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EFFECT OF POLLUTION ON DISSOLVED OXYGEN CONCENTRATION IN STREAM OF SHIVALIK HIMALAYAS A CASE STUDY

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ABSTRACT

This paper addresses the effect of pollution on dissolved oxygen content (DO) in a Shivalik Himalayan stream during early hours of day in the summer season (May, 2009) – June 2010). The study showed that the Dissolved Oxygen in the stream is below 4mg/l in a stretch of 2600m and therefore water is not fit for public supply, bathing wildlife and fish culture.

INTRODUCTION

Oxygen is the regulator of metabolic processes of plant and animal communities and indicator of water condition. This factor provides more information about the overall health of stream than any other chemical parameters.

Seer stream is one of the sub tributaries of river Satluj in Bilaspur District of Himachal Pradesh (India). It lies at latitude of 31^0-26 59'0 N and 76^0-43-11' East longitude. The Bilaspur town falls in Shivalik hills of lower Himalayan region, at altitude of 600 meter above mean sea level. The town is located on left bank of Seer stream. It is small rainfed perennial stream taking its origin from near Sarkaghat and meandering over 20 km in the district of Bilaspur. It ultimately joins Satluj river. It swells during rainy season but gets reduced to narrow stream in the summer. The stream serves as a drinking water source for the region. For want of proper sewerage system in the town, the night soil from the houses is being treated through septic tanks. The water from kitchen and baths flows in open drains and is being discharged into two local nallahs, viz. Ghumarwin nallah-I and Ghumarwin nallah-II finally joining Seer stream. The present study addresses the DO concentration in Seer stream during early hours of the day in summer season.

MATERIAL AND METHODS

The weir for water supply scheme Ghumarwin was selected as a reference point and the monitoring of DO was carried out at downstream of it at 6 points up to 5 km (Fig. 1). The guidelines given by USEPA (1997) were followed for sampling. The DO was fixed at site and analysis was done with in half an hour in the laboratory. The sampling was repeated after 15 days and the present study is spread over a period of two months of summer season. The DO was determined following the Standard Methods (APHA 1992).

Figure 1 ***Location Plan of Sampling Station on Seer Stream***

RESULTS AND DISCUSSIONS

The DO in the Seer stream was monitored during early hours of the day during May and June, 2009 and observations are given in Fig. 2 and Fig. 3.

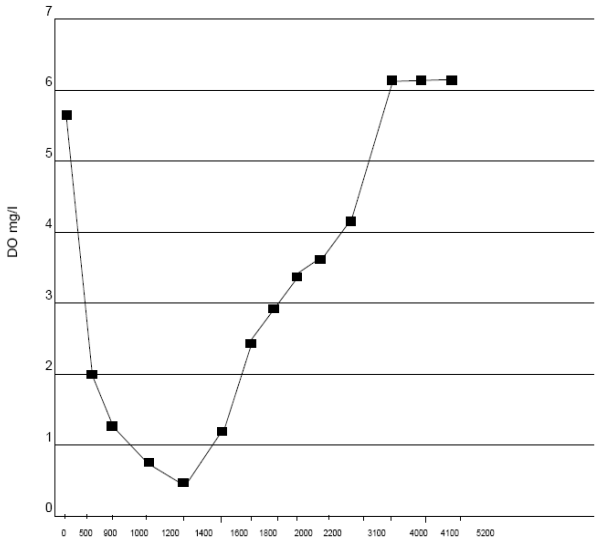

Figure 2 Average D.O. concentration along Seer Stream in May, 2009 at 6:00 A.M.

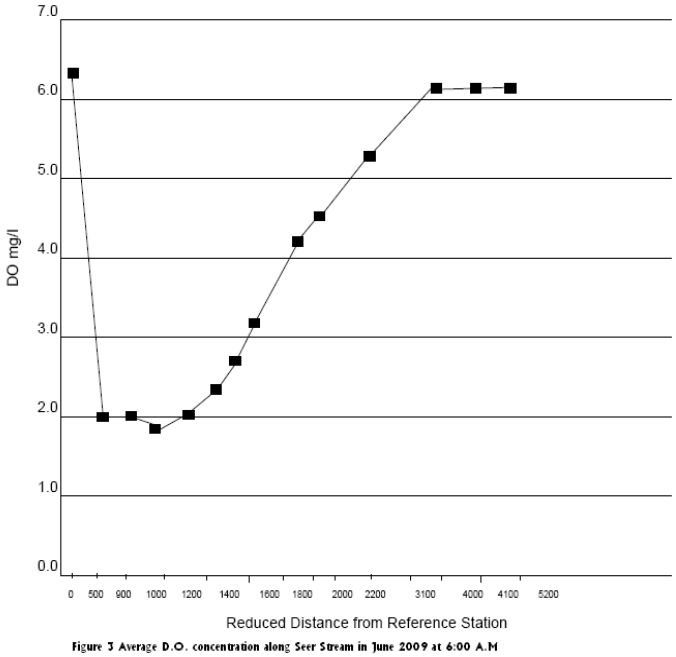

Figure 3 Average D.O. concentration along Seer Stream in June 2009 at 6:00 A.M

During May the maximum value of DO was observed as 6.3mg/l and minimum of 1.8mg/l. it is less than 4mg/l in a distance of 1600m, which is in between the confluence point of Ghumarwin nallah-I with Seer Stream to a distance of about 1000m downstream on it.

During June, the maximum value of DO was observed as 5.5mg/l and minimum 0.7 mg/l. It is less than 4mg/l in a distance of 2600m, which is in between the confluence point of Ghumarwin nallah-I with Seer Stream to a distance of 2600m downstream on it.

The Bureau of Indian Standards (IS :2296-1982) is laid down tolerance limits for inland surface waters subjects to pollution. The Indian standards have considered the following classes of water,

A : Drinking water source without conventional treatment but after disinfection.
B: Organized outdoor bathing.

Table 1 : ***Classes of water as per IS :2296-1982***

Characteristics	Classes				
	A	B	C	D	E
DO mg/l	6	5	4	4	-
BOD_5 mg/l	2	3	3	6	-
Total	50	500	5000	5000	-
Coliforms, MPN/100ml					

C : Drinking water source after conventional treatment
D : Propagation of wildlife and fisheries
E : Irrigation and industrial cooling

The standards fixed for the Dissolved Oxygen (DO), Biological Oxygen Demand (BOD) and coliforms for various classes are given below :

CONCLUSIONS

As per the Indian Standard IS : 2296-1982, the water of Seer Stream falls in Class – E. It is therefore not fit for public supply, bathing,

wildlife and fish culture. Thus it can be concluded that the stream is not in good health and the stretch of Seer stream right from confluence of Ghumarwin nallah-I to 2600m downstream is heavily polluted. Steps should be taken to treat the wastewater of town entering the stream so that it can be restored to its original condition.

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