# "How To" Series:
# Diagnosing Water Loss... Is it a Leak or Evaporation?

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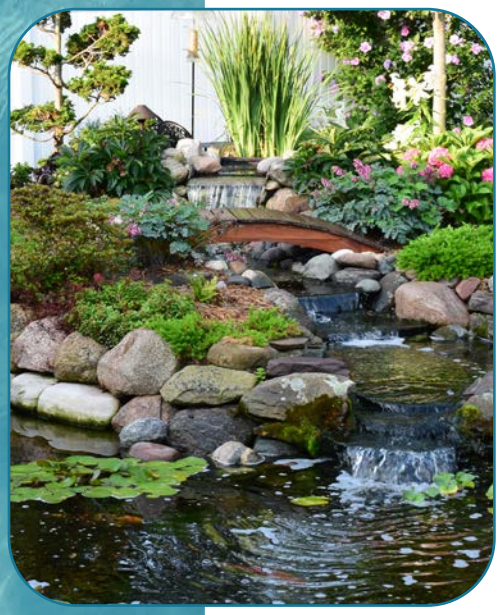

**At some point, for anyone who has been in ponding for any period of time, the question comes up. Is this water loss natural evaporation or do I have a leak? Other than the loss of fish to a Blue Heron's breakfast, I can't think of anything more frustrating for a ponder.**

Unfortunately, for water evaporation, there are so many variables, (air temperatures, levels of humidity, cloud cover, shade, winds, and even the amount of splash from water agitation like waterfalls) it is impossible to have a catch all formula or calculation. However, we can provide some general rules of thumb that will assist you in determining if it is natural evaporation, or it warrants exploring for a water leak.

## Address Water Evaporation First

A good "General Rule of Thumb" is a pond can lose ½" to ¾" of water per day under certain weather conditions.

One of my ponds is 20' x 13' x 3' deep. It also has an upper pond 12' x 10' x 1.5' deep, two streams totaling 15' in length and four waterfalls. There is a lot here that can contribute to water loss and evaporation.

I can go weeks without needing to add water. Then suddenly when humidity is only 20% and it has been windy, I will lose and inch of water per day.

Yet, in the summer when temperatures are in the 80s and humidity is running high the pond does not require any additional topping off. Go figure.

***TIP 1:*** *The swimming pool industry uses a very simple and easy to do test that tells you if it is evaporation or a leak. It is called the Bucket Test and it will save you a lot of time and frustration. Turn off the waterfall(s) and any fountains or spitters that would contribute to splash.*

### *The Bucket Test*

- *Take a five-gallon bucket and fill it 1-2" from the top with water.*
- *Set the bucket in the pond making sure that half the bucket is set above the water line.*
- *With a magic marker, mark the water level inside the bucket and outside the bucket.*
- *If you have a leak – the water on the outside of the bucket will drop more than the water inside the bucket. If they both drop at the same rate, it is evaporation.*

# Finding a Leak - A Process of Isolation & Elimination

**Using a very sequential checklist to isolate the leak location is the quickest and easiest process. This checklist should start out with the easiest things to do first and then move to the more involved explorations.**






*Photo: Josiah Specialty Water Gardens, Columbia, MO*

## PHASE 1: The Visual Checklist

**Check the silicone seal** on the skimmer box and the spillway of the AquaFalls filter box. Make sure the silicone seal is still in tacked. There should be no missing, loose, or pulling away of the silicone. *(Photo 1)*

There should only be silicone between the liner and the skimmer box. A common error is to have silicone on both sides of the liner (between the liner and skimmer box and between the liner and the face plate). The excess amount of silicone (between the liner and face plate) actually can fail sooner. This makes it harder to maintain a good compression seal between the liner and the skimmer box where it really matters.

**Check around the waterfalls for excessive splash** on the surrounding hot rocks, which will evaporate off, or goes beyond the liner. Check the ground for wet spots. You might be able to rearrange a few rocks and/or correct the splash by reducing the flow a little. Just make sure you still have enough flow for proper filtration. *(Photo 2)*

**Check the liner around the edge of the pond and streams** to make sure rocks and/or soil have not pushed it below the water line. A moisture meter used for indoor plants can be very helpful.

**Check for signs of wicking.** Check for landscape plants, like vines or ground cover, encroaching over the water. **Check waterfalls closely for the very ends or small clumps of encroaching feeder roots.** This would be an indication of a bigger issue.

The waterfall at the left looks absolutely fine until you look closer between the layers of rock. Aggressive plant roots are getting all the water they need. *(Photo 3)*

You can try to locate the source of the roots outside the liner area and cut them there, or if that is not possible due to rocks, the only thing left to do is rebuild the waterfall. *(Photo 4)*

**Check streambeds for visual signs of feeder roots.** If the pond liner in the streams or waterfalls were just overlapped and not seamed properly, this area would be a prime target for feeder root wicking.

## PHASE 2: Isolate the Pond from the Waterfalls & Stream

**Check to see if the leak is in the main pond.** Turn off the pump(s) to the AquaFalls filter box, stream(s), and any fountain spitters.

**Fill the pond to its normal full level.** Then measure the depth or make a mark on the skimmer face plate to mark the water line. Check the level over the next 24 hours.

**Keep your fish safe and healthy.** The pond can hold enough oxygen for a short period time and your fish should be safe, especially if you have an aeration system. However, you could reroute the pumped water directly back into the pond bypassing the AquaFalls filter box and stream.

**If the water level drops significantly, or at the same rate,** let the water continue down until it stops. At this new water level start looking very closely for holes or tears in the liner. If it stops just below the rocks on the rock ledge, and we cannot visually see any holes or tears, we will start looking under the rocks for tears. *(Photo 5)*

**If the water level remains constant in the pond,** then we have some confidence that the leak is located somewhere else.

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*Photo: Josiah Specialty Water Gardens, Columbia, MO*

## PHASE 3: Check the Waterfalls & Streams

**Check for wet areas along the stream liner.** Look for splash from the waterfalls and rocks that have settled pushing the liner below the water line. *(Photo 6)*

**Check for rocks or plant material that is creating a dam in the stream.** This can be subtle in appearance but enough to cause the water to back up over the liner.

**For leaks in the stream that are more difficult to locate,** attach a moveable water line to your pump then place the water line in the stream. By doing this, you can further isolate the leak. Try the following as a guide to locating the leak.

- **Day 1:** 1/4 way up the stream – no leak?
- **Day 2:** 1/2 way up the stream – no leak?
- **Day 3:** 3/4 way up the stream


*Photo: Josiah Specialty Water Gardens, Columbia, MO*

## PHASE 4: Checking for Plumbing Leaks

Finding leaks in buried tubing and fittings is more challenging. However, before you start digging, here are some tell-tale signs to look for first. *(Photo 7)*

**In cold winter climates, it is important to drain or blow out tubing and open all ball valves.**

**Were all ball valves opened?** Check to make sure you didn't forget to open a ball valve before freezing temperatures. Ice will destroy them. - guaranteed!

**Check to make sure check valves were properly placed.** They should be part of the pumps discharge check valve assembly and removed with the pump during the winter months. If they were located "in-line" water couldn't drain and expanding ice ruptured the tubing. If winter ice ruptured the line, it will probably be at the lowest point of the tubing.

**Look for vegetation that is greener along the tubing line.** Not the best form of drip irrigation, but a constant supply of water greens things up and a good place to start looking.

**Run an external supply line and by-pass the underground plumbing.** Run a line that is the same size, above ground from the pump to the AquaFalls filter box and let it run for at least 24 hours. This will tell you if you have a supply line leak.


***TIP:** I have seen ponds where the pump is sitting on the bottom, directly on the liner, instead of using a skimmer box. The vibration from the running pump has worn a hole in the liner. The older the liner, the more susceptible it is to damage.*

## The Good News is...

Most water loss is due to evaporation and/or easy to correct splash from waterfalls by moving a few rocks or changing the water flow.

Either way, we hope this information has made your evaluation proces a little easier, less stressful and provide you with more peace of mind.

Enjoy your pond!