



United States  
Department of  
Agriculture

Natural Resources Conservation Service

# Backyard Pond

A pond or water garden will likely become the focal point for all your backyard conversations.



**CONSERVATION**  
in your  
**BACKYARD**  
WE CAN ALL HAVE A HAND IN IT

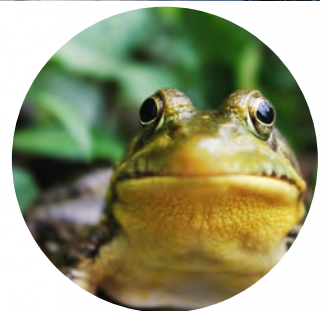


## In Your Backyard

Backyard ponds and water gardens are for birds, butterflies, frogs, fish, and you and your family. These ponds are typically small, sometimes no larger than 3 to 4 feet in diameter.



They may be built in barrels or other patio containers. Water is effective in drawing wildlife to your backyard. It is also a natural and relaxing addition that can provide interest and enjoyment.



Natural  
Resources  
Conservation  
Service

[tx.nrcs.usda.gov](http://tx.nrcs.usda.gov)



# Backyard Pond

A pond or water garden will likely become the focal point for all your backyard conversations.



## Where to Put a Backyard Pond

Consider locating your backyard pond where you can see it from a deck or patio. Have it blend in with its natural surroundings. Elevate the soil around the pond slightly so that excess water will flow away from the pond, not into it. Make sure that any drainage from the pond is away from your house. Plan to landscape around the pond to provide habitat for frogs and birds that need land and water. There will be less maintenance if your pond is not under trees. Most aquatic plants will grow better in full sun.

If you do not have space in your yard for a built-in earthen pond, consider a "tub" pond or large water bowls. These can be placed on the patio and provide many of the same benefits as a built-in pond. There are numerous tub kits available that can be as simple as adding water, a pump, and some plants.

## Pond Liners

Pond liners keep water from seeping into the soil. Even in heavy clay soils, a liner is necessary. You can buy rigid pond liners in a variety of shapes. These are durable and may include built-in waterfalls. Many are quite small. If you want a larger pool or would like to design your own shape, consider using a polyvinyl chloride (PVC) liner.

Use a liner specifically designed for pools. While other plastics initially may be cheaper, many are not resistant to ultraviolet light and will break down quickly. Some plastics may also be toxic to fish. Liners also come in different thicknesses. A thicker liner tends to be more resistant to punctures. While expensive and requiring more expertise to install, cement is also an option as a pool liner.

## Pond Liners/PVC

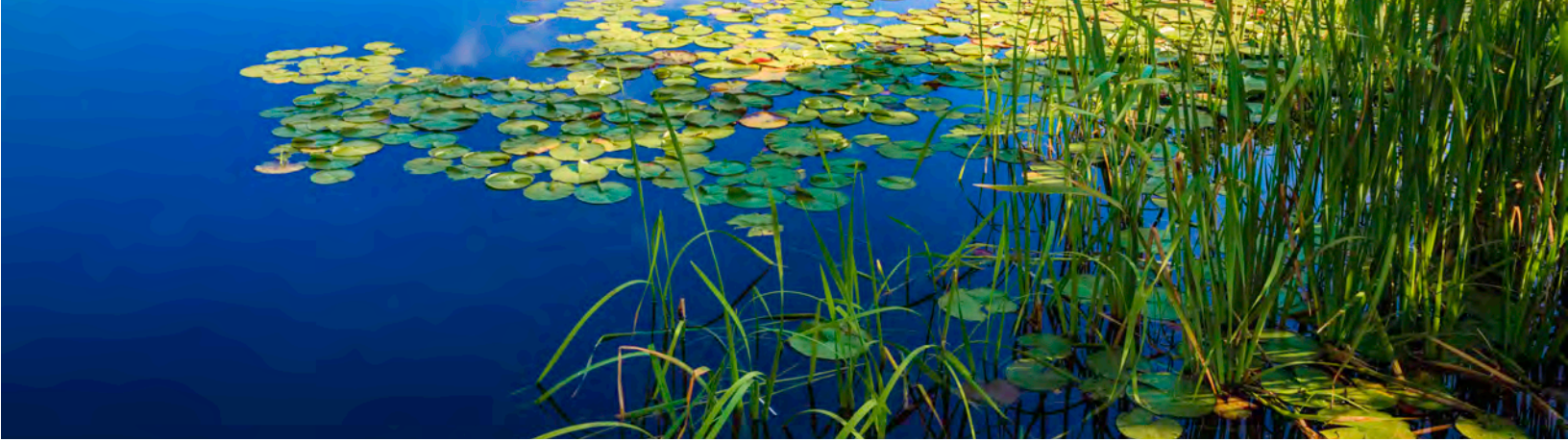
If you use PVC, you will need to get a liner large enough for your pool. To determine how large a piece you will need sketch your pond shape roughly to scale so you can determine approximate maximum dimensions.

Use geometry to compute your area of liner needed (usually sold in square yards). Most common shapes examples:

- 1) *Rectangular* =  $(length + 2 \times depth) \times (width + 2 \times depth)$ .
- 2) *Circular* =  $3.14 \times (radius + depth)^2$ .

It is recommended that a sloped side be used to allow wildlife easier entrance and exit than straight sides. If good clay soil exists then not using a liner is an option as long as the landowner is good with seepage loss and vegetation around edges developing. The latter can be considered a nuisance by some or an additional benefit to wildlife by others.

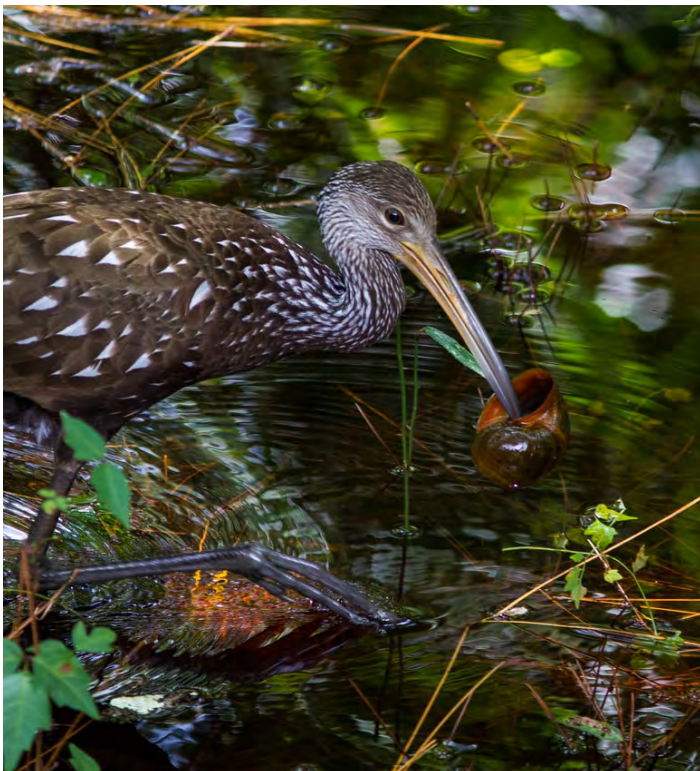




## Installing the Pond

You can put in a backyard pond anytime the ground is not frozen or overly wet. If using a pre-formed liner, dig a hole to the correct depth and slightly wider. Insert the liner, making sure it is level and sits securely in the ground. Backfill around the sides. Add water, pump, and plants. Complete landscaping around the pool.

If you use a PVC liner, plan on at least a weekend to install and landscape. See page 4 for steps to install a pond with a PVC liner.



**Note:** Many species of aquatic plants can become weed problems and may be regulated for use in Texas because of their noxious and invasive potential. Refer to Texas Department of Agriculture noxious weed list when determining plants for establishment.

## Establishing Plants



For ponds, consider a mix of emergent, submergent, and floating species. Emergent plants, those that have their roots in the water but their shoots above water, can be added to the margins of pools. These include cattails (*Typha* spp.), arrowhead (*Sagittaria* spp.), and water lilies (*Nymphaea* spp.). Submergent species, or those that remain under water such as elodea, are often used as oxygenators.

These are plants that remove carbon dioxide from the water and add oxygen. These plants are essential in most ponds to keep the water clear.

Floating species, or those that are not anchored at all in the pond, include plants such as duckweed (*Lemna minor*) and American Featherfoil (*Hattonia inflata*). While not as effective as oxygenators, these plants help keep the water clear by limiting the amount of sunlight that algae receive. In tiny ponds created in barrels and similar containers, these plants may be adequate to maintain clear water.





# Installing a Pond



## With a PVC Liner



### Decide

- Decide on your pond's location.
- Using a hose or rope, lay out the shape of your pond on the ground.



### Start Digging

- Plan for part of your pond being at least 18 to 24 inches deep; 24 to 36 inches is even better. This will allow for a greater diversity of plants and fish to live in the pond.
- You may want to make tiers around the inside of the pond at various depths on which to place pots of different aquatic plants. Make tiers about 12 inches wide to accommodate the pots.



### Safety

- Remove any rocks from the excavated area.
- To help prevent punctures in the plastic, put a one-inch layer of damp sand on the bottom of the excavated area.
- Spread the plastic liner over the hole. Let it sag gently in the hole. Place a few rocks or bricks around the edge to hold in place.



### Filling the Pond

- Slowly start filling your pond. The weight of the water will help smooth out the liner.
- Remove rocks holding the edges to allow liner to conform to the edges of the hole.
- Smooth out wrinkles but do not pull too tightly. You can walk on the liner if you remove your shoes.



### Wrapping Up

- Finish off the pond by placing rocks around the edge to securely hold the liner in place.
- Install pump and filter, if desired. Many smaller pumps have a built-in filter. For larger ponds, a separate pump and filter may be necessary.



### Filter & Pumps

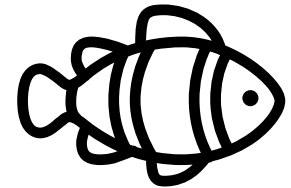
- Make sure the filter and pump are adequate for the volume of water in your pond. Pumps not only add interest, but are important in adding oxygen to the water.
- If you want a fountain or waterfall in your pond, you will need a pump to circulate the water.

Finally, let the pond sit for a few days before adding fish and plants. This allows chlorine to evaporate from the water. Chemicals are also available that will quickly neutralize chlorine and other harmful compounds.





# Choosing and Establishing Plants for Ponds



When choosing and establishing plants for ponds a variety of considerations have to be taken. From determining water depth, to the types of plants, to plant container preparation, see "Establishing Plants for Ponds" on page 5 to learn more about these considerations.

When choosing and establishing plants for your pond, it's important to remember that plants should cover 50 to 70 percent of the water surface. Native plants usually do not need fertilizer. For some exotic water lilies, limited fertilizing once yearly may be required. Check with your nursery on care of plants and how deep to place potted plants. Be aware that over-fertilizing may cause unwanted algae blooms which can rob the water of oxygen.

## Add Fish and Scavengers

Consider stocking your backyard pond with native fish. They are fun to watch and help keep the pond free of unwanted insects. Most small ponds will warm up quickly in the summer, so make sure you stock with fish that can tolerate elevated temperatures.

You'll also need scavengers, such as aquatic snails and tadpoles, to help control algae. In cold climates, a heater may be necessary for fish to survive the winter. However, this uses a significant amount of electricity and, in most cases, probably is not justified. A better option may be to set up an indoor aquarium in which to overwinter fish and plants.



## Safety Recommendations

- Locate the backyard pond where it is unlikely to attract unattended children.
- Check local safety ordinances to determine if a fence is required for the specific depth and size of your pond. Check local building ordinances for depth and safety restrictions and permits.
- Always call 811 for underground utility safety before you dig to get a free locate service if needed for your proposed construction area.
- Equip outdoor outlets with a ground-fault circuit interrupter. Unplug the pump before cleaning the filter.
- Also monitor your pond for any out of balance mosquito production.
- At certain times of year local authorities recommend homeowner mosquito control actions so illnesses they carry can be reduced.

# Establishing Plants for Ponds

Consider the following when choosing & establishing plants for ponds.

## 01. How Deep is the Water?

- Is your pond permanently installed in the ground or is it a small tub that will be moved inside in the winter? In this case, even tropical plants may be an option.
- Will you drain your pond in the winter? If you intend to drain your pond, you should consider plants that can spend the winter in a basement in a dormant state.
- How much sunlight does your pond receive?
- How large is your pond? If your pond is small, consider dwarf species.

## 02. Types of Plants to Purchase

- Purchase plants from a reliable vendor. Remember to include some oxygenator plants such as elodea.
- Emergent and submergent plants should be planted into pots. A wide assortment of pots is available, from plastic baskets to pulp planters. Choose pots that are large enough for your plants.

## 03. Plant Container Preparation

- If using baskets with numerous perforations, line the basket with burlap or 2 layers of newspaper to keep the soil from falling out of the holes.
- Fill the container about half full with a mixture of good garden topsoil. Do not use potting mixes or peat moss. These are too light and will float out of the pot. Adding aquatic plant fertilizer to this bottom layer of soil is recommended for some species.
- Follow directions on the label for amount.

## 04. Planting Considerations

- Place the plant on top of the soil and fill the container with topsoil within one inch of the top.
- When planting water lily rhizomes, make a mound of soil in the middle of the pot. Place the rhizome at a 45 degree angle.
- The crown of the rhizome should be toward the center of the pot. Cover the roots with soil, but not the crown.

## 05. Planting the Plants

- In all cases, add a layer of gravel to the top of the pot. This will help keep the soil from floating out and prevent fish from digging in the soil.
- Slowly place the pots in the pool to keep soil from floating out. Place pots on bricks to get the desired height.
- Floating species can be placed directly into the pond with no other care needed.

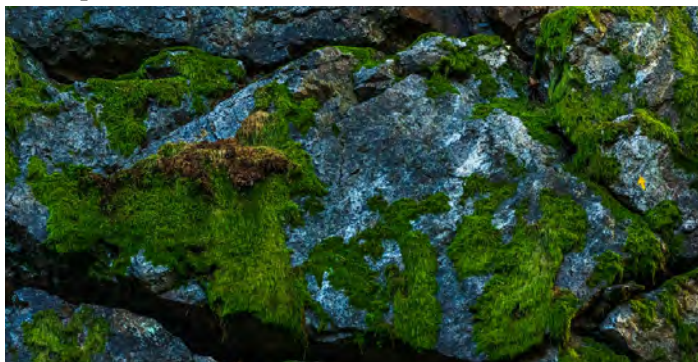


# Maintenance

Algae is a common problem in many newly established ponds. The water often becomes an unsightly green after a few days. Draining the pond and starting over only prolongs the problem. Once a pond is "balanced," algae usually is kept at an acceptable level.

A balanced pond is one in which the nutrients are at the appropriate level for the plants present. Excess nutrients and light are needed for algae. Reducing the nutrients and decreasing the amount of light entering the water will help reduce algae.

Floating plants or those with broad leaves such as water lilies will help reduce the amount of light available for algae and compete for available nutrients. Scavengers such as snails will help clean up wastes from the bottom of the pond.



Pond filters can help reduce algae, but require maintenance. Chemicals can also be used to control algae. Use cautiously as they can be toxic to other plants and aquatic life. The need for algaecides should decrease as plants become established.

Excessive plant growth, especially of free-floating plants, may be a problem. Periodically skim off excess growth of floating plants. Monthly, prune dying plant material. Clean out decaying plant material that has accumulated in the bottom of the pond in the spring. Remember: a natural pond is not a swimming pool and too much cleaning can do more harm than good.



## On the Farm

A properly located and maintained pond can reduce gully erosion and improve water quality. Ponds provide water for livestock, waterfowl, and fish; store water for emergencies; and add beauty to the landscape. Wildlife use ponds for water and habitat.

You can order a copy of "*Ponds- Planning, Design, Construction*" at <https://nrcspad.sc.egov.usda.gov/DistributionCenter>.







## NON-DISCRIMINATION STATEMENT


In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.


Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotope, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at [How to File a Program Discrimination Complaint](#) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: [program.intake@usda.gov](mailto:program.intake@usda.gov).

USDA is an equal opportunity provider, employer, and lender.

**USDA Natural Resources Conservation Service**  
**CONTACT:**

 254-742-9800

 [texasNRCSinfo@usda.gov](mailto:texasNRCSinfo@usda.gov)



[www.tx.nrcs.usda.gov](http://www.tx.nrcs.usda.gov)

June 2021