PREFACE

The environment consists of the atmosphere, hydrosphere and lithosphere. When parts of the environment change its chemical composition changes as a result of human activities, without any obvious biological consequences. From the global point of view; it would be a great interest to compare the amounts of element added to the water Cycle by man’s activities with the amounts which are cycled naturally. It is of primary importance that water would be available to living organism in sufficient quantity, but scarcely of less significant is the quality of water. In this connection, the pollution of many rivers looms as a problem of the first magnitude and represents wasteful misuse of water and discharge of substances produced by human population in water.

The high rate of increase in human population in India and rapid pace of its industrialization have created problems of disposal of waste products. Maintenance of harbors, industrial plants, agriculture, food developing plants, villages, town and cities discharging their domestic wastes into the water bodies. The human activities increases progressively all over the world; they exert an over growing influence on near shore and banks of these water bodies and the organisms contained therein. All the polluting components (oil products, chemical wastes, domestic sewage, radioactive substances and heated effluents form cooling systems of industrial installations and power stations) tend to enrich the water with foreign organic and inorganic components, thus, influencing, as a special investigations have shown the endemic bottom invertebrate fauna modifying its composition, pattern of distribution, biological cycles and the activities of individual species (Manivaskam, 1987).

Experts estimated that industrial and domestic waste water introduces up to a million different pollutions into natural waters. Substances such as polycyclic, aromatic, pesticides, radioactive
material and many trace elements directly enter the human life. The latter groups of pollutants are noted in two respects firstly, many trace elements are not usually eliminated from aquatic ecosystem by natural processes, in contrast to the most organic pollutants and secondly most elemental pollutants are enriched in mineral and organic substances. Amongst these elements, toxic metals such as mercury, cadmium, arsenic, copper and many other species like fluorides tend to be accumulated in bottom sediments. They may be released by various processes of remobilizations and move up the biological chain thereby reaching human beings where they produce chronic and acute toxicity.

The earlier studies on water pollution were motivated primarily by public considerations. The physical, chemical, microbiological and biological changes that occur in unpolluted streams and streams polluted by domestic waste are adequately, not completely understood. Various aspects of these changes have been studied with the exception of the biological changes. The principal area concern today is the need for understanding the biological effects of the various industrial wastes and hazardous chemicals on the biological resources of receiving water. Many industrial wastes prove to be complicated mixtures of metals, organic substances, greases and oils derived for the lubricants used for plant machinery and any other materials most easily disposed of through a floor drain, will be discharged into water ways containing substantial amounts of toxicants or oxygen reducing substances derived from other industrial or municipal waste sources.

Environmental pollution and human efforts for the betterment of living standards are the two sides of the same coin. In the wake of the industrialization consequence, urbanization and ever-increasing population, the basic amenities of life, viz, air, water and land are being polluted continuously. Industrial complexes have become focused on environmental pollution.
Public interest in ecology implied a concern for air and water quality, for the increasing demand on limited natural resources in the context of increasing population. Today water resources have been the most exploited natural system since man strode the earth (Dara, 2002). Time is perhaps not too far when pure and clean water, particularly in densely populated, industrialized water scare areas may be inadequate for maintaining the normal living standards. Ground water, rivers, dams, seas, lakes, ponds and streams are finding more difficult to escape from pollution. Many rivers of the world received heavy flux of sewage, industrial effluents, domestic and agricultural wastes, which consist of substances varying from simple nutrients to highly toxic hazardous chemicals.

Hydrogen, oxygen, carbon, nitrogen, calcium and phosphorous are the elements present in greater quantity in both soil and water. They are required in larger concentrations than the other elements and most studies of the problem have focused on carbon, nitrogen and phosphorus. Hydrogen and oxygen are present in almost limitless supply, the hydrogen coming from water and the oxygen from the air. Although nitrogen is abundant in air, not readily available to living organism because of the nitrogen triple bond energy. Calcium is generally available via soluble components. An organism required the supply of nitrogen in a special form i.e. easily metabolized. Thus, the presence of certain numbers of moles of nitrogen atoms might not be a sufficient condition for the organisms continued existence. Phosphates and sulphates occur in the bottom sediments and in biological sludge, both in precipitation in organic forms and incorporated in to organic compounds where as carbonates, bicarbonates and chlorides are dissolved in water. In an aquatic ecosystem, physico-chemical environment has profound influence on its biotic components. It controls diversity, biomass and spatial distribution of biotic communities in time and space. The physical
and chemical parameters exert influence both individually, collectively and their interaction produced abiotic environment which ultimately conditions the origin, development and finally succession of biotic communities. Further, biotic communities intern, continuously alter abiotic components goes in a dynamic ecosystem (Tyagi and Mera, 1990).

With rapidly advancing technology mans impact upon the world of living things is beginning in the environment, some of these are toxic and non toxic. Man is a basic pollutant responsible for the pollution hazards and toxic effects. The toxic chemicals are discharged by industries into air, soil and water get into human and animal food chain from the environment. Once, they enter into the biochemical process, they produce serious effects on living conditions. Man has brought great changes in the natural environment both intentionally and accidentally, with disastrous consequences. Geochemical and biological process is also involved in metal pollution together with human activities in the field of technology, which resulted in contamination of various water bodies. The problem of water pollution by heavy metal is well known to be of crucial importance all over the world and especially in developing countries like India (Patil, 1993).

Natural water is extremely varied in chemical composition and factors controlling the composition include physical, chemical and biological processes. Dams are the most important water resource. Unfortunately, the dam is being polluted by indiscriminate disposal of sewage, industrial wastes and human activities through rivers. The rivers are always victims of impact of urbanization. Most water bodies become contaminated due to incorporation of untreated solid and liquid waste. Generation of hazardous waste has become an integral part of different activities of modern man. Large quantities of sewage and industrial waste find its way to river and dam water bodies. Large towns in India are situated on the river banks, their runoff and those form
agricultural and lands find their way to the river making the water unfit for human use (Manivasakam, 1987).

Physico-chemical characters becomes essential part of study and also generates baseline data regarding the extent of pollution and sources for the same. Studies on the physico-chemical characterization of single industries have been reported by various researches and the related impacts on the surrounding areas have been investigated in our country (Trivedy, 1988). Various researchers studied physico-chemical characters of drinking water (Raju, 2001). Extensive research has been carried out on the characteristic of rivers and dams at various stretches in India and abroad. Some of the major rivers investigated in India include Ganga, Yamuna and Godavari which are polluted mainly due to the domestic wastewater discharge. On otherhand, the main sources of pollution of the river Godavari are uncontrolled and partially treated industrial effluents containing toxic metals (Pondhe and Jadhav, 2000).

The present study was undertaken on the water quality of Godavari river water and the survey of the dam with reference to present status, topography of areas, degradation areas, altered areas, identification of water flow, identification of human intervention, industrial wastewater and residence of human population, socioeconomic status of the villages along the dam, seasonal primary productivity, seasonal physico-chemical and biological characteristics of water quality, diversity of fauna including macro invertebrates and avifauna, determination of enrichment of heavy metals, identification of areas threatened and endangered species.

The study was carried out to determine the effect of heavy metals on the distribution of inhabiting bottom fauna. The major sources of heavy metal inflows are industrial, agriculture runoff and domestic releases. The water, sediment & benthic macro fauna were collected from different stations. The work has been
carried out to determine the enrichment of metals like Iron, Copper, Chromium, Zinc, Lead, Cadmium and Fluoride in water and sediment. Heavy metals are well known pollutants, which are often encountered in many rivers, dams and lakes of India and there is possibility to fish, the most important aquatic fauna being subjected to stress caused by these heavy metals (Smit et al., 1987).

Phytoplanktons are tiny single-celled plants. Like higher plants, phytoplankton requires light to live and reproduce. Therefore, the largest concentration in the water is a major determinant to the abundance to these plants. According to Welch (1952) no single abiotic or biotic factor has so many profound direct and indirect influences which can be fixed in nature, but there is inherent variation at different times of the day and during different seasons of a year and even latitude to latitude.

Phytoplanktons are typically microscopic single organisms called algae. Zooplanktons are small organisms that eat the phytoplankton and which in turn to other animals eat, this phytoplankton and zooplankton are a basic foundation of life.

Zooplankton plays a major role in converting phytoplankton into food suitable for fish and aquatic mammal. They have acquired importance in fisheries research. They are important in fresh water ecosystem as they indirectly convert the energy due to their role as preys of economically important fish. By their heterotrophic activity, zooplankton organism initially handle and manage biogenic organic materials, primary and secondary production to considerable extent (Surve et al., 2004).

Zooplankton in water belongs to four main taxonomic groups (Rotifers, Cladocera, Cyclopoda and Calonoid Copepoda). These are abundant in shallow areas of reservoirs, ditches, stagnant water ponds, but only few species are abundant in open water. They occupy an intermediate position in food webs. They migrate several meters each day towards the surface at night and
towards the bottom at daylight. Birds have play a unique role in the growth, protection and restoration of natural environmental and thus there important significance in the maintenance of clean and healthy environment is of high odor and it is great important to man (Patil et. al., 2005). Studies of bird migration and distribution during the several decades have emphasized questions related to the mechanism and development (proximal causation) of migration, whereas questions related to the evaluation and function (ultimate caution) of migration and distribution have received considerably less attention from ornithologists (Eswari Yalavarthi, 2002). The Proximal causation bias has failed to emphasize the diversity of avian migration systems that have evolved as results of temporal and spatial changes in the environment (Venkateshwarlu and Mallikarjun, 2002).

The study was focused in the taxonomic composition and abundance of the macro vertebrate’s community, seasonal abundance to the macro vertebrate community and baseline water quality data, based on macro vertebrates and several physicochemical measurements to better understand and manage the water body of the Godavari river water

The data collections on the above study are presented in different heads Introduction, Material and methods, Results and discussion, General summary & conclusion and References.