Here again this depends on what you mean by "crisis." Certainly if you made your living fishing on a particular lake and all the fish were dying, it would be a crisis. But the major problem with eutrophication today is that it is interfering with the aesthetic and recreational uses of our lakes. The big point is that we've got to start *now* to do whatever we can to stop euthophication from accelerating. We've got to begin more intensive study and planning so that it doesn't build to crisis conditions in the future.

Does eutrophication pose a health problem?

I don't believe there is any direct relationship between eutrophication and the suitability of the water for, say, drinking purposes provided that it is given proper treatment. Depending on how badly the water has deteriorated, of course, there may be some additional cost in preparing it for potable use.

What do we need to do to keep eutrophication from getting out of hand?

That's a big question. But let me put it this way at the risk of oversimplificaion . . . we've got to accumulate more data on the sources of nutrients entering a particular water body and the relative effects of specific ones, and then establish priorities for reducing them. The problem involves not only technical and economic considerations but also institutional arrangements. For example, if a drainage area covers hundreds of cities, several counties, and a few states, you can see that there might be some administrative difficulties in approaching the problem.

What are the major nutrients involved?

Phosphorus and nitrogen are most frequently mentioned as being of primary importance. There are other elements such as iron, magnesium, calcium, silicon, sulfur, manganese, sodium, potassium, carbon, etc. which are also involved in the metabolism of aquatic plants and these may be limiting factors in algal growth.

What quantities of phosphorus and nitrogen cause excessive algal growth?

It is not possible to answer that question categorically. Each body of water must be investigated separately in evaluating the overall problem. A useful approach, however, is to determine the growth response to various nutrient levels by a bio-assay test. In other words, actually measure the algal growth with different levels of nutrients present. In this way you can determine what the critical levels are in a particular water body.

What problems does this data gathering present?

First of all, nitrogen and phosphate analyses are a bit more tricky than tests for, say, chloride. Past data on these constituents may be difficult to evaluate since sometimes we don't know how the numbers were arrived at. Then, too, the data must be accumulated over a long period of time to determine general trends. On a short-term basis, a decrease in nutrient level, for example, may be misinterpreted . . . it may only be a temporary dip in a rising curve.

Should we approach the problem by simply trying to eliminate phosphate and nitrogen discharges into lakes?

We can't, of course, eliminate these when they come from natural sources. Whenever it is practical to cut down on cultural pollution of this kind it would undoubtedly help. But we can't willy-nilly decide to remove all nitrogen and phosphate from discharges, however, since they may not in all cases be seriously contributing to the eutrophication problem.

For example, these may be minor elements which are limiting factors in algal growth (even in the presence of phosphate). We need to check this out carefully to determine whether or not the reduction in phosphate and nitrogen results in the decrease in algal growth desired. One of the big difficulties in dealing with eutrophication right now is that you can use available statistics to support various approaches in combatting it. And in many cases, the results of tidy and neat work in the lab just can't be extrapolated to conditions in nature.

Why is the problem so complex?

A natural body of water such as a lake is a dynamic "organism" and there are many interrelated factors which affect its metabolism. Not only do you have to consider the biological and chemical factors, but also the physical factors which have a bearing on eutrophication . . . geological history, climate, thermal properties, hydrology of the drainage basin . . . to name only a few. Then, too, in addition to determining the rate of eutrophication of a particular lake it becomes necessary to differentiate between "normal" and cultural contributions to this rate. This is important in determining the degree of a lake's recoverability. But establishing a base line of "normal" eutrophication isn't easy because there aren't many good records available on conditions before man started contributing to it.