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Ecology of lakes and its conservation

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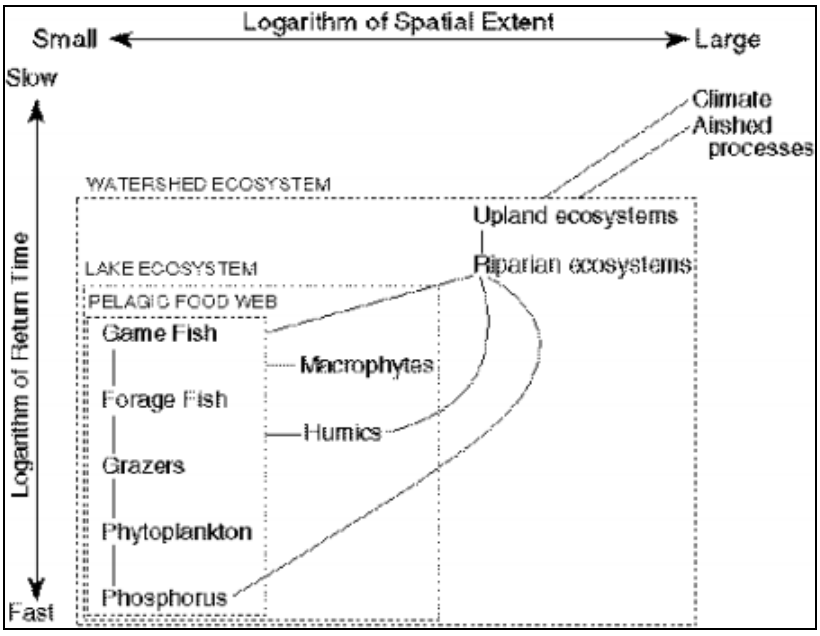
Abstract
Water is very important resource for every living organism of the world. It is available through many sources to all. Some of its sources are rivers, ponds, rain and lakes etc. Water fulfills the daily needs of every living organism. It also has some biological importance. Its role in metabolic activities is significant. Lakes are good sources of water. Lakes are used as tourist places for human beings and works as money earning service for the local people by providing the facilities of boating and fishing.
Another big benefit of lakes is that it preserves many living organisms like fishes, ducks, small intersects to maintain the balance of ecology. Many species of fishes are found in lakes. Hence, lakes are very much valuable in preserving these organisms. The current article highlights the ecology of lakes and its conservation.

Keywords: lake, water, ecology

Introduction

There are many lakes in India. Dal Lake, Chilika Lake, Sukhna Lake, Ooty Lake etc. The water of lakes is used for the purpose of irrigation, hydroelectric power and dilution of pollutants etc. But, in the recent years, it is observed that with the effect of global warming, these lakes have started to dry in many places and their existence is in danger.
Also, in some cases, it is found that the quality of water is decreasing in lakes of urban cities due to industrialization. It is a fact that this industrialization has speed up the growth of development but on the other hand, it has really damaged the whole natural sources.
Men are just thinking of more and more development without caring about the loss of nature. It is certainly harming the balance of ecology and it may have some adverse effects in the future if the balance between nature and development is not maintained.
According to a report, many species of living organisms are in minor stage due to deforestation and disappearance of lakes. The species of water bodies like fishes, ducks, crocodiles etc. are facing the anger of their existence as most of these are dies due to water pollution and hunting.
Government needs to take hard actions to conserve the lakes and purify their water so that the existence of these precious species of water bodies can be preserved. Hunting is also a big factor which is causing decrease in the number of these water body species. All these things need to be stopped so as to maintain the balance of ecology otherwise the existence of human beings would also come in danger if the destruction of the nature continues like this.



Ecology of Lakes

Lakes are bodies of non-marine standing water connected by water flow and aerial inputs to their surrounding landscapes (watersheds). As relatively discrete ecosystems, the interplay between physical, biogeochemical and organismal processes in them is especially clear, and can be studied, understood and put to use in effective management. Sunlight penetrating from the lake surface provides energy that warms the surface water, energy for photosynthesis and an environment suitable for predators that hunt by sight.

The depth to which light penetrates is determined by the amount of suspended particles (phytoplankton, organic and inorganic sediments) and colored organic chemical compounds dissolved in the water. Important chemicals entering from the watershed include essential nutrients (chiefly phosphorus and nitrogen) and pollutants that are taken up and passed through the food chain from primary producers (phytoplankton and rooted plants) to consumers (animals that eat plants and other animals).

All organisms in lakes have adaptations that affect the strengths of their interactions with their physical and biogeochemical environments and with other species in the food web. Introduced species, pollutants, and other changes in the environment result in rapid evolution of the adaptations that determine interaction strengths. These processes are particularly obvious in discrete lake ecosystems.

Lakes are relatively discrete ecosystems; the interplay between physical, biogeochemical and organismal processes in them can be easily studied. Lakes take up a small proportion of the Earth's surface but their ecological importance is disproportionately high. Lake ecosystems are influenced by their watersheds; a lake and its watershed are often considered to be a single ecosystem.

Thermal stratification in lakes generates vertical structure and compartments with different physical, chemical and biological properties. The shallow-water littoral and the open-water pelagic are the two major horizontal zones in lakes; each zone has its characteristic food chain based on macrophytes and benthic algae or phytoplankton. Carbon, nitrogen and phosphorus are the major nutrients affecting lakes and their watersheds as part of their biogeochemical cycles. Production is limited by phosphorus in most, but not all, lakes.

The lake sediment plays an important role as habitat for rooted plants and animals, as nutrient storage (particularly phosphorus), and as a repository of decayed material and dormant stages of lake organisms. Both bottom-up and top-down processes determine the trophic structure and dynamics in lake food chains and webs. Lake ecosystems are shaped by both ecological and evolutionary processes that occur on the same time scale.

Discussion

Jammu & Kashmir is one of the beautiful parts of this planet with rich water resources. There are many water bodies in Jammu & Kashmir and Dal Lake is a largest water body after Wular Lake situated in Srinagar, the capital of J & K which lies more than 5000 ft. above the sea level. Dal Lake is world famous water body which needs to be preserved. The Government of Jammu and Kashmir has commissioned an authority to save this water body from pollution called Jammu & Kashmir Lakes and Waterways Development Authority.

The waters of Dal Lake support a permanent floating population of some 7000 people, with whole villages having in effect been illegally created in the lake. The lake supports a huge floating market garden industry, an important fishery and a booming tourist industry. Weeds are harvested for cattle fodder. The lake also acts as a sump for a great deal of the waste products from Srinagar. Dal Lake, subjected to an ever increasing rate of eutrophication and siltation, has been estimated to totally disappear within the next 50 years.

Harvesting of rainwater especially during the rainy season is most important which means that during this period we should be able to absorb and conserve the maximum quantity of this natural water for our domestic and agricultural purposes. The over flow of this rainwater in the shallow basin forms the lake. The water retention power of the soil due to too much of the moisture present already in the soil results into the natural accumulation of water from the surroundings which result into the natural formation of lakes which differ from ponds as these are manmade for domestic purposes.

Floods and droughts which have happened this year in our country are the natural calamities of life and property which are caused due to higher temperature for longer period.

Fingerling i.e., seeds of different varieties of fishes are released in these ponds and lakes which give income to farmers. The most important characteristics of majority of these lakes are their temperature patterns with depth. The stratification plays a major role in the movement of nutrients and dissolved oxygen and has an important control effect on Lake Ecology.

The pattern of sediment deposition in lakes depends on the rates of supply in flowing water and on surface current and topography. Earth rotation has an important effect on the flow of water within the lake. The action of wind also helps in direction of water flow. The biological health of the lake is crucially dependent on its chemical characteristics.

Limnologists and hydro biologists concern with cycling of basic nutrients within a lake system particularly carbon, nitrogen, phosphorus and sulfate sediments and silt of a lake, which is rich on nitrogen and help in the increase of agricultural yields. Risk of diagnosis of pollution is one of the key tasks in the field of ecological monitoring of natural and technogenous environment.

Eutrophication in the lake ecosystem is a natural process, which can be greatly accelerated by those activities which may discharge nutrients in the form of pollution. Accelerated eutrophication results in the production and accumulation of organic matter through excessive growth of algae and other plants.

Eutrophication can have a significant effect on domestic, industrial and recreational uses of water. Excessive growth of algae results in high water treatment costs to make water potable and it can impair the aesthetic qualities of neutral waters. A portion of the nutrients, soluble and insoluble, introduced to an aquatic system becomes a part of bottom sediments.

Eutrophication can be analyzed quantitatively by modeling and thus the effects of various parameters will be analyzed which in turn help us in monitoring and controlling the point sources and non-point sources of pollution. The subsystems

that contribute for the eutrophication are modeled using neural network based system. With input/output from a system, a neural network dynamic model is developed using supervised learning.

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