

# APPROACHES TO DEVELOPMENT OF WATER QUALITY CRITERIA AND STANDARDS FOR LAKES

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## INTRODUCTION

Eutrophication and toxics contamination are serious problems in many lakes in the United States. In a 1989 EPA publication entitled, "Report to Congress: Water Quality of the Nation's Lakes," 25 percent of the 12,413, 837 assessed lake acres were found to be impaired or partially impaired.

Water quality standards are the primary regulatory tool for water quality protection under the Clean Water Act. Development of lake water quality standards has lagged far behind the development of standards for streams. Enforcement actions to protect water quality in lakes have been few. Despite these problems, numerical lake water standards are gaining a slow acceptance. This slow acceptance is due to a number of technical and policy problems that are either perceived or real. Some of these problems are discussed below.

**Narrative Standards.** A generic narrative standard usually states that water will be free from a certain class of pollutant, e.g., BOD, toxics, nutrients, in quantities that will be deleterious. These standards have proved useful in some enforcement activities but, because of their general nature and multiplicity of interpretation, often do not lend themselves to prompt resolution of water quality enforcement problems. Too often enforcement of a narrative standard is treated as discretionary. However, because of their generalized non-specific approach, narrative standards do not attract much adverse attention during the adoption process and, therefore, are much easier to get adopted. Once these standards are in place, they are often considered as "good enough" despite their obvious shortcomings, and then no further efforts are made to improve the standards.

Implementation guidelines (or procedures) are possible approaches to strengthening narrative standards. These procedures can also be used to develop numerical standards from narrative standards, but the process is convoluted and not often attempted.

**Geographical Extent of Coverage.** One of the more significant problems with adoption of lake water quality standards is the debate over the geographical area of

coverage for the standard. Some have advocated a national standard and others have advocated standards with a statewide coverage. Recently, there has been considerable interest in the ecoregion concept, including the possibility that standards can be adopted on an ecoregion basis. The ecoregion concept may prove to be useful, especially for those areas where there are many smaller lakes with similar watersheds and with a consensus that expected uses of the lakes will be similar.

**Lake Specific Standards.** Lake specific standards have historically not been favored for a number of reasons. These reasons include:

- A. There has not been a good "model" for states to follow.
- B. Lake specific standards are expensive to develop and adopt, especially for those states with a large number of lakes. Lake specific standards are much more suitable for states with a relatively small number of larger lakes.
- C. Proposals for lake specific standards attract attention from the regulated community. Lake specific standards increase the awareness of the general public around a lake, and this increases the probability that regulatory action will be taken to maintain or improve water quality conditions within a lake. This obviously has potential for adverse economic impact on the regulated community, especially the regulated community upstream of the lake which derives no obvious economic benefit from the lake.
- D. Lake specific standards increase the probability of engendering water quality violations, with the subsequent necessity for enforcement actions.

**Lack of Information Dissemination.** There has generally been no attempt to educate the public regarding the societal benefits of water quality standards. Therefore, there has been little public demand for improved water quality standards, especially lake water quality standards. The public has a deep interest in maintaining and improving water quality, but their understanding of the more basic regulatory foundations for these actions is generally lacking.

**Low Priority Within E.P.A.** Lake water quality standards are a low priority within the Agency. This is apparently due to several reasons including:

- A. Inadequate number of staff within the EPA Headquarters branch charged with standards development.
- B. Recent emphasis on development of toxics numeric standards (mandated by Congress).
- C. New emphasis on development of water quality standards for estuaries and wetlands and biological standards (biocriteria) (EPA priorities).

**Standards Adoption Difficulties Within States.** Some states can develop and promulgate standards within the state water quality agency. However, many states cannot adopt new water quality standards unless they are approved by the state's general assembly and signed into law by the governor of the state. Water quality legislation that must successfully negotiate the latter process is often difficult to enact.

## RECENT DEVELOPMENTS

**Total Maximum Daily Loads (TMDLs).** Several developments that may improve the prospects for numerical lake water quality standards. Recent litigation regarding the lack of progress on development of "total maximum daily loads" (TMDLs) as required under section 303(d) of the Clean Water Act, has encouraged EPA, and subsequently the states, to establish a higher priority for TMDL development. Unfortunately, a TMDL can only be established where there is a violation, or potential violation, of an adopted water quality standard. If no water quality standard has been set for a parameter, it is difficult to establish a meaningful TMDL for that parameter. The TMDL can and would be an excellent regulatory tool to limit pollutant loadings to lakes that have tributary streams and numerical lake water quality standards.

Lakes integrate the pollution loading from their watershed and are especially sensitive to nutrient inputs. Lakes cannot be protected from nutrients unless the nutrient loading from the watershed can be regulated. Therefore, TMDLs which take into account point and nonpoint loadings are probably the best regulatory "fit" for those lakes where the primary nutrient loading is from tributary streams.

When EPA, the states, and the concerned public realize that TMDL development will be stalled prematurely for lack of adequate numerical lake water quality standards, perhaps there will be a renewed interest in the development of these standards. TMDLs are a versatile, powerful, and much needed regulatory tool; it will be very unfortunate if their development and use is hindered by failures to develop lake standards.

**Georgia Lake Standards Legislation.** The problem with the lack of a model for lake specific water quality standards has been resolved with the enactment of a numerical lake water quality standards bill by the State of Georgia. In 1990, a member of the Georgia State Senate requested Region IV assistance in the drafting of a lake water quality standards bill (Senate Bill 714). I coordinated the writing efforts within the Regional office, including obtaining peer reviews from other scientists and program coordinators within EPA Region IV and several state agencies and universities.

The bill was introduced in the 1990 Georgia General Assembly. Some modifications were made during the legislative process and some important technical strengths were lost, including provisions for dissolved oxygen profiles through the entire water column. This would have helped to protect sports and commercial fisheries in the lakes. Also omitted was the provision for trihalomethane standard in raw water supplies. This would have provided protection for lakes as drinking water sources. The algal growth potential parameter was also omitted. Most of the key provisions of the bill were retained. The bill was signed into law in March 1990.

The bill as enacted may be one of the best lake water quality standards legislation in the United States. Dr. David Kamps of the Georgia Environmental Protection Division discusses the details of the legislation in his paper.