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# Kneese, Allen V., The Economics of Regional Water Quality Management

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# *The Economics of Regional Water Quality Management*

By

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The upsurge of public interest in water pollution has brought with it the uncomfortable realization that pollution is too simple a word and the policy issues with which it is normally associated too narrow in scope to permit really effective public action. Consequently, the field of water quality management, though characterized by a high level and quality of research in the relevant areas of physical science and engineering, has been singularly devoid of coherent criteria and programs for remedial and preventive action. In an area requiring public and private investment running to billions of dollars annually, it is more than slightly discouraging to find public policy still heavily reliant on such words as "legitimate use," "reasonable waste loading," and similar loaded words with no operational content.

This little volume, the culmination of several years of productive scholarship in the field, is a refreshing contrast. Its format reflects the fact that water quality management, perhaps more than in any other field of public policy of equal importance, is multi-disciplinary. On the assumption that when one goes bear hunting it is well to learn the habits of bears, the economic analysis is prefaced by an understandable and technically competent summary of the physical parameters in water quality systems, and of the areas of research in which our factual information remains seriously deficient. Part I accomplishes this in two admirably compact chapters. They are designed particularly for the social scientist, and provide ample suggestions for further reading.

In Part II the water quality management problem is recast in terms of economic efficiency and distribution effects. A discussion of the ubiquitous technological external diseconomies and property right problems that prevent the market mechanism from identifying and meeting aggregate demands for water quality is followed by the development of a model in which water quality is treated as a problem in cost minimization subject to specific constraints and un-

der ideal conditions when the contraints themselves become variables. This is followed by an extension of the analysis to place waste disposal systems within the proper regional context, which permits the author to assess the significance of economies of scale running beyond the confines of the local political jurisdictions that usually control water quality management programs, and to set water quality in its proper perspective as part of the overall problem of water supply.

The book is liberally illustrated throughout with reference to specific quality control programs, including a most interesting discussion of the water management program in the Ruhr where the *Genossenschaften* have developed a program of economic penalties and rewards that has resulted in a water quality program yielding the nearest approximation, in practice, to a workable economic optimum.

The major strength of the book lies in its uncompromising adherence to the principle that water quality is essentially a problem of minimizing the real economic burden of waste disposal. The fact that water utilization violates some of the standard rules of the market game and thus calls for public intervention, and the inadequacy of valuation procedures for many important water uses, complicate the analysis but cannot destroy the primacy of economic maximization as an objective.

On the other hand, Kneese makes it abundantly clear that the integrating influence of economic analysis, vital as it is for policy formation, is complementary to rather than competitive with the work of the physical scientist and engineer. The more urgent proximate questions in water systems formulation reflect the need for an economic definition of the problem and economic evaluation of relevant alternatives; but the hard, slogging research effort required to quantify these systems is heavily centered in the domain of the water engineer and the associated physical and biological sciences. The rate at which new substances are being added to water, and the increasing importance of estuarial and salt water areas as waste disposal vehicles illustrate the wide open areas of inadequate knowledge that must be shored up before the Kneese models can be converted even to sub-optimal systems for minimizing the aggregate waste disposal costs.

Inter-disciplinary communication is, at best, a touchy and difficult task in academic and government spheres alike. The analysis in this volume is multi-disciplinary in the best sense of the word—that is,

the analysis is presented systematically as a problem in economic evaluation, but at every stage of the argument the author's familiarity with the underlying physical parameters is evident, and he has prepared the uninformed reader with an adequate summary of the physical relationships that determine water quality and its impact on alternative users of water. For all the straightforward simplicity of the writing, this is no elementary book. It comes close to being a handbook for the development of water quality systems—unfortunately not yet fully operational, in view of data weaknesses, but analytically complete and capable of being translated by stages into progressively more efficient practical systems. To preserve the continuity of the argument, the more difficult technical economic discussion is presented in appendices, but the professional economist will find little to quarrel with in terms of the completeness or accuracy of the author's theoretical underpinnings.

In brief, this is an admirable book, based on broad experience, lucidly presented, and full of suggestions for further research and the development of more effective policies. There is no longer any substantive excuse for failure to integrate economic criteria into the problems of waste disposal; and as these problems grow in severity and complexity, the need to utilize the economy of effort inherent in the approach outlined by Kneese becomes more and more insistent.

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