

## A Koi Needs a Pond

**Keeping koi in an aquarium, even a very large one, has unavoidable consequences.**

*By Steve M. Meyer*

Q. I have five koi that are just over three years old in a 130-gallon aquarium. Their sizes range from 12 to 24 inches. The aquarium is equipped with two power filters, one canister filter and two powerheads driving two submerged mechanical filters.

The fish are healthy and active, and both my wife and I enjoy them very much. The problem is obvious. They have outgrown the aquarium and they are still growing. They have already broken the pieces of glass on top of the aquarium many times due to their jumping, often when I was trying to change the water.

There is no possibility of my building a pond inside or outside the house, and a larger custom-made aquarium would have to be built on site because it would not be able to get through the entrance. I am looking for advice regarding a more efficient and low maintenance filtration system and any other suggestions for a way to cover the aquarium. We don't want to give the fish up.

A. I'm afraid you are not going to be happy with what I have to say. Despite all the best of intentions and technologies, there is simply no way you are going to keep those fish alive — let alone healthy and happy — in that 130-gallon aquarium for much longer. No amount of filtration, aeration, water changing and so on will matter.

Consider this. Suppose you had a free-flowing pond and stream system near your home. Imagine that the water from that natural source was absolutely pollution free, always kept at a temperature of around 70 degrees Fahrenheit, and was near the saturation point in dissolved oxygen concentration. And suppose you were able to pump 100 gallons per hour from the pond through your aquarium year round.

The fish would indeed survive for a while. But ultimately they would die from stress-induced disease. This is because there is more to maintaining a healthy aquatic environment than biofiltration, aeration and feeding. As koi mature they have a wide range of physical, biochemical and behavioral requirements that can only be met by "space."

Let's just assume that you have three 18-inch animals. If they are at all healthy then they probably weigh around 2¼ pounds each. So you have almost 7 pounds of fish in about 100 gallons of water (taking into account gravel, air space at the top, etc.).

For the sake of a rough approximation, assume that the fish have the same basic density as water. Because water weighs about 8 pounds per gallon, it follows that about 7 percent of the aquarium volume is taken up by fish!

Even in the most incredibly over-crowded fishponds — in which as a matter of routine catastrophic fish die-offs occur every several years — I have never seen a ratio exceeding 1 percent. (As regular readers know, my absolute maximum rule of thumb ratio is about 0.1 percent.)

Moreover, the configuration of the water volume matters. Even in the most ridiculously overloaded ponds the fish have the space to turn around freely and roam. If your aquarium is 24 inches wide, your largest koi has to struggle to change direction. Repeated physical contortions just to maintain some degree of motion will be fatal.

This Aquarium Fish International magazine has used a lot of column space to discuss stress as a source of disease. I recommend you review these articles. You are holding these fish in conditions that will induce chronic stress of ever-increasing amounts. I urge you to take these fish to a local store or breeder and trade them in for three young (6-inch) koi. "Recycling" your koi is the only intelligent and humane option you have.