



THE "SCIENCE" OF FINDING LEAKS

Every Spring our company gets between 10-20 calls from pond owners who are losing water somewhere in their system. Sometimes these are simple problems to solve and other times they can be very time consuming. Obviously the more time it takes, the more dollars it takes. This not-so-brief article is intended to save you some money. Even if in the end you hire a professional to do the actual repair, if you can save him/her the time of looking for the leak, you have saved yourself the lions share of the repair bill.

If you are one of the fortunate few who have never had to look for a leak in your pond, quickly find a piece of wood and knock on it. But remember, your day may come, so here's how to tackle the problem when it arrives.

First you must determine if you truly have a leak or if you are just experiencing evaporation. All ponds will lose water to natural evaporation. Hot windy summer days are great for "stealing" water from your pond, especially if you have waterfalls and streams where you get a lot of splashing. Ponds with larger waterfalls, thus more splashing, may tend to lose more water than ponds with quietly meandering streams. Unless Mother Nature provides enough rainfall to replenish this water loss, you will have to add water to your pond. Ponds can lose anywhere from 1 to 3+ inches of water in a week depending on individual pond characteristics and circumstances. So, how do you know if your water loss is normal?

DIAGNOSIS: If you are a new pond owner it might take a while for you to figure out what your pond normally loses in a weeks time. For those of you who are veterans, you know what to expect from your system. It's very similar to going to the doctor and saying I feel kind of "yucky" but I don't know exactly what's wrong. The doctor will start eliminating possibilities by asking questions. Which is exactly what you are going to do with your pond. Unfortunately your pond won't be able to answer you directly...

It's best to have a benchmark from which to gauge your ponds water loss. Pick a rock in your pond to use as the "measuring stick". When your pond is filled to where it should be, check to see where the water level is on the rock (**remember that the rock will actually be wet a good 1/2" above the actual water surface due to the wicking action of the stone itself**). Now you have a benchmark. If you want, mark the exact water level with a piece of duct tape. If you feel that at the end of one week (or sooner) you have lost more water than normal, start the search.

Almost 90% of all leaks are found along the edges of the pond, streams or waterfalls (very few leaks are actually punctures in the liner). Some causes are: shifting stones; soil settling after a freeze/thaw cycle (winter); heavy rain storms that erode soils from the pond/stream edges; a stream becoming clogged with leaves; or excessive plants in the stream or biofalls.

The best method to look for a leak is to walk the perimeter of the pond (including the biofalls and skimmer) and look for excessively wet areas in the soil or mulch. If you find such a spot, determine what the cause is. Is the liner too low at that point? Is there excessive splashing from the falls? Has something (leaves or rocks) caused the water to divert away from the main flow of a stream? (If you have children, they love to make dams with rocks and sticks). Has the biofalls settled, causing water to spill out the back? If no obvious wet spots are found and you are sure that you are losing too much water (*say, 1 inch per day*) the job becomes a little more time consuming.

Now you must determine if the water loss is coming from the stream, the falls, the pond itself, or the equipment/plumbing. At this point, shut down the pond and make note of the water level in the pond using your benchmark. (*It's a good idea to fill the pond back up to the proper level*). Now let it sit 24 hours and come back and check the level in the main pond. If it has stayed the same, then you can be pretty sure that you are not losing water from the main pond. If it is down, continue monitoring until it has gone a full 24 hours without water loss. Once it stops dropping, you at least know at what level your leak is located.

The leak might be around an opening through the liner, such as with a skimmer opening. Check there to see if the soils are excessively wet. Also check the skimmer itself. If the water level in the skimmer is lower than the level in the pond, you may have a cracked skimmer. If there is a crack, check with your manufacturer (or installer) as to warranty. A good temporary fix is marine epoxy. If the skimmer is good, look for holes around the edges at the level where the water stopped dropping. If you have rocks in your pond you will probably need to move them to view the liner. Be sure to unfold any folded sections of liner and check there as well. This is where we sometimes find a rodent has chewed through while burrowing through the soil. Once you find the spot and determine the cause, it's fairly simple to repair yourself or have a professional fix for you. All you need is a patch kit.

The next area to check would be the Biofalls and the plumbing. The Biofalls can be checked at the same time as the main pond. The pump and check valve should be attached (but not running) when testing the biofalls. The check valve is designed to prevent water from draining back into the pond, but they are not always reliable. If you think you might have a leak in the biofalls, you are better off buying a PVC plug at your hardware store (under \$2) and screwing it into the inside hole at the bottom of the biofalls. Fill up the biofalls with water



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and let it sit for 24 hours. If it does not hold water, check for internal cracks or loose plumbing connections at the bottom water inlet. If there is a crack, check with your manufacturer (or installer) as to warranty. A good temporary fix is marine epoxy.

To check the stream and waterfalls will require a bit more work and some extra equipment. The best way is to take some flexible 2" PVC (or whatever size plumbing your pond uses) and connect it to your existing pump. Lay the PVC over the ground with the open end part way up your stream (usually 3'-5' upstream from the ponds edge) and let it run for 24 hours. Be sure the flow is as natural as if you were using the Biofalls, with no water splashing out of the stream where the hose is laid. If there is no water loss, move it up stream a little further and repeat until you find a section that is losing water. Now you have narrowed down the search to a small section of the stream/waterfall. Once again, you will probably need to remove some stone to find the hole. Many times the hole will be found on the vertical walls underneath the waterfalls in the stream – but not always.

If there has been no water loss in the stream, you will want to check your plumbing lines & connections next. Even "freeze-proof" flexible PVC has been known to crack over the winter. First, look for a wet spot in the yard where your plumbing line runs. If you find a wet area, it's possible that your plumbing is leaking close to that spot. If there is no noticeable wet area you will need to test your plumbing line(s). Using a threaded coupler & a few elbows on your piece of "flexible test plumbing" which you tested the stream with. Connect the plumbing to the inlet in the bottom of your Biofalls (if you have a Biofalls) and lay the piping on the ground, having it empty back into the pond. You have now essentially created a "closed system". There is no place for the water to splash out or evaporate as the stream and waterfalls have been eliminated. Run the system for 24 hours and see if you are losing water. If you are, now you know that your plumbing is your problem.

To repair the plumbing line is simple. Finding the leak, on the other hand, might not be as simple. You have several options. One mentioned previously is to look for a wet spot where the line is buried. If you find one, carefully dig down to the PVC line, turn the pump back on and look for & listen for the leak. Sometimes it will be kind enough to squirt you in the face, making the locating very easy. Other times it might be somewhat elusive. If no wet spot is located you can either dig up the entire line to find the source of the leak or you can lay an entire new line. If your pond is older and you have many mature plantings where the pipe was originally buried, you might not want to disturb them, in which case installing a new line is a better choice.

If you choose to lay a new line, lay it out where you will not have to disturb many plants. If your system has a biofalls you have the option of connecting the new line into the bottom of the biofalls, like the original installation, or bringing the plumbing in at the side or over the top of the Biofalls. In some instances there are plants (or large boulders) directly behind the Biofalls which almost prohibit the excavation of that area. At that point coming at the side or over the top might make more sense. If you do choose this method, you will need to drain the Biofalls and insert a siliconed plug into the inlet at the bottom to prevent water loss through the now vacated line.

REPAIR: With the location of water loss diagnosed you can repair it yourself, or hire a professional if it requires materials and equipment you don't have on hand. But you have saved the repairman hours of diagnostic time, which means you've saved yourself many \$\$\$\$\$. Most leaks are usually easy enough to fix by: packing soil under a low spot of the liner; rearranging the rocks to prevent excessive splashing; cleaning the leaves out of the stream; or removing excessive amounts of plants in the Biofalls - *which will cause the water to spill out the back side of the filter*. If it actually is a hole in the liner you can easily patch it with a liner repair kit. There are also products online that will allow you to repair cracks in rigid filtration systems - sometimes without removing the water.

Plumbing lines can be repaired one of three ways. The first way is to simply cut out the section of damaged pipe and splice in new piece of flexible PVC. This works best if there is a lateral crack in the line. If there is only a pin-hole in the line, cut the plumbing at that point and reconnect the two ends using a rigid PVC coupler. It's best to use a PVC glue that works in wet locations, as it's difficult get all of the water out of the line, especially if you have a long level run. Let the glue sit for the recommended amount of time and then test the system again. **DO NOT REBURY A REPAIRED LINE UNTIL YOU ARE SURE IT'S FIXED.** There have been instances where the new coupler leaks, or there is more than one hole. Once you are sure the problem is solved, cover the line up, grab an iced tea and sit back and brag to all your pond friends as to how you solved your water loss problem with no outside help.

Oh yes, I did say three ways to repair the pipe. The last way would be to call a professional.... but then you couldn't brag about your plumbing prowess to your pond friends.