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LETTERS

Algae Control in Reservoirs

The August 1985 issue of the JOURNAL contained an article by R.K. Raman entitled, "Controlling Algae in Water Supply Impoundments." As past chairman and cochairman of the AWWA Quality Control in Reservoirs Committee, we wish to point out that Raman has failed to discuss the most important method for controlling algae in water supply reservoirs—namely, limiting the phosphorus loadings to the reservoirs. It is our experience that far too many water utilities focus their algae control efforts on the use of algicides after the algae have developed, rather than on the prevention or minimization of algal biomass production by phosphorus load reduction in the waters entering the reservoir. Whereas the relationships between phosphorus loading and algal growth were not well-defined a few years ago, these relationships have now been quantified for lakes and reservoirs through the Vollenweider-OECD eutrophication modeling approach. These models are based on statistical regressions between the phosphorus loading (normalized by mean depth, hydraulic residence time, and water-body surface area) and eutrophication response as measured by planktonic algal chlorophyll, Secchi depth (water clarity), and hypolimnetic oxygen depletion rate. The regressions are based on the behavior of nearly 400 bodies of water (lakes and reservoirs) around the world. With this approach it is now possible to quantitatively predict the amount of algae that will occur as a function of a particular load to the reservoir or change in the phosphorus load. A summary of the key aspects of the nature and use of this approach was published in 1982 and has recently been updated.[1,2] (Copies are available from the authors.)

In his article Raman stated, "Eutrophication is a natural aging process that affects every body of water from the time of its formation." Although this statement is frequently made, it has been recognized for a number of years that the common interpretations given to this statement—that eutrophication is something that must be accepted and that there is little that can be done about it—are in error. As discussed by Lee,[3] in terms of the life span of humans, "natural" eutrophication is not an important factor in causing a body of water to become more eutrophic. The degree of eutrophication in a body of water is controlled almost exclusively by the phosphorus load. Reducing the phosphorus input by a sufficient amount can have a significant impact on the amounts and types of algae present. The Vollenweider-OECD eutrophication modeling approach provides a demonstrated, reliable method to determine the amount of planktonic algal biomass reduction that will result from a given phosphorus load reduction. In general, water utilities that face problems of excessive fertilization of their water supply reservoirs should examine the phosphorus sources to determine the feasibility of controlling algae within the reservoirs by limiting the phosphorus intake.

Several years ago, we developed guidance manuals for use by water utilities and others for the evaluation and management of eutrophication in water supply reservoirs. These manuals were reviewed and approved by the Quality Control in Reservoirs Committee as recommended committee reports. One of the manuals, *Study Program for Development of Information for Use of Vollenweider-OECD Eutrophication Modeling in Water Quality Management*,[4] provides guidance on the monitoring that is recommended for all water utilities so that they may reliably determine the sources of phosphorus for the reservoir and determine the impact on water quality and cost of treatment when the phosphorus load to the reservoir is altered. (Copies of this manual, as well as the others, are available from the authors.)

References

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