THE APPLICATION OF TWO SIMPLE INDICES
TO IRISH ESTUARY POLLUTION STATUS

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ABSTRACT

Two complementary indices of estuarine quality have been developed as a management tool and to facilitate intercomparison of diverse estuarine types. The indices used here have been devised as relatively quick and inexpensive and taking into account both the biological and the environmental information from a systematic survey of the intertidal regions of an estuary.

The Biological Quality Index (BQI) is based on the proportions of the estuary classified abiotic, opportunistic or stable. The Pollution Load Index (PLI) is obtained from analysis of the intertidal sediments for pollutants which are then scored according to baseline (i.e., unpolluted) and threshold (i.e., at which adverse biological effects occur) values.

The BQI and PLI were then tested in seven Irish estuaries which represented the range of sizes and industrialisation present in Ireland. The results for BQI ranged from 0.0 (completely abiotic) to 9.94 (largely unpolluted), and for PLI from 0.0 to 2.56, although individual site PLI values ranged up to 10.0.

Modification of the indices and their wider application to other European estuaries are discussed.

INTRODUCTION

The two indices to be described are an important part of a method for describing and intercomparing the quality of estuarine en-
environments. In order to evaluate the method and the indices it is necessary to state the objectives in mind when they were developed, notably communication between scientists and other interested parties including administrators and the public leading eventually to their application as a management tool.

These objectives were a major constraint not encountered in the monitoring of individual estuaries, and are outlined more fully below.

a) The method should be applicable throughout western Europe. It is hoped that the specific details of the procedure are applicable at least within these territorial limits, whilst the general principles outlined may be used universally.

This synoptic dimension alone potentially restricts use of biological indicator procedures.

b) Environmental quality should be determinable at any season of the year, certainly whenever fieldwork is possible.

c) Procedures and methods should be within the technical capability of a wide variety of agencies.

This constraint seriously restricts the assimilation of the more complex research methods requiring specialist knowledge, techniques or equipment such as the sampling and analysis of interstitial fluids from sediments (e.g. Nurnberg, 1980) or the various uses of specific biological indicators. The indexing procedure is however sufficiently flexible to assimilate data from such techniques if they are developed for widespread use.

d) Procedure should be rapid and economical.

Given the urgency with which answers are required and the financial constraints which obtain, it was decided to devise the most rapid and economical method consistent with scientific accuracy. It seems particularly important to avoid wasteful oversampling or over-analysis. A problem that arises from economics of this kind is the comparison of sites with different kinds of data base.

e) The need for a suitable indexing procedure was strongly indicated by the desirability of the public's comprehension of statements of estuarine quality as well as facilitating the interpretation of the data by both environmental specialists and non-specialised administrators. While it is understood that any index represents a simplification of the situation, a good index will provide, at the very least, a direction for further or more intensive investigation.