

Title of the Project:- To Study the impact of proposed Morena Water Supply sub project under MPUDP on the Dolphin, Crocodile & Gharial and their habitat in National Chambal Gharial Wildlife Sanctuary, Morena (M.P.).

Why this Project:-

This project of Madhya Pradesh Urban Development Company Limited is supported by the World Bank and Madhya Pradesh Government. The task has been assigned to examine the impact of ecological flow on critically endangered species and their habitat which may be influenced due to construction of proposed intake well on Chambal Gharial Wildlife Sanctuary for water supply to Morena district.

Research Methodology:-

The study was performed by adopting nationally and internationally accepted scientific methods in rainy, winter and summer all round the year as under:-

Selection of reference sites - Reference sites were selected in upstream with zero value of hydrological stress.

Selection of observation sites – 30 observation sites were selected for following observations –

- Observation on population distribution, movement pattern, habitat, nesting and breeding sites of crocodile (Mugger) Ganges river dolphin and Gharial in upstream and downstream during all three seasons.
- Observation on various hydrological parameters i.e. rate of discharge, water velocity, river depth from reference site and sampling site of 30 Km river stretch.
- Observation on physico-chemical properties of water (pH, DO, EC, COD, BOD, Temperature, salinity, Nitrate, phosphate, Magnesium, chloride etc) from reference site as well as from 30 sampling sites.
- Sampling of macro-invertebrates done from 30 sites in all the three seasons.
- Working on methods of Maximum Allowable Environmental Difference (MAED) for similarity measure related to reference site.
- Other abiotic attributes of the study area i.e. landuse-landcover, catchment area, drainage etc. analysed in ArcGIS software as influencing variables.

Study Design:-

- The study area covers 30 km stretch of the Chambal River 15 km either sides from the proposed intake well along the side of National Highway (Old NH-3- Agra-Mumbai road) including reference site to compare the hydrological and ecological data from the project site.
- The study area of 30 km is divided into 30 segments at the interval of 1 km to observe hydrological, ecological and population data of Gharial, Dolphin and Mugger, details as given in the methodology.

Objectives of Research:-

- Study the population distribution, movement pattern, nesting and breeding sites of Gharial (*Gavalia gangeticus*), Ganges Rivers Dolphin (*Platanista gangetica*) and Crocodile (*Mugger*) affected by the proposed project of Chambal River.
- Asses the Ecological flow including ambient water flow, water discharge, Physico-chemical properties and water requirements in reference to Gharial, Dolphin and Crocodile.
- Predict and identify the impact of proposed project on the river ecology, existing flora and fauna and their habitat at the stage of operation, execution and maintenance phases.
- Recommend the mitigation measure and monitoring plan, based on finding of the study.

Activities Undertaken:-

- A reconnaissance survey of the proposed project site where intake well is to be constructed on Chambal River and 15 km upstream and 15 km downstream was done and collected relevant secondary data.
- Work permission from PCCF Wildlife to work in National Chambal Gharial Sanctuary, Morena.
- Prescribed proforma with details of the individual team member sent to Chief Wildlife Warden Madhya Pradesh Bhopal to grant work permission.
- Collection of primary data on – population, movement and behavior pattern, location of breeding & nesting sites of Crocodile, Gharial and Dolphin in different months (including lean season, pre and post monsoon).
- Observed the population of animal, through boat survey using binocular and camera.
- Movement and behavior pattern through focal sampling method and record the physical conditions of that area.
- Find out the breeding and nesting sites and their locations recorded through GPS.
- Assessment of water velocity, river depth, width in 30 km stretch in each segment of 1 km interval including reference site in different months (including lean season, pre and post monsoon)..
- Workout the way points of each segment for observation with the help of Arc GIS on study area map.
- Observation recorded on water velocity (Water flow Probe), river depth (Depth finder), width (Range finder and Rope) in each 30 segment of 30 km stretch including reference site.
- Assessment of Physico-chemical characteristics of water.
- Observations were taken with the help of portable instruments – DO meter and multi parameter.
- Collected river water sample for laboratory analysis from 30 sampling sites and reference site.
- Macro-invertebrates sampling for bio monitoring of river health.
- Collected samples with dip-net from river, from rock substratum and from shallow river bank. Identified and collected their photographs.

Cost of the project : Rs. 64.51 Lakhs

Outcome of Research:-

The impact prediction of water abstraction from National Chambal Sanctuary for the drinking water supply to Morena district is based on last 36 years data. Demand for the drinking water supply in this dry locality is the prime focus along with the maintenance of environmental and ecological flow for the continued existence of endangered fauna of the National Chambal Sanctuary because environmental flows are the balance between water resource development and the maintenance of a river along with ecologically acceptable conditions.

The quantity of raw water abstraction is almost equal to the water availability at minimum level of 36 years which are maintaining the sustainable survival of the Gharial and Dolphin. Looking to the demand for drinking water supply, an optional arrangement of the additional release of water quantity from Kota Barrage which can maintain the required ecological flow during peak summer months i.e. May and June or it may be May, June and July (depending on the rainfall of that year) is suggested.

The present observation on available population of Gharial, Dolphin & Mugger and the assemblage of other communities of large vertebrates, fishes, macro-invertebrates, benthos etc. indicates the congenial environment for the survival of the critically endangered species with other supporting elements such as channel form, water depth, deep pool areas and the existing river flow in the summer season. The only major requirement is to check on illegal anthropogenic activities, especially the extensive sand mining which is prevailing all around the study area.



Observation on water velocity and water depth at National Chambal Sanctuary, Morena



Measurement of various parameters across the river width at every 10 m distance, marked by red ribbon on synthetic rope



Observation on nesting site of Gharial at National Chambal Sanctuary, Morena