

Building Your Own Waterfall or Stream

By Shannon Goins

Building a waterfall or stream in your backyard is a great do-it-yourself project that, with a little advanced planning, can easily be accomplished in a weekend. While it requires a bit of effort, the process is straightforward, and the result is one that you can enjoy for years to come.

Whether your future waterfall or stream will be an addition to an existing pond or the pond less centerpiece of a total landscape overhaul, many of the same building principles apply.

VISUAL DESIGN

To design a water feature that is pleasing to the eye, you should focus on what would look natural in the final landscape design. Proportion is key to this concept. Consider your space and make sure your design is appropriate for that space. Bigger is not always better. A gentle stream with a number of smaller drops would be more appropriate for a very modestly sized backyard than an attempt to recreate Niagara Falls. Additionally, you should think about the perspective from which you plan to view your future waterfall. If you have a bay window, deck, or patio, the waterfall is likely to serve as a natural focal point, so make sure that it is positioned accordingly.

AUDITORY DESIGN

Equally as important as the visual characteristics are the auditory effects of a moving water feature. From an auditory perspective, consider the purpose of your stream or waterfall. Are you trying to drown out noise from a nearby busy street, or is your backyard so quiet that it bores you to spend time there? With this in mind, imagine the type of sound you wish to create.

Several factors affect the sound of water: the distance that water falls, the volume of water, the number of falls, the degree of irregularity in the surface over which the water moves, and the surface onto which the water falls. In general, the more complex

the path over which water must pass, the greater the water volume, and the greater the distance that water falls, the louder the noise that water makes as it moves. Likewise, water falling onto water makes more noise than water falling onto rocks. Additionally, the deeper the pool of water that the falling water strikes, the louder the noise.

MATERIALS

Water features take a number of different forms, so the exact materials that you will need will likely vary a bit from this list. These suggested materials are meant as a jumping-off point for your initial planning. Consult with your local pond retailer to see if there is anything else you might need.

Start by locating non-kink tubing at your local pond supply store. Not only will it resist kinking when bent, but it will not crush if hidden under rocks. Black pond foam is a must for holding rocks in place and keeping water on the correct path. It is fish safe and dries quickly.

Next on the list is a weir, which is a specialized water trough that sits at the top of a waterfall. It accumulates water in one place and then allows it to spill over in an even manner. You should choose a weir that is rated according to the rate of flow it will be receiving. Under sizing a weir

will produce an unnatural turbulent flow coming out of it. Look for a weir with a rock tray at the top. It will help to disguise the weir by allowing you to cover it with rocks or even plant it.

Pond Liner

You will want to place liner under any surface where water will pass – this includes behind waterfalls to catch any water lost. Beware of vinyl liner because it is thin, inflexible, brittle, and breaks down after a very short time. Concrete and preformed liners are also not recommended because they are very prone to cracks in our climate. EPDM synthetic rubber makes the best choice because it is guaranteed for 20 years is extremely tough, highly resistant to puncture, yet it is flexible enough to be manipulated into almost any form imaginable. The



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Indoor small waterfall with stream

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45 mil thickness is generally better than the 60 mil, which is so stiff that it is difficult to use.

To estimate the size liner you will need, measure the maximum length, width, and depth of the area you need to cover. To calculate liner length, add together the maximum length + 2 times the maximum depth + 2'. Width is calculated the same way. Add the maximum width + 2 times the maximum depth + 2'.

A cloth underlayment material is strongly recommended for the rocky areas of central Arkansas to protect the rubber liner from potential punctures. Avoid using underlayment materials such as old newspaper that will degrade over time. While they may work well initially, you will be setting yourself up for unnecessary work in the future.

Rock Selection

Correct rock selection is important to successful design. You will need several sizes of hard rock. Try to avoid using rock such as sandstone which is prone to cracking and erosion in our climate. For creating spillways, flagstone is the ideal rock type. It is generally very flat and comes in varying thicknesses. River rock in sizes from ¾" to 12" makes for the best choice of rock for channel formation for a stream. Boulders may also be incorporated if you have some help to carry them. The amounts of each size rock will be specific to individual project, so consult your local pond retailer for help with these estimates.

Spillway Calculation

To get the right effect for your water feature you will need a pump that

is sufficient to move the volume of water appropriate for the height and breadth of your design. The higher and wider your spillway, the more power you will need. Large pumps can take a hefty bite out of your budget, so it is important to calculate the size pump you will need before you begin.

As a general rule a waterfall should have a minimum of 100-150 gallons per hour (GPH) of water flow over each inch of width of the waterfall. So, if your waterfall has a width of 10 inches, you should have a flow of 1000-1500 GPH to produce a desirable effect.

To correctly size a pump, first consider the height of the waterfall you are building. Pumps are rated by the amount of water they are able to lift one foot in elevation every hour, so if you are going to pump anything higher than one foot, you must account for the effect of gravity. Essentially, the higher the pump must lift the less effective power it has. Actual GPH output at a given height can vary widely from one pump manufacturer to the next, so consult with your local pond retailer for details about the pumps they carry.

A second factor to consider is the length of hose that the pump must carry the water. For roughly every 15 feet of hose, the pump must exert the equivalent work of 1 foot of elevation. For short distances, this isn't usually a problem, but you should keep it in mind if the pump must move water a long way through your design.

Remember that the size of tubing you use makes a difference. Using tubing that is too small will restrict the water coming from the pump, making it less effective. In general, a 1" pipe can efficiently deliver up to 1000 GPH and a 1¼" pipe up to 1500 GPH.

THE PROCESS

Now that you have your materi-

als together, it's time to get to work! Start by marking the excavation area with spray paint. Next, excavate the area working backwards from the basin that will catch the water to the area where you will position the weir. The basin area will be the deepest area. As you work backwards from the basin, make sure that each level of your stream or waterfall is higher than the last one.

Tamp down the soil with a hand tamper when you have finished with an area. This helps minimize settling that can lead to future leaks up and over the edges. Also, be sure to check that you have created a level surface for each place where water will drop. This is where you will position your large flat pieces of flagstone.

After the excavation is complete and all sharp rocks have been cleared away, put down your underlayment cloth. Next, unroll the liner and allow it to sit for 20 minutes or so in the sun. This will allow it to gently shape itself into the form you just dug. Be sure that you have at least 1' protruding from the edge of your trench and if you are adding a waterfall or stream onto an existing pond, be sure you have at least 1' of overhang into the existing pond. Do not cut your liner yet! This is generally the best point at which to run your tubing from

your basin up to your weir. You do not have to plumb everything at this point, but go ahead and get your tubing in place so it can be covered by rock in the next few steps.

Add water to the unfinished water feature to further seat the liner into position and check the general flow pattern you have created. When you are happy with the basic design and position of the liner, pump out the water and begin laying stone at the bottom of the water feature. Remember to stack rocks in a fashion that is sturdy. Make sure they lock in place with one another and do not allow them to wobble.

As you lay in your flat pieces of flagstone at each drop point, be sure to position stones on top of it on either side to cause the water to flow inward towards the center of the waterfall or stream. This helps reduce water loss along the edges of the drop areas. You might try running water from the garden hose over each spillway to see how your rocks should be best positioned.

Once you have a good design, use black pond foam to seal them in place. This also ensures that water passes over the rock instead of underneath it. Most rocks in your water feature will not require pond foam, but spillways or other areas that are likely to have water leakage should be foamed in place. To disguise visible areas of pond foam, toss a handful of gravel onto it immediately after application.

Once the rock work is complete, connect your tubing to the pump and the weir. Fill the water feature, submerge the pump, and turn it on. Check for splashes and leaks from the edges of the waterfall. You will likely need to make some minor adjustments to get the water to go where it should.

To soften the overall appearance of the new water feature and help it blend into its surroundings, add a variety of plants.

Plants also can disguise the mechanical parts of the water feature that you were not able to hide with rocks.

As a finishing touch, you may install accent lighting so you can enjoy your water feature at night. ♣



Medium waterfall with small pond



Small waterfall with small pond