

If the lake quality does not improve then no biological organism will survive, says Ramachandra

By Vidhya Krishnan | March 15, 2016

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A wash of dead fish on the shores of Bengaluru's Ulsoor Lake March 7, has stoked concerns about pollution among residents in the area. There was a similar scene at Kaikondrahalli Lake witnessed on June, 2015.

In an email interview with The SoftCopy, T.V Ramachandra, a member of Energy and Wetlands Research Group, Indian Institute of Science, Bengaluru said that the presence of nitrogen and phosphorus in the untreated sewage provides a favourable environment to algal bloom and enhances biological activities. Moreover it becomes a viable habitat for disease parasites leading to decline of fishes.

SC: What is the ideal living space for a fish?

Ramachandra: Fish requires oxygen and food. Most fish species in this lake require a "dissolved oxygen content of 5 mg/l". Apart from this, planktons (phytoplankton and zooplanktons) are required to meet its food requirement.

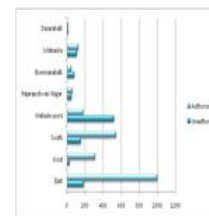
SC: Due to the system of linking of lakes in Bangalore, do you think the fish migrate? If so, can the same scenario (of dying fish) be seen on other lakes as well in the coming years?

Ramachandra: Most of the interconnectivity amongst the lakes in Bangalore is choked now because of the solid waste dumping. The migration happens mostly during the monsoon. The enhanced biological activity in the lake is seen during other seasons, when the temperature goes up which is the reason behind this dying of fishes in lakes in Bangalore.

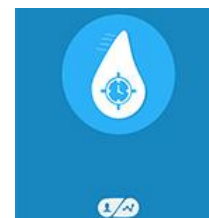
This is not because of pathogens. Suppose the fish from one lake goes to another lake and if it gets a better environment then it might survive unless the dead body of the dead fish goes to the lake then that becomes a serious issue.

It is because of irresponsible action of BWSSB and industries for letting in effluents into the lake that is

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causing this situation.

SC: How does polluted water affect fish metabolism? Can it be in any way related to osmoregulation (definition) in fish?

Ramachandra: We have not looked at this aspect. But it has been in news many times, that lakes are covered with macrophytes such as water hyacinth. This is also a reason for disappearance of native fish species in eutrophic (high nutrient) regions.

SC: "This occurred because of a high amount of organic content in the lake due to untreated sewage. With temperatures rising in the city, there is more biological activity and a reduction of oxygen levels in the water, which caused the deaths," TV Ramachandra, professor at Bengaluru's Indian Institute of Science, told *Mashable (<<http://mashable.com/2016/03/07/dead-fish-bengaluru/#vFOh3WrLWSqo>>*).

What does "more biological activity" mean in your above words?

Ramachandra: "more biological activity" here refers to higher algal and bacteria activities. High nutrient content in the lakes leads to algal bloom with bacteria population. Oxygen given by algae is consumed by bacteria (leading to depletion of oxygen) and during night algae uses oxygen. The Dissolved oxygen (DO) content is usually zero from the place where the sewage enters into the lake and remains the same during the late evening hours.

SC: How does the organic content in lake due to untreated sewage affect the fishes biologically?

Ramachandra: Untreated sewage essentially contains N (nitrogen) and P (phosphorous). The presence of N and P allows favourable environment for algae (with lot of nutrients) leading to bloom. This provides an ideal environment for algal bloom. Enhanced biological activities (bacteria, algae) would increase the demand for oxygen leading to depletion of oxygen in the water.

Apart from these, this becomes viable habitat for disease parasites, leading to the decline of fish.

SC: What happens if these dead fishes are not removed on time?

Ramachandra: We need to remove as quickly as possible otherwise it becomes a suitable habitat for disease vectors.

SC: How are these dying lakes affecting the overall fish ecosystem balance?

Ramachandra: Fish is a source of protein for millions of humans, be it health or occupation. Individuals dependent on fishery are affected due to loss of livelihood. A good lake gives goods in the form of fish, fodder etc which adds up to 10,500 rupees per day per hectare which when compared to polluted lakes is just 20 rupees per day per hectare.

Apart from this, contaminated lake (due to sustained inflow of effluents and sewage) has been one of the reasons behind contamination of surrounding bore wells/ groundwater resources. Food and contaminated water decides the human livelihood.

SC: If the lake ecosystem does not improve, then what are the future effects on the fish in the lake? Do we see any kind of scenario for extinction of fish from lakes?

Ramachandra: If the lake quality does not improve then no biological organism will survive. If there is no biological organism then there won't be any bio remediation. If there is no bio remediation then contamination will continue to happen. It is a chain reaction where if there is no life in the water body then naturally there is no treatment.