Planning and Budgeting Your Pond

Drs. Foster & Smith Educational Staff

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Stage One - Selecting the Basics

You've decided to add a pond to your property. To help ensure long-term success, you'll need to determine how much space you have for a pond, how large you want your pond to be, what kind of pond you want, and how much you can afford to spend.

Keep in mind that larger ponds usually have better water quality and fewer problems resulting from temperature variances and toxin buildup. So strive to create the largest possible pond you have space for. You will also need to decide whether you want your pond to be home to fish, plants, or a combination of the two. If, for example, you want to keep Koi in your pond, you will not need to plan or budget for many plants. However, if you want a water garden with lots of plants, you'll need to plan for a pond with "shelves" (terraces).

After you've chosen your pond size and type, you'll need to select the required basic equipment - a liner, filter, pump, and plumbing parts to connect your system. When selecting your basic equipment, consider the following factors:

- **Price** - Remember, an initially inexpensive system may require extensive maintenance - costing you time, effort, and money in the long run.
- **Power consumption** - Know the amount of electricity required for each piece of equipment, and remember to factor those requirements (and their cost) into your overall plan.
- **Recommended size** - Once you've determined your desired pond size, be sure to choose equipment that best fits your unique requirements.
- **Amount and type of required maintenance** - Each piece of equipment will require some level of maintenance. Choose equipment that requires a level of maintenance you're willing and able to perform.

You may wish to employ an all-inclusive pond kit if you're not sure about which equipment to choose.

Choosing a liner

When choosing your pond liner, go to your pond area and outline (with rope, stakes, or tape, for example) the area (and shape) in which you pond will be located. Measure its longest length and widest width, and record those numbers for reference. If you're not sure which shape pond to build, keep in mind that oblong ponds can be easier to maintain than perfect circles - their shape typically allows you to trim plants without having to get into the pond. Kidney-shape ponds are also a perennial favorite. Next, decide how deep you want the deepest part of your pond to be. Once you have determined your pond length, width, and depth, use the chart below to find a liner that will accommodate your pond. The sizes listed allow two feet of additional liner around the edges. You should have at least this much extra liner; otherwise you may have to create a smaller pond or risk unwanted drainage. The sizes highlighted in blue are minimum sizes recommended for keeping Koi. While Koi can survive in smaller ponds, they are better suited to large ponds. When Koi are kept in small ponds, they may take on a hump-backed shape or never reach their size potential.

	Maximum pond size & gallons possible				
Liner Size	**18" Depth**	**2' Depth**	**3' Depth**	**4' Depth**	**5' Depth**
10' x 10'	3' x 3', 100 gallons	N/A	N/A	N/A	N/A

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10' x 16'	3' x 9', 300 gallons	2' x 8', 200 gallons	N/A	N/A	N/A
13' x 19'	6' x 12', 800 gallons	5' x 11', 800 gallons	3' x 9', 600 gallons	N/A	N/A
19' x 19'	12' x 12', 1600 gallons	11' x 11', 1800 gallons	9' x 9', 1800 gallons	7' x 7', 1400 gallons	5' x 5', 900 gallons
19' x 26'	12' x 19', 2500 gallons	11' x 18', 2900 gallons	9' x 16', 3200 gallons	7' x 14', 2900 gallons	5' x 12', 2200 gallons

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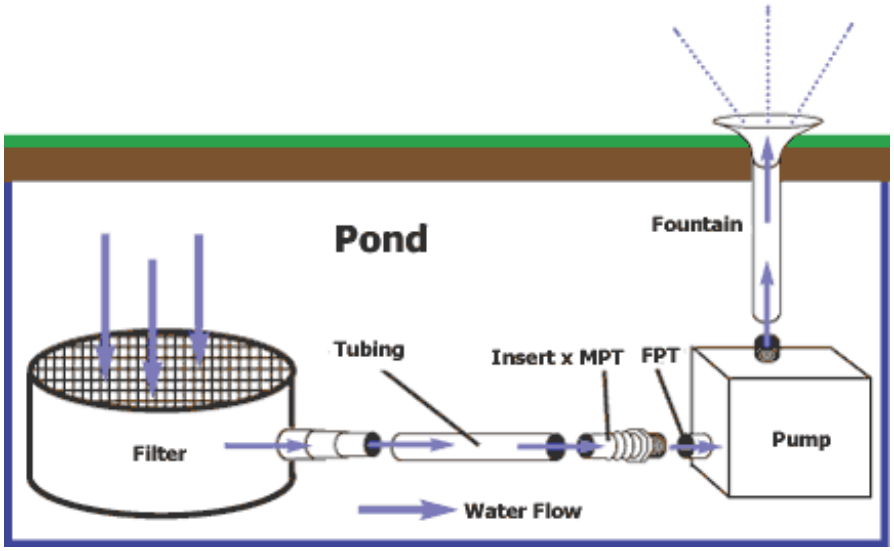
Choosing a filter

At the very least, your pond filter should contain biological and mechanical filtration, but you may wish to invest in one with an area for chemical filtration - this can be very helpful if you ever need to medicate (and subsequently remove medication) from your pond. You may also wish to implement an ultraviolet (UV)-sterilizer to help control algae.

When choosing a filter system, you will need to know your total pond volume. To determine maximum pond volume, multiply length x width x depth x 7.48. Once you've determined your pond volume, choose a filter that not only fits the volume, but also the level of maintenance you are willing to provide. Typically, the more expensive the filter, the less maintenance it should require.

Check to see if your selected filter suggests maximum flow rates, so the pump you choose falls within manufacturer recommendations. Take note of the distance the pump will have to push water upward for your filter setup, and make sure your chosen pump will deliver the gph you need at that height. Also, make a note of the filter's fitting type (female pipe thread - FPT, male pipe thread - MPT, or insert) and sizes - you will need this information to select the correct plumbing pieces.

The illustrations below detail the three basic types of filters.



Internal filter

- Relatively inexpensive.
- Placed directly in pond.
- Best for small to medium ponds with a low bio and debris load.
- Easy to assemble.
- Easy to clean (but may prove more difficult if placed far from the edge of your pond).
- Pump output can also be connected to tubing to run a waterfall, or a diverter can be added to run both a waterfall and fountain.

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- Filter is easily hidden since most parts are black and blend in with a black liner.
- A UV sterilizer can be added with additional plumbing.

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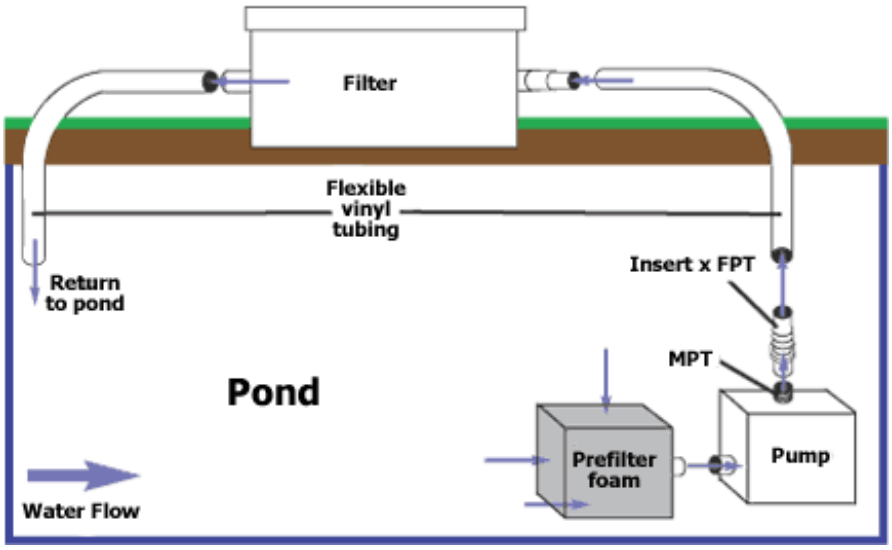
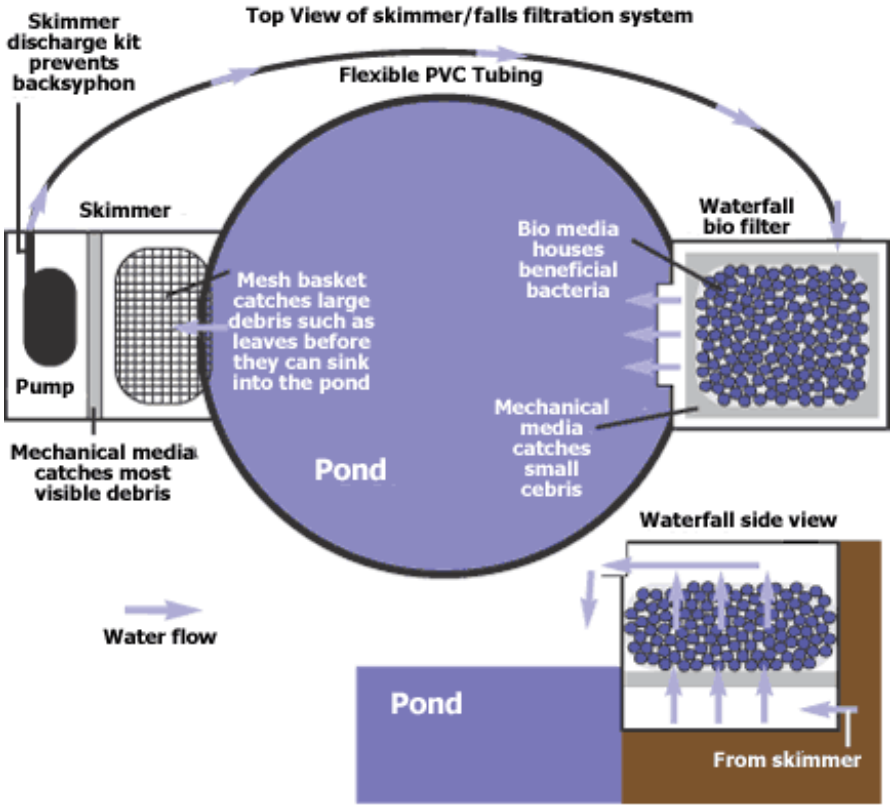


External filter

- Average-priced filter - generally costs more than internal filters, but less than skimmer/falls filters.
- Large variety of sizes and features fit nearly every budget and pond size
- Easier maintenance than internal filters because it is located outside of the pond. Also, when filter is paired with a pump that will transport large debris, you won't need to clean a prefilter.
- More (although simple) plumbing involved in assembly.
- Will require a little creative effort to disguise filter with landscaping.
- Some have built-in UV sterilizers or two outputs so half the flow can be directed to a UV unit.



Skimmer/falls filter system

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- Best for medium to large ponds
- Provides the overall best water quality - debris is caught before it sinks into pond.
- Requires minimal maintenance - just lift lid from skimmer, dump debris out of mesh basket, then rinse mechanical media with a hose if needed.
- Installs in the ground, right next to the pond.
- Easy to disguise - cover skimmer with a large flat rock and disguise waterfall bio-filter with rocks and plants.
- More (although simple) plumbing involved in assembly.
- More expensive than most other filters, but some large or fancy externals can cost more.
- A UV sterilizer may be added with additional plumbing.

After you have decided on your filter, you'll need to find the size that will work best for your pond. You'll see much better results if you choose a filter recommended for a pond slightly bigger than yours.

Choosing a pump

The pump size you need is determined by your total pond volume (length x width x depth x 7.48) as well as the number of vertical feet the pump must push water. All of our pond pumps online have flow charts available by clicking on the "More Information" link. This will allow you to check the maximum flow each pump can provide per foot of height. Choose a powerful pump - you can always slow it with an in-line ball valve, but you cannot speed it up. In choosing a flow rate, consider the following:

- Determine the number of feet the pump will have to push water upward, and use that flow rate.
- If you are building a water garden that will contain more than 50% plants covering its surface and a few fish, the flow rate you'll need can be less than the estimated pond volume.
- If you plan to stock your pond with several fish and just a few plants, your pond's flow rate should be greater than the pond volume.
- If you plan on creating a Koi pond (see the liner chart above for the minimum size pond recommended for Koi) the recommended flow rate should be equal to twice the pond volume.
- Check your chosen filtration system to ensure the flow you choose is within manufacturer recommendations.

Record whether the pumps you're considering have FPT, MPT, or insert fittings, as well as their size. This information is vital to choosing the correct plumbing.

Plumbing - putting it all together

Selecting the right plumbing can seem a very daunting task. However, it is not nearly as difficult as you may initially think it to be. Refer to the filter illustrations above for a better understanding of the basic plumbing pieces required for the different systems.

Before selecting plumbing connectors, you'll need to measure the length of tubing needed to run through your entire system. This is easily done by going out to your pond site and placing objects (rocks, etc.) where you plan to place your pump and your filter. Measure the distance between the objects, and then add a few extra inches to ensure that you buy enough tubing. Reminder: when setting up your system, place the beginning of the filtration system opposite from where the water returns to provide thorough circulation.

When choosing your connectors, you must be familiar with the fitting types and sizes on both your pump and your filter. If the pump or filter has an insert, you will not need a connector (since the tubing will slide right over it), but you should use a clamp to keep the tubing from sliding off of the insert. An MPT fitting will require an FPT x insert, while an FPT fitting will require an MPT x insert to connect tubing. You should choose identical insert sizes, so you can use the same size tubing throughout your entire project.

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Adding it up

Once you have selected your liner, filter, pump, and the correct plumbing to connect the system, you can total these items to find your cost for the first stage. Don't be discouraged if your ideal pond setup is initially more than you wanted to budget - there are ways to lower the costs. First, take another look at your filter. See if you can find another model that offers adequate filtration with fewer features. But don't skimp on the size of filter or the quality of pump you choose, as some cheap pumps can burden you with steep energy costs. If this change does not decrease your cost enough, consider choosing a smaller liner and designing a system around the maximum pond size it allows. Then repeat the steps of choosing a system until it meets your budget. You might also wish to consider waiting until you can afford the pond size you really want - many who settle for a smaller pond actually end up enlarging it within a couple of years.

EXAMPLE: 5' x 10' pond, 5' deep, Max. volume, 1870 gallons	
19 x 26 liner:	$399.99
Filter:	$84.99
Pump:	$189.99
Plumbing:	$19.69
Total:	*$694.66*

Stage Two - Selecting & Adding Plants and/or Fish

Plants and fish are the final step in completing your pond. While you do not have to add plants and fish, a pond that is not ecologically balanced will require frequent maintenance

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and the use of pond chemicals to keep algae from building up.

Keeping Koi

If you plan to keep Koi in your pond, plan for minimal plants because Koi love to munch on them. Koi will grow to between 30" and 36" long, so you will need to determine how many Koi your pond will comfortably support. This is best achieved by taking the number of gallons your pond will hold, divide that by 10, then divide again by 36 to get the total number of Koi it can support. When your Koi are babies, your pond will look nearly empty, but resist the urge to fill your pond with numerous Koi babies - they grow quickly and will demand much more maintenance once they've grown into adults.

Growing a Water Garden

If a water garden is your desired outcome, you'll need to determine the number of plants you can successfully keep. Start by measuring the length of the plant shelves you created when you dug your pond. For shelves 12" deep or less, divide the length by two to get the number of bog plants (and medium-large plant baskets) you'll need. For shelves in areas 12" to 2' deep, choose lilies or lotus. The number you need will depend on how far each type of plant will typically spread. Drawing a scale picture of your pond will also help greatly when choosing the number of plants for your pond. Draw a circle around areas of moving water, such as a waterfall or fountain. Avoid putting lilies or lotus in these areas, since they thrive in calm water. If you want more plants in your pond, you can addwater hyacinths on the edges of these areas, or Anacharis or Hornwort to the bottom of the pond. In addition to adding lush beauty to your pond, these plants will filter out excess nutrients and increase the oxygen levels in your pond.

You can also add fish to your water garden. Comets, fancy goldfish, and Shubunkins are all good choices. To determine the number of these fish your pond can support, divide your estimated pond volume (in gallons) by 10. The resulting number will give you the total inches of fish your pond can support. When choosing fish, take note of their adult size, then divide your total inches by the adult size to determine the number of fish your pond will comfortably accommodate. For example, an 800-gallon pond can support 80 total inches of fish. Fancy goldfish can grow up to 8" in length, so this pond could house 10 fancy goldfish. Visit LiveAquaria.com for details (including adult size) on a wide variety of pond fish.

Additional Pond Needs

Since your pond will be supporting life, you will also need fish and/or plant food and a thermometer to monitor water temperature. You may also wish to invest in water conditioners (such as dechlorinator), and plant fertilizer to keep your water and plants healthy.

In Conclusion

The natural beauty of a pond not only adds style to your property, it also brings a new level of peace and tranquility to your life. When planning your pond, be sure to invest a little extra time and effort into selecting the right type of pond, the necessary equipment, and the desired inhabitants. Your investment will pay off for years to come, as you enjoy your, lively, healthy, and beautiful pond.

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