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Study of Aquatic Biodiversity of River Gandak In Bihar

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ABSTRACT

Over a one year period, comprehensive studies were undertaken on the fish, decapods crustacean and macro invertebrate faunas and update species inventories . A baseline of both environmental condition and biodiversity status has been established. future investigation of socioeconomic systems dependent upon water resources, aquatic biodiversity and other services provided by rivers, is urgently needed especially focusing on the relationship between these resources and human health and wellbeing

Keywords – Aquatic Biodiversity, river Gandak

INTRODUCTION

Freshwater resource are essential for life. They occur in minute proportion relative to all water sources on earth and are inequitably distributed and used. Although Bihar is reputed to be adequately endowed with fresh water resources significant threats to the quality and quantity of those resources are apparent. Surface water provided about three- quarters of the total volume of water supplied for domestic, industrial/ commercial and irrigation purposes in Bihar. In addition to water resource supply, surface waters serve a variety of functions and values- ranging from hydrological (floodplain water storage and flood protection) , ecological biodiversity support and conservation (Tonapi 1980; Reddy and Rao,1989; Verma et al,. 1984, Yadav et al,1984; Zutshi et al. 1972). Riverine environments however range from small upper course torrents to deep slow-moving lowland streams and rivers. Only recently by detailed studies been conducted on the biodiversity of local freshwater faunas (Jaiswal and Singh, 1994;Krishnamurthy, 1966; Mandal and Moitra 1975. Biodiversity and conservation of freshwater ecosystems has been the focus of regional assessments recently since along with their terrestrial counterparts, aquatic ecosystems have been increasingly placed pressures to provide renewable resourses while being exposed to the ravages of poor planning and pollution. (Pahwa, 1979; Oomachanda and Belsare 1985; Sharma 2003; Srivastave , 1980).

Clearly adequate supplies of clean fresh water in Bihar is necessary not only for human survival and economic development but also for maintenance of productive and species- rich aquatic ecosystems that are some importance to the region. This paper focuses on our experiences in the assessment of Gandak river near Hajipur.

MATERIAL AND METHOD

Over the last century river throughout the world have come under increasing pressure from human activities, often affecting their ecological integrity or health. Awareness of this problem continues to grow among the general public manager of rivers and their catchment need to stop, or reverse this trend in declining health. A critical part of improving river health is being able to accurately assess the current ecological state of river ecosystems so the cause of poor health, or the success of rehabilitation effort can be measured.

Sustainable river management aims to ensure that rivers should function in the same way as they do in unexpected catchments , as well as supporting a similar range and abundance of organisms (i.e. have similar structure). River health monitoring has traditionally concentrated on the use of structural measurements like water quality,the composition of stream invertebrate communities and to a lesser extent the biomass of macrophytes and fish to infer the health or integrity of river ecosystems. Functional indicators, such as the rates of primary productivity and organic matter decomposition, have been used only rarely in the past. Recent advances in technology make measurement of these functional indicators more simple, thus enabling them to be used alongside traditional. This will be a significant step forward since functional indicators provide direct measurements of the functions that river ecosystems perform and thus provide an alternative but complementary, view of ecosystem health.

In these circumstance, several observations were conducted during this research towards the assessment of Gandak river of Bihar for species diversity of Fauna. Manual as well as instrumental observations were conducted. Identification of different aquatic animals was assessed for better understanding. All conventional method was employed.

Zooplankton were collected by using 125 mesh size plankton net from 100 liters of filtered water and concentrated up to 100 ml and preserved in 70% alcohol. Literature was used for identification of zooplankton. Identification of species was done by the literature of Adonis et al (1985) and Edmondson (1963). Observed species of zooplanktons are listed in tables 1, 2 and 3.

Table 1: Occurrence of species of rotifer

Sr. No.	Species
1	*B. calyciflorus*
2	*B. angularis*
3	*B.cadatus*
4	*B.falcatus*
5	*B.quadridentata*
6	*B.forficula*
7	*B.bidentata*
8	*Anuraeopsis*
9	*K. tropica*
10	*K. cochlearis*
11	*K.srecies*
12	*K. quad rata*
13	*Platyias*

14	*Mytilina*
15	*Lepadella*
16	*Lecane*
17	*Monostyla*
18	*T. longisets*
19	*T. multicrinis*
20	*Asomorpha*
21	*Asplanchna*
22	*Harringia*
23	*Potayarthra*
24	*Filinia*
25	*Hexarthra*
26	*Pomphotyx*
27	*Phiodina*
28	*Asp lancha nopus*
29	*Pleosoma*
30	*Leydigia*
31	*Sinantherina*
32	*Vorticella*
33	*Oxytricha*
	Total Rotifera (36)

Table 2 : Occurrence of species of crustaceans

Sr. No.	Species
1	*Dophinia*
2	*Sida*
3	*Monia*
4	*Alona*
5	*Bosmina*
6	*Cypris*
7	*Stenocypris*
8	*Cyprinotus*
9	*Mesocyclop*
10	*Cyclopid copepod*
11	*Calanoid copepod*
12	*Cyclopos*
13.	*Diaptomus*
14.	*L. Macrurus*
15.	*S. diaptomus*
16.	*Calanoids*
	Crustaceans (16)

Table 3: Occurrence of species of Brachipod

Sr. No.	Species
1	*Eubrachipus*
2	*Senecella calanoids*
	Total Branchiopod(5)

Influences due to natural variability and anthropogenic impacts are generally distinguishable own to the large number of sites and replication within geographically similar areas.

RESULTS AND DISCUSSION

Freshwater fish and decapods crustacean (crabs, freshwater shrimp or prawns) faunas are high diverse and reflect our favorable geographical position close to mainland sources of biodiversity. True freshwater fish diversity is estimated between 57 to 70 species. The full inventory for fresh water decapods stands now at 43 species belonging to 10 families. In general items, much of our study area possesses river in fair condition and extensive vegetation cover. Including riparian vegetation, appears to be a significant regulatory factor for high water quality and aquatic ecosystem integrity. While some pollutants such as oil may be localized in distribution. In pristine sites with no visible wastes, lead contamination of sediments is apparent and explicable only through contamination with road dust, washing of cars in rivers and direct deposition of vehicle emissions.

Impairment of faunal communities is expressed as increased abundance and biomass when moderate nutrient enrichment occurs, but decreased species richness under extreme conditions of eutrophication organic or toxic pollution. Since some freshwater course can affect populations throughout that river system. In stream habitat alteration by flow regulation, dredging and channelization lead to decreased species richness. This occurs by simplifying habitats, increasing disturbance decreasing substrate stability smothering, and depriving aquatic communities of natural energy and nutrient sources from the surrounding riparian and terrestrial vegetation (Ahmad and Singh, 1984).

There are instances of introductions of exotic species such as tilapia various aquarium fish, the tiger prawn Macro brachium rosenbergii, the invasive snails Melanoides tuberculata and Thiara granifera. The ecological impacts of these introductions on native species are as yet unknown and require close investigation. Some exploitation of fish and decapods occurs but largely on a a subsistence level (except for the teta hypostomus robini). We fishing for the aquarium trade takes place in moderately to severely eutrophic rivers contaminated by sewage where public health issues are probably more important than overexploitation of the firshery. Use of a variety of biotic groups has been suggested for biomonitoring in order to assess a wide range of potential impacts at different temporal and spatial scales (APHA, 1998). Fish and decapods crustaceans are valuable on a large scale to assess long term change. On the other hand, benthic macro invertebrates are capable of assessing change at smaller shorter scales, Microbiota (Protozoa) are used for more detailed studies but require intensive training. It is concluded here that rapid assessment techniques can be best carried out with a combination of fish and benthic macro invertebrates to encompass a range of scales with a minimum of taxonomic training.

CONCLUSION

As part of this process of assessment of status and change in river ecosystems monitoring is crucial. Current water quality monitoring by the relevant agencies does not consider the ecosystem impacts adequately and therefore some form of biological-monitoring is necessary. The studies reported here from the basis of a network for development of a future monitoring system for both water resources and aquatic biodiversity assessment which can be implemented by the regulatory agencies in collaboration with academic researchers. Ecological assessment entails the application of ecological knowledge to environmental problem solving. Resting on a systems approach, it considers problems from a multi-disciplinary perspective including environmental conditions and ecological systems, and by including humans as an integral part of ecosystems, logically includes socioeconomic systems. Although it is outside the scope of this research, further investigation of socioeconomic systems dependent upon water resources, aquatic biodiversity and other services provided by Gandak river is urgently needed especially focusing on the relationship between these resources and human health and wellbeing.

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