



Finding a Pond Leak

INTRODUCTION

Finding a leak in a pond can be really frustrating. You just know that the water is disappearing faster than it should be, but you do not see a wet spot anywhere along the sides. You wonder if this is normal evaporation or if this is a big leak and you worry about how much your water bill is going to be or if excessive new water additions of water might contain excessive chlorine or chloramines.

EVAPORATION

Every pond is located in a different microclimate. Water will evaporate faster from ponds located in full sun, on a hot or windy day, with a large and splashy waterfall and with a long bubbly stream. If sunlight and therefore heat, is reflected off a building, then more water will evaporate.

The first thing to do is to figure out if the water is just evaporating or if it is really leaking. This is easy to do. Just fill a bucket with water, set it next to the pond, watch it for a day or two, and see how much water evaporates out of the bucket. The bucket method will not account for evaporation from waterfalls and streams, but will give a good indication of how fast the water normally evaporates. If pets can drink from the bucket, it should be set out in the pond, away from slurping tongues. If the bucket tries to float, fill the bottom half with rocks. If the evaporation is nearly the same in the pond and the bucket, your problem is solved. Well, planting a tree or installing a trellis may be necessary to really help slow the rate of evaporation.

Plants covering the water's surface, floating in the pond or growing along the shoreline actually increase evaporation. Water moves through plants (even the biggest trees) through evaporation. Water molecules stick together very well. As one molecule evaporates off a leaf's surface it pulls on the next one and next one and so on down the branch, trunk and into the roots and soil. The more leaf surface area there is in the pond, the more water will be evaporated. Having many plants in a pond provides a lot more surface area than the water alone, so a well-planted pond will lose more water.

Small leaks are okay, because they force the pond owner to replace it with cleaner water. Water chemistry does not stay static in a pond. As water leaves the pond through evaporation, the salts, proteins, hormones, poisons and other chemicals all remain, with their concentration slowly increasing until more water is added. Therefore, they become more concentrated in the pond water. An old adage is that "the solution to pollution is dilution." Adding new water, in this case, merely puts the chemicals back to their original concentrations. Making an actual water change is better and so if the water is leaking out

of the pond and carrying away polluting chemicals, the new water being added is a refreshing change to the pond water.

An automatic fill valve that is left running can mask a leaking pond. Water fill valves should be left off periodically to check for leaks. A valve that is left on so that the water just trickles in to the pond can keep up with a small leak or evaporation and not add too much water too fast or add too much chlorine too fast.

CONTAINER LEAK

If evaporation is eliminated as a problem, the next thing we must do is determine if the leak is in the pond containers or in the powered portion of the system or possibly in both. The first thing we do is shut the pump, filters and streams off. We mark the water level on every container in the system. We scratch a rock in the pond, use a pencil on the skimmer box, waterfall box and any other filter containers and we mark the water level in every stream section that holds water. Then we wait. We do not want to wait long if the leak develops in the season when the filters need to be on to manage fish waste and other pollutants, but in cooler seasons we can wait overnight if we need to.

If one container goes down and the others don't, then the leak is in that one and not the others. If none of the containers go down, then the leak is in the powered part of the system. It is possible to have two or more leaks, one in a container and one in the powered system.

The most common place for a leak in a flexible liner pond is along the edge. The liner will have wrinkles that have an "S" curve look to them. If the liner is folded over at the top of the pond edge to tuck it into the mulch, the "S" curve can fold over and become lower than the top, visible portion of the liner. If rocks are placed on the top edge of the liner to hide it, then the "S" curve may get stepped on and when it settles down into the soil, it leaks. This is especially common in the spring when the soil is soft and several people over a period of time, take a single path to the pond edge to check on the fish after a long winter.

The funny thing about a leak like this is that the soil or mulch on top of the ground does not necessarily get wet. Since the leak is already several inches below the soil surface and water sinks in to the ground, the leaking water moves away from view. It is helped on its path downhill if an underlayment is used. The underlayment material wicks the moisture down under the pond and into the ground. If the soil under the pond liner is heavy clay, the underlayment may wick the water to a lower area on the far side of the pond and it may appear that the leak is occurring in a completely different location.

If the pond container goes down a few inches and stops within the level of the skimmer door opening, you could have a leak around the skimmer door or a leak somewhere else. Since most people are very careful about how they install a skimmer, because they know it could leak, the leak is rarely there. The most common reason for a leak at the skimmer is that the silicone is not applied in a line wider than the screw holes that attach the liner to the box.

If the water level goes down and the liner edge has been checked so that it is above the water level, there may be a hole in the liner. The hole will be near the water level when it stops, but it can be below the actual water level, because it may not really be stopped when you start looking. Also, water pressure may force the hole open so when the water level drops the hole may close. Water seeping from the hole can also slow down because a leaf or other debris has plugged it up. Once the water level stops going down, you can lower it another few inches to make finding the leak easier.

Burrowing rodents have been known to chew small holes in several places around a pond as they dig their burrows. They seem to stop each burrow when the water starts squirting them in the face and they move to a new spot to continue digging.

When installing the pond, never trim the liner just above the water level. You must leave several inches of liner, folded over and tucked into the mulch, so that if there is any settling, you will have enough liner to pull up and use it to still hold in the water. If you trim it off too low you will never have the chance to easily fix the leak over the edge of the liner. This is especially true on sections of a stream where just a few leaves sticking at a waterfall can raise the water level behind the waterfalls by a half-inch or more. That may not seem like much, but when the water is running over the liner, it will add up quickly. Switching to a larger waterfalls pump or just cleaning an existing pump can have the same effect on water levels & leaks in streams.

I only know of one pond that leaked all the way to the bottom. After a frustrating week, the new pond customers finally drained the pond, flopped the liner out of the way and lined the hole with white newsprint paper. They flopped the liner back into place and partially filled the pond with water and red food coloring, after a few minutes they drained the pond and pulled up the liner. The paper was covered with more than a dozen red water spots. We do not know if some one poked the holes in the liner or if the liner roll rolled back and forth on a nail in the freight truck, but a new liner quickly solved the problem.

POWERED LEAK

If a pond only leaks when the pumps are running, there are several places the leak can occur. The most common is a leak caused by the splash of a waterfall. Any water that lands on a rock and evaporates away or that rolls off the back of the rock and out of the pond is a leak. Framing the area around the waterfall with cloth or paper will quickly show where the splashes are landing. Rebuilding the few rocks that are causing the splash is not usually very difficult.

Use black expanding foam that is designed to fill gaps between rocks, to force the water to stay where you want it to be. Mortar is difficult to work with, because it cracks and leaks with frost action and does not easily come off the rocks when you want it to. The foam sticks better, expands to fill voids, moves with the seasonal changes and brushes off when you want to make changes.

The third most common pond leak after leaking containers and splashing waterfalls is the leak of water from the powered part of the system. Dirty filters pads in a waterfall box or other open container can sometimes cause an overflow condition. Inspect around the edge of each box while the filters are running to see if water is bubbling up due to the water channeling around dirty mats. This is an easy leak to fix, just clean the filter pads more often.

It is rare to find a leak in a cracked pipe or fitting, but they do occur. Since they are usually underground, we try to eliminate all the other possible leaks first. Leaking pipes may only leak when the system is running and pressurized. If there is a check valve on the low end of the pipe and a filter box full of water at the high end, there may be enough water pressure to show a possible leak in the underground pipes. If the water in the filter box drops when the system is off, the leak is between the box and the check valve.

STREAM LEAK

To determine the location a leak in a stream, you will need an extra length of pipe. Take the pipe off the pump that normally runs to the top of the stream and replace it with the new piece. Run the new piece to the closest section of the stream to the pond and turn on the pump. If the leak shows up, then it is in that stream section. If the leak does not show up, then move the pipe up to the next higher stream section. Keep moving up the stream until the leak shows up and you will know the leak is in that section.

FIXING A LEAK

Leaks caused by holes in flexible liners are generally easy to repair once they are found. Clean off the liner around the leak with a scrub pad and soapy water if necessary. Dry it thoroughly using a hair drier if it is cool outside. Cut the corners off a piece of single sided rubber backed tape and stick it on. Rub it down so that it makes good contact and you are done.

CONCLUSION

No matter where the leak really is, the first place it will show up is in the bottom most pond level. That is because the water is being pumped out of this pond level and filling all the other levels before the water makes it back to the lowest level.

In most flexible pond liners, the leak is easy to find and easy to fix, which is one of the reasons we used the flexible liner in the first place.