



## REMOTE SENSING WITH SPECIAL REFERENCE TO POLLUTION

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## ABSTRACT

The recent development of satellites has made available enormous quantities of photographic and other forms of data about the surface of earth. These data have great potential for helping to solve human problem such as monitoring and controlling environmental pollution. All the wavelength regions for UV through microwave have practical applications. The synoptic regional coverage availability of data from inaccessible areas, and repeated coverage are advantages of satellite imagery. The great mass of industry and population creates pollution at a scale we are now not capable of handling. Even the monitoring of sources of pollution is beyond our present capabilities. The monitoring is the first step in pollution control and it can be accomplished by carefully designed remote sensing system. The feasibility of employing this technique in monitoring water pollution is indicated in this paper.

## INTRODUCTION

Environmental pollution and ecology have become commonplace words in our vocabulary. In prehistoric times the pollution was thin and with the advent of civilization and growth of urban areas, the effect of pollution began to be noticed. It is sad irony of events that progress of mankind in every sphere of activity is closely associated with the deterioration of the environment. The subject of pollution and human environment is of topical interest in Madhya Pradesh which is one of the States of India. The pollution of rivers by industries must have had its beginning at the time of industrial revolution. As the industries expand their plants, so there is a corresponding increase in the discharge of pollutional wastes. The wastes are contaminated with acids or alkalis, chemicals, floating and suspended solids, silt, oil, organic matters etc. Moderate quantity of these wastes can be absorbed without damage to a healthy river. But when they are discharged in excess and the river discharge is low the water becomes grossly polluted; unsuitable for fish life, unsafe for domestic and recreational purposes.

The development in remote sensing technique has brought a revolutionary change in the methods of detecting sources of pollution and monitoring pollution dispersions (ref.1). Aerial photography has been used extensively in studies of water pollution. Even from the satellite altitudes, the radiance level measurements has correlations with the level of pollution in the river water. Multiband photography, by virtue of its ability to record subtle differences in reflectance provides a powerful tool to detect pollution.

The remote sensing technique is employed in the case study of one of the rivers of India polluted by wastes from paper mills.

## CASE STUDY

The river Tapti is one of the perennial rivers of Madhya Pradesh (India), flowing from east to west. The National News Print and Paper Mills of Napanagar is situated in the District of Khandwa on the banks of the river Tapti. The quantity of waste water effluent from this industry is about 3,75,000 m<sup>3</sup>/day and is discharged in this river. The effects of pollution are perceptible at places even beyond 40 Km from the waste discharge point. The water supply scheme of Burhanpur, a major town on the bank of this river about 24 Km downstream, has been badly affected. The characteristics of composite waste from this Paper Mill is shown in Table 1.

Table 1  
Characteristics of Composite Waste

S.NO.	Characteristics
1. Colour	: Brown
2. pH	: 7.8 - 9.0
3. Total Solids	mg/l : 1200 - 1640
4. Suspended solids	mg/l : 624 - 870
5. B.O.D.	mg/l : 296 - 410
6. C.O.D.	mg/l : 784 - 1210

The MSS data in band-6 of ERTS-1 imagery is employed to study the pollution of river Tapti.

The Landsat-1 frame of MSS-6 has central co-ordinates:

N  $21^{\circ}22'$  and E  $75^{\circ}47'$

The transmittance at various points along the river course is measured using micro-densitometer (ref.2). The results obtained are presented in Figure 1.

The spectral response of the effluent and clear water (ref.3) is shown in Figure 2.

#### CONCLUSIONS

Pollutant presence in water is one of the major factors affecting spectral response of water bodies. The polluted water has higher reflectance than clear water. This indicates that water pollution can be effectively studied by Landsat imagery.

#### ACKNOWLEDGEMENT

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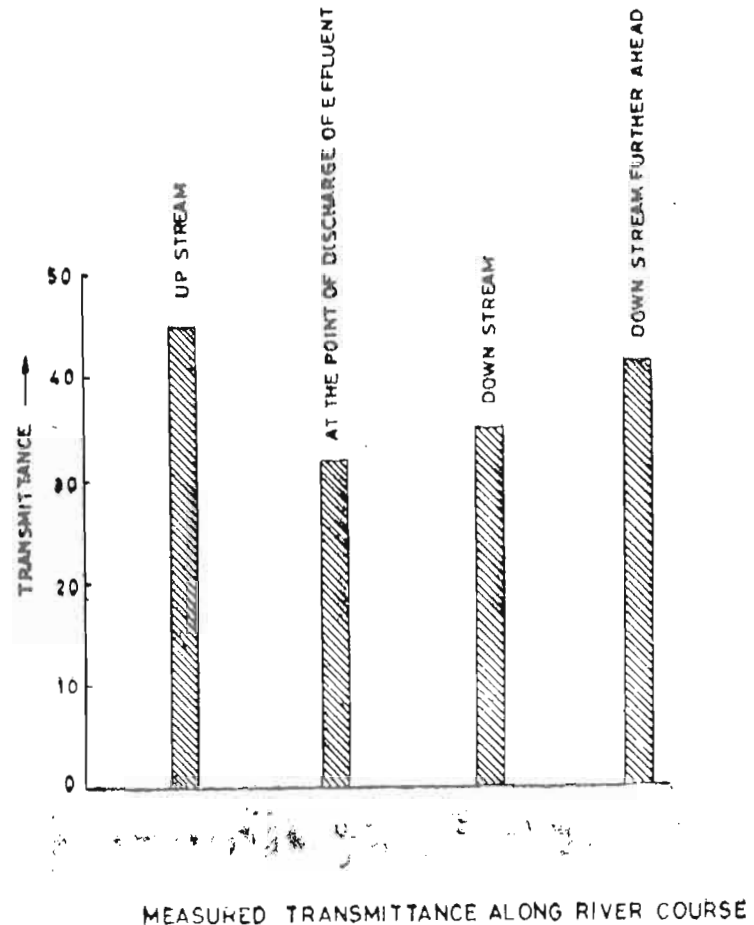


FIG. 1

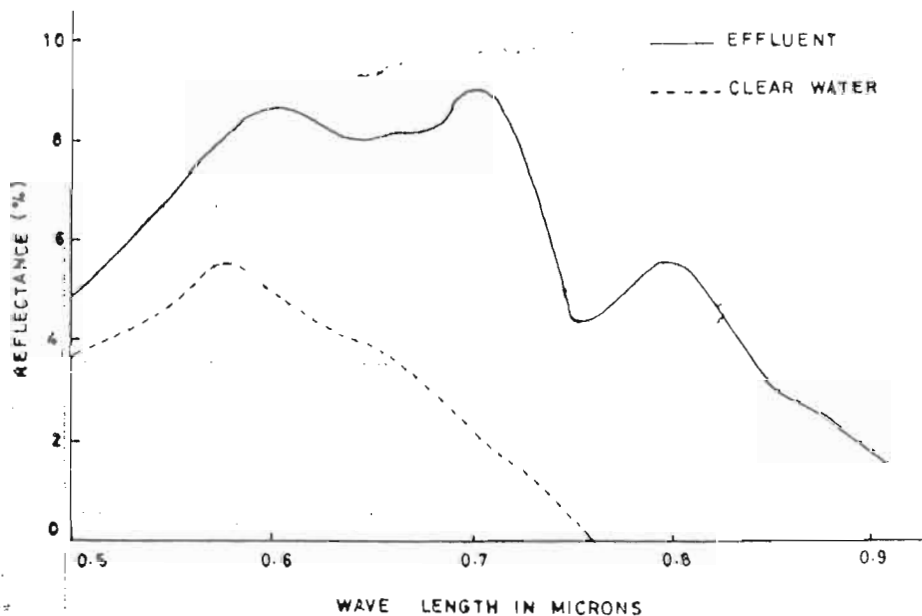


FIG. 2 SPECTRAL REFLECTANCE CHARACTERISTICS OF EFFLUENT & CLEAR WATER.