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Perspective

Changes of Qarun Lake According to Seasons

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INTRODUCTION

In Lake Qarun, Egypt, the seasonal link between the macrobenthic fauna community and the physico-chemical properties was investigated. El-Batts and El-Wadi drains carry a significant amount of agricultural drainage water to Lake Qarun from nearby cultivated area. The results collected generally indicate that the continual discharge of pollutants into the Lake's water has resulted in a decrease in dissolved oxygen, clarity and an increase in COD, NO_3 and NH_3 at the stations in front of El-Batts and El-Wadi drains. According to the WQI, Lake Qarun's water quality is unsuitable for aquatic life.

Sixteen species from three phyla made up the macrobenthic community: *Mollusca* (7 species), led by *Cerastoderma glaucum*; *Annelida* (4 species), led by Limnodrillus spp.; and *Arthropoda* (5 species), led by Balanus pallidus. Numerous causes, most notably pollution from sewage-contaminated drainage water, had an impact on the structure and number of macrobenthic species, which in turn affected all living things in the lake. Lake Qarun's WQI values ranged from 32.30 to 38.40 (bad class) and the area's average value was 35.89 ± 1.64, which is considered unsatisfactory for the utilization of aquatic life.

DESCRIPTION

The only enclosed saltwater lake in Egypt is called Lake Qarun. It is located 83 kilometres Southwest of Cairo in the El-Fayoum depression's Western desert. The lake is directly connected to the River Nile *via* the Bahr Yussef canal, however it is not connected to the sea. El-Batts and El-Wadi drains collect agricultural drainage water from nearby cultivated area.

Over the past few decades, there has been growing worry about the wide range of toxins that are contaminating the aquatic environment. Many environmental pollutants have been reported to enter Egypt's natural waterways, such as rivers, lakes and oceans, through home, industrial and agricultural effluents generated by human activity. An increasing quantity and volume of commercial, industrial and agricultural chemicals are being released into aquatic environments, which has resulted in a number of negative consequences on fish and humans who consume them.

Lake Qarun is now dealing with a number of environmental issues. Fayoum province provides it with drainage water for sewerage and agriculture. As a result, the salinity gradually rises, having a significant impact on the lake biota. The majority of the drainage water enters the lake through two main drains, Al Batts and El Wadi, as well as two pump stations, the main pump station and the Khor Alhitan pump station. The drainage water is received by the lake through a system of twelve drains. The Egyptian Company for Salts and Minerals (EMISAL) is situated on the lake's Southern shore, where a port was divided into several concentrating ponds and closed off from the lake to concentrate the lake's water up to ten times its initial salinity. The situation was made worse by the EMISAL brine water effluents that were released into the lake. Since Lake Qarun is a closed ecosystem, a large amount of water evaporation leads to the accumulation of chemical pollutants (pesticides, heavy metals and other pollutants), which is expected to change the quality of the water and fish in the lake and have an impact on their aquatic life.

Anthropogenic pressures, especially the introduction of chemicals into the water, can have a negative impact on a variety of aquatic plant and animal species. An aquatic ecosystem is characterized by the intricate interplay of physical and biochemical cycles. Only physical-chemical factors that support and preserve aquatic life may be considered in water quality standards for the preservation of aquatic life. In order to evaluate the quality of water for industrial, agricultural, residential and ecological health, regular monitoring of water resources is important.

Since water temperature fluctuates both spatially and temporally, it is one of the most fundamental physicochemical characteristics. It has an impact on aquatic creatures' metabolic rates as well as the capacity of water to retain oxygen. It also has an impact on trace metal

availability, which indirectly impacts water pH. Fish development and reproductive behavior are impacted. As the temperature rises, the solubility of solids increases while that of gases decreases. As a result, as temperatures rise, vital gases for aquatic life diminish.

Temperature generally affects the rate at which basic biochemical processes occur, which in turn affects the characteristics of organisms such as their rate of development and survival. Ammonia, nitrite and nitrate are salts of nutrients that are vital to aquatic species' growth and metabolism; an increase in their concentration disturbs the biological equilibrium. Due to human activities, salts in aquatic ecosystem nutrients have significantly increased over time, resulting in a water quality issue.

Significant work was required to restore the lake's health and purity and more data was required to create a database for the best fisheries and water quality conditions, which would aid in the lake's management.

Therefore, the primary goal of this study is to monitor changes in Lake Qarun's water quality by determining the physicochemical characteristics of the water during each of the four seasons.

CONCLUSION

The water quality analysis of Al-Batts and Al Wady drains showed that they were the most highly polluted sampling location. This was because these two enormous drains discharged sewage and agricultural waste into Lake Qarun. Additionally, pollution appeared to be concentrated at sampling sites B1, W1, P1 and K1 and to be more contaminated than other sampling points as the distance between two drains and two pump stations increased.