Water Quality

As owners and care-givers of our aquatic and semi-aquatic animals there is one component that is of upmost importance, that is water quality. Water quality goes beyond the clarity and smell of the water, though those can be indicators of good/bad water quality. When it comes to the health of aquatic species we have to always think of the environment, i.e. the water. If you take terrestrial species or even humans for that matter our environment mainly consists of air, to which most of the time we don't consider the quality of air. Now if you live in a major city where smog is an issue, then you understand the importance of air quality. This principle is paramount to our aquatic species, not only do they live in their water environment, they also eat, sleep, and eliminate in it. Then take that fact that our aquatic animals then live in enclosed aquariums, where water quality can quickly go from good to bad; to even worse. There are many aspects to understanding water quality. I want to introduce you to certain parameters that should be monitor weekly and even as much as daily. There are many other aspects to water quality that we won't go over at this time; such as, filtration systems, pumps, heaters, light cycles, etc. I want to focus on water chemistry and touch on those other aspects at a later time.

Water Chemistry

At your local fish store you probably have seen water quality kits that change colors. I want to explain the importance of these parameters and why we measure them.

Temperature

Fish and other aquatic species (amphibians and reptiles) cannot regulate their own body temperature. Therefore they must rely on the ambient temperature. Every aquatic species has a certain temperature to which they are accustomed to, thus it is important to do thorough research on any potential aquatic animal before purchasing. In addition; temperature also affects salinity (specific gravity), dissolved oxygen (DO), ammonia, bacterial growth, animal health, and pH.

Salinity

Salinity is the total concentration of dissolved ions in water, which is usually read in ppt (part per thousand) or another unit of measure is Specific Gravity. Most take this measure with either a hydrometer and/or a refractometer. This measure is less important in fresh water systems, though become important in brackish water systems and salt water systems. Salinity affects oxygen saturation, ammonia, and certain animal species.

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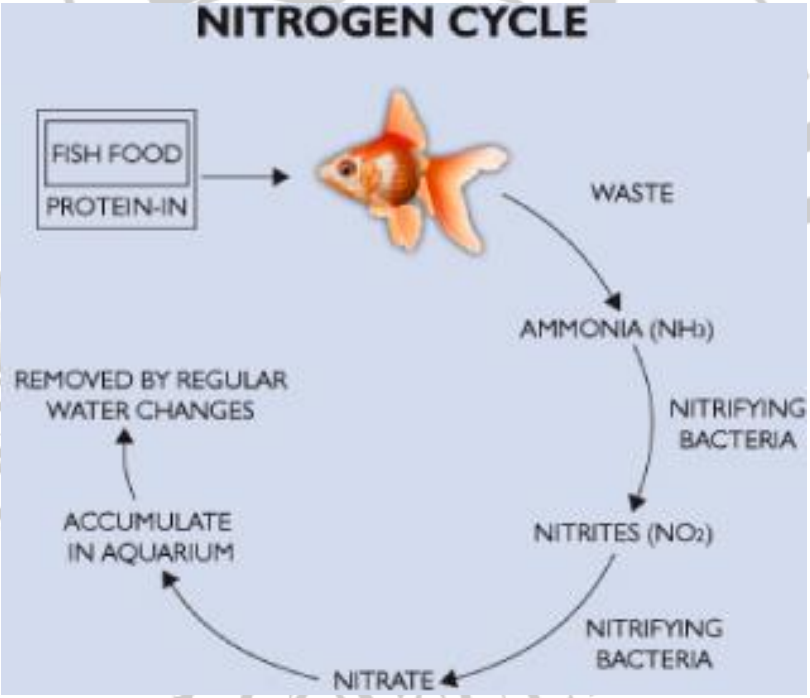
Ammonia

To fully understand ammonia, you need to understand the nitrogen cycle. Here are some important aspects of the nitrogen cycle. Fish waste consists of ammonia. The ammonia is converted to nitrite via the aid of bacteria, a process called nitrification. Nitrite is then converted to nitrate via the aid of bacteria. Nitrate is then removed via water changes, bacteria (process called denitrification), and assimilation by algae, and commercial removers. This is a simplified overview of the nitrogen cycle and can be better explained during a discussion on filtration systems.



http://bettafishawarenessday.blogspot.com/2012/09/understanding-proper-water-conditions.html

Nitrite

Nitrite is converted from ammonia via bacteria. Nitrite is toxic to fish, which causes asphyxiation, lethargy, rapid respiratory rate (rapid gilling), and change the gills from a red color to a brown/tan color. Nitrite toxicity is more of a concern in freshwater systems. Saltwater systems are less susceptible due to the sodium chloride (NaCl) interferes with the uptake of nitrite into the gills.

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Nitrate

Nitrate is converted from nitrite via bacteria. Nitrate is toxic at very high levels but for the most part it is relatively non-toxic. It is decreased by water changes, plants, algae, and anaerobic bacteria (bacteria that don't require oxygen).

pH

The pH is an important parameter that is specific to the type of water system. Freshwater is close neutral pH (6.0-8.0) and saltwater is slightly alkaline (8.0-8.5). Deviations either to low or high can affect animal health. The pH is affected by the nitrogen cycle, photosynthesis, temperature, and buffers.

Oxygen

Oxygen is measured as dissolved oxygen. Oxygen is affected by temperature, atmospheric pressure, salinity, time of day, water movement, and stocking density.

Conclusion

Monthly, weekly, and daily monitor depends on how established your system. The aforementioned parameters are some of the most common and some kits test for further parameters. My hope from this discussion is that you see how these parameters affect each other and how they play a role in animal health.

Robert Martinez, DVM
drrobmartinez@aquaticvetconsulting.com
http://www.aquaticvetconsulting.com/