

# Water Quality Assessments

A guide to the use of biota, sediments and  
water in environmental monitoring

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## Chapter 2\*

### STRATEGIES FOR WATER QUALITY ASSESSMENT

#### 2.1 Introduction

The operations involved in water quality assessment are many and complex. They can be compared to a chain of about a dozen links and the failure of any one of them can weaken the whole assessment. It is imperative that the design of these operations must take into account the precise objectives of the water quality assessment. During the 1950s, in the early days of modern water quality monitoring, activities were rarely focused on particular issues. However, the water quality assessment process has now evolved into a set of sophisticated monitoring activities including the use of water chemistry, particulate material and aquatic biota (e.g., Hirsch *et al.*, 1988). Many manuals on water quality monitoring methods already exist (e.g., Alabaster, 1977; UNESCO/WHO, 1978; Krenkel and Novotny, 1980; Sanders *et al.*, 1983; Barcelona *et al.*, 1985; WHO, 1987; WMO, 1988; Yasuno and Whitton, 1988) although most of these consider only one type of water body (i.e., rivers, lakes or groundwaters) or one approach to monitoring (e.g., chemical or biological methods). Few manuals exist which consider all water bodies (e.g., Hem, 1989). This guidebook presents the combined use of water, particulate matter and biological monitoring in order to produce comprehensive water quality assessments for all three types of water body. However, economic constraints frequently mean that the variables to be monitored, and the methods to be used, must be chosen carefully to ensure water quality assessment objectives are met as efficiently as possible.

#### 2.2 The water quality assessment process

##### 2.2.1 Monitoring, survey and surveillance

The main reason for the assessment of the quality of the aquatic environment has been, traditionally, the need to verify whether the observed water quality is suitable for intended uses. The use of monitoring has also evolved to determine trends in the quality of the aquatic environment and how it is affected by the release of contaminants, other anthropogenic activities, and/or by waste treatment operations (*impact monitoring*). More recently monitoring has been undertaken to estimate nutrient or pollutant fluxes discharged by rivers or groundwaters to lakes and oceans, or

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