to your feature.

Fertilize regularly, perhaps every 3 or 4 weeks. Do not place any common fertilizer directly into the water. Water with a high nutrient content is an alga magnet! Wrap a teaspoonful of low- or zero-nitrogen fertilizer in a small piece of newspaper. Make a hole in the plant medium with a dibble or your finger, then stuff the package down in the medium. A large plant can handle a couple of these fertilizer "bombs." Or buy fertilizer pellets sold for just this purpose. They work, though they seem a little expensive to me. If you have used a nonorganic planting medium, there

will be no continued growth without the addition of fertilizer!

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