

Maintaining the health of fish and plants is directly related to the quality of the water in which they live and grow. Test the pond water for the following:

**Ammonia** Your results \_\_\_\_\_  
**Acceptable: Zero**

Ammonia is the first waste product of your fish. High protein foods left in the pond and decaying debris also add to the Ammonia load. Ammonia is more toxic at a higher PH. High Ammonia levels will burn fish gills and tissues. If left unchecked it can harm gills beyond repair. Ammonia is removed from the environment by beneficial bacteria. You can control Ammonia with proper filtration and partial water changes.

**Nitrite** Your results \_\_\_\_\_  
**Acceptable ranges are: zero**

Ammonia is converted into Nitrite by bacteria nurtured within your filter system. Nitrate (plant food) is the byproduct of the conversion of Nitrites. Nitrites are highly toxic to fish. Nitrites cause damage to the gills and interferes with the ability of the blood to carry oxygen. Lack of oxygen in the system is commonly referred to as "brown blood disease". Salt at .15% will protect fish until the filter is established. Nitrites can only be controlled with proper filtration and water changes as needed.

**Nitrate** Your results \_\_\_\_\_  
**Acceptable ranges are: below .5**

Routine water changes are the very best step of controlling Nitrates. Trickle tower filters (wet/dry) systems also are very good at eliminating nitrates. Increases in lighting will stimulate green algae growth, which is also a means to control Nitrites. Algae will consume Nitrates at a prodigious rate. Cleaning the pond bottom of algae growth and removal of the filth-holding slime in the pond is advised, but the pond needn't be "sterilized" or impeccably cleaned. Plants may be employed. In order to force the plants to use waterborne nitrates and phosphates, a soil-less potting media may be used so the plants can send out viable root systems, but all their nutrition is derived from the water. Because feeding and stocking rates influence this so dramatically, a reduction in stocking density and feeding rates can make an improvement in the accumulation of Nitrates.

**Total Alkalinity (KH)** Your results \_\_\_\_\_  
**Acceptable ranges are: KH - 100 ppm minimum is recommended**

Alkalinity (KH) is the ability of water to resist (buffer) changes in pH. Alkalinity (also known as Carbonate Hardness or KH) is the measure of bicarbonate ion concentrations. These minerals are present in all tap water regardless of their source to some degree. An alkalinity value of 100 to 300 ppm is good. These levels provide greater buffering and a more stable pH. If alkalinity is less than 60 ppm then wide pH swings are common and a filter crash is imminent.

**pH** Your results \_\_\_\_\_  
**Acceptable ranges are: 7.0 – 9.0**

The pH of the water is a measurement of acidity and alkalinity ranges from 0 to 14. Below 7 is acidic, 7 is neutral, and above 7 is alkaline. In a pond pH may fluctuate due to the filter activity, lack of KH (buffering) and carbon dioxide levels in the water. Carbon dioxide from fish metabolism, plant respiration, mineral acids from pollution, organic acids from decaying debris, and impurities that leach into tap water all lower pH. A deficient KH (bicarbonate level) in the pond will cause the pH to crash. Very slight pH variations will not harm fish significantly as long as they do not go too low or too high. Koi and goldfish, however, prefer a pH between 7.0 and 9.0. A proper KH (bicarbonate) level in the pond will keep the PH from deviating from a level of 8.4 which is desirable for koi and goldfish.

**GH** Your results: \_\_\_\_\_  
**Acceptable ranges are: 60ppm upwards**

GH is what is referred to as General Hardness. Water that is too soft (below 60ppm) cannot support fish health and life. It lacks the calcium and magnesium necessary to maintain growth and health. A very low GH test result in the pond water can effect the PH levels in the pond causing the PH to drop.

It is important to test the pond water during the "start up" time of year – spring and when cycling a new pond. Knowing these results will allow you to know your pond and know when something isn't "quite right" with fish health. This information is invaluable when trying to isolate a fish health episode. Water quality is the first area to examine when fish are experiencing difficulties. Also, be sure to test your tap water so you know what you are adding to your pond.