

Measuring Pond Water Movement

By Larry Lunsford

One aspect of a healthy pond is good water movement. Your water should be moving well in all areas of your pond and filters. Your Koi need water movement for exercise. You don't want stagnant areas in your pond that can collect debris. Water should flow evenly through filter media and not channel through it or around it. It's relatively easy to determine the total flow rate of your pond - just add up the flow rates of all your pumps. However, this does not tell you how well this flow is distributed through your pond.

This article describes how you can assess the water movement in your pond. The technique is an adaptation from "Measuring Turbulent Flow In Reef Tanks" by Richard Harker. Harker's article can be found online at <http://www.aquariumfrontiers.com/fish/aqfm/1998/aug/features/1/default.asp>

To measure water flow in various areas of your pond use dissolving cubes. Place a dissolving cube at each point of interest in your pond and leave it there for a fixed time. At the end of the time period, remove the cube. By measuring the size and/or weight of each cube before and after its been in the pond, you can get a measure of the relative amount of water movement at different points in your pond. The dissolving cubes not only work in areas of smooth flow, but they give an accurate measure of water movement in areas of turbulent flow.

Start by preparing dissolving cubes. The cubes are simply made by mixing plaster of Paris and forming small cubes in ice cube trays, muffin tins, film canisters, or any other handy form. Make all your cubes the same size and shape. These dissolving cubes are made from the same material that Dr. Johnson uses for his Home-made pH Pills (see his web site info <http://www.koivet.com/phpill.htm>). Use plain plaster of Paris - don't use a plaster containing any ingredients other than limestone and gypsum. Put the same amount of plaster of Paris in each mold so that the dissolving cubes are as identical as possible. Allow the cubes to thoroughly cure. Remove cubes from their molds. Drill a small hole through each cube (it doesn't matter which way you drill the hole, just drill all cubes alike). Attach a piece of string to each cube through the hole. The string should be long enough to allow you to suspend the cube in points of interest in your pond. Put labels on the ends of the strings so you can keep track of the cubes (a piece of masking tape makes a good label). You could also cast the string in the cube or eliminate it all together if you prefer.

Put the dissolving cubes in strategic locations around your pond. Place them in areas such as: stream bed, in an array around bottom drains, near skimmers, in corners or other suspected stagnant areas, throughout filters, etc. Your Koi may decide the cubes are food or toys. You may want to put a couple of cubes in the pond where the Koi can check them out and learn that they aren't food before you start your water movement test. Give the cubes time to dissolve (from a few hours to a few days depending on the size of your cubes and the amount of water movement). Leave the cubes in until the fastest dissolving cube is down to 1/2 to 1/4 its original size. Check up on your Koi while the cubes are in the pond. If your Koi are fiddling with the cubes a lot it can cause them to be dissolved faster than they would from water movement alone.

Remove the cubes and measure them. You can just eyeball them to get a rough idea of how your water moves in different areas, or you can precisely weigh or measure them (before and after putting them into the pond) for more precise results. That's all there is to it. If you find you have uneven water movement through your filter, you can re-arrange the media and repeat the experiment until your filter performs as well as you desire. If you have dead spots in your pond, you can add or re-arrange pipe outlets and airstones to change water flows. An airstone will create an up flow of water with the

rising bubbles. When you're done, toss what's left of the cubes back into your pond - they're good for your water quality.