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1966 ANNUAL MEETING

UNIVERSITY OF RHODE ISLAND
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ECONOMICS OF WATER QUALITY MANAGEMENT

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Economists are rightly concerned with criteria and techniques for choosing among known alternatives. It seems, however, that the returns to our efforts in formulating improved alternatives and in eliminating constraints are likely to be as high as efforts devoted purely to improved allocations.

A review of the environment in which water resources are developed and used in Connecticut will reveal ample opportunities for improving alternatives and for eliminating many constraints.

Water Rights in Connecticut

The Connecticut General Assembly has passed numerous laws relating to various aspects of water use. There are specific laws prohibiting the contamination of water supplies. The State Department of Health has broad authority to set and enforce standards where questions of public health are concerned. A water pollution control and abatement program, not limited to the protection of public health, was initiated in 1925. This more comprehensive pollution control program will be discussed subsequently.

There has been no statutory definition of water rights in Connecticut. In settling conflicts over water rights, Connecticut courts have relied primarily on common law principles. The common law doctrine of riparian rights permits the owner of land contiguous to a stream or lake to use water on his riparian land.1/

The common law pertaining to water pollution is particularly confusing. While some decisions refer to a riparian's right to a pure and uncontaminated flow of water, other decisions have granted a riparian owner the right to dispose of sewage and waste material in a stream so long as the water is not appreciably and materially polluted.2/ Riparian owners suffering a particular loss from upstream waste disposal can take legal action for damages and in some cases can secure an injunction to prevent continued pollution. A party polluting a stream is not relieved of liability because others are also polluting it. The injured riparian may sue each party contributing to the pollution in whatever order he desires.

Let us analyze for a moment the practical value of a riparian's right to sue those responsible for upstream pollution. When a riparian owner is being substantially damaged by pollution from a single source his right to civil suit has practical significance. However, where the damage results from numerous sources it is almost impossible to identify the economic loss resulting from the individual sources of pollution. Try

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1/ Clyde O. Fisher, Jr., "Connecticut Law of Water Rights," Appendix A, of Water Resources of Connecticut, Report to the General Assembly, by the Water Resources Commission (a special commission created by Special Act No. 572, 1955). State of Connecticut, 1957.

Robert L. Leonard, "Water Rights in Connecticut: Existing Law and Future Possibilities," Cooperative Extension Service, College of Agriculture, University of Connecticut, Bulletin 66-7, January 1966.

2/ Fisher, op. cit., p. A-12.

to imagine the time, effort, and costs which would be required to take independent legal action against twenty or thirty parties contributing to the pollution of a stream. In most situations the right of an injured riparian to sue each party contributing to the pollution is of no practical significance.

Even if the pollution were from a single source, only those suffering a substantial economic loss would find the possibility of compensation worth the trouble and cost of court proceedings. On the larger streams the number of parties contributing to the pollution is usually large and the total cost resulting from this pollution is usually spread among numerous riparian owners. Civil suits based on property rights have not generally been effective in either preventing water pollution or in securing compensation for those incurring losses.

Welfare Economics of Water Pollution

Water pollution has long been a classic example of a real or technological external diseconomy. For the uninitiated who might be present, a real external diseconomy exists when part of the costs associated with an activity is incident on someone other than the economic decision unit responsible for the activity. Consider, for example, an industry which discharges waste into a stream. The resulting pollution increases water treatment costs for downstream industries and municipalities, and decreases the satisfaction of recreational users and nearby residents. Unless all of those incurring a loss are compensated there is an obvious redistribution of income from the injured parties to the firm responsible for the pollution. Real external diseconomies also have a distorting influence on resource allocation.

With the costs of pollution falling on others, a firm has no economic incentive to consider the costs of water pollution when selecting the location for a plant, and there is no incentive to treat waste before discharge or to select production processes which produce less waste. The situation is similar in the case of municipal sewage disposal. Since sewers drain downhill, the outfall is usually on the downstream edge of town.

With due regard for the many disparities between the usual assumptions of welfare economics and the general economic environment of Connecticut, it seems safe to conclude that a system which allows waste dischargers to neglect the downstream costs of waste disposal will produce too much waste and will devote too few resources to the treatment of wastes. It should also be noted that allowing waste dischargers to neglect downstream costs results in a relative under-pricing and consequently in an overproduction and overconsumption of some commodities, such as paper, the production of which results in relatively large amounts of waste material.

Based on the previous discussion of property rights there appears to be no grounds for expecting an elimination of real external diseconomies through property law. Hence, we must look to other techniques. Allen V. Kneese, in his excellent book entitled, "The Economics of Regional Water Quality Management," analyzes three forms of public intervention which can cause offsite costs to be reflected in the waste disposal decisions of individual firms and of local government units.[3/] The three approaches are: incentive payments, effluent charges, and enforcement of quality standards. In all cases the objective is to minimize the costs associated with waste disposal in a region.

3/ Allen V. Kneese, The Economics of Regional Water Quality Management (Published for Resources for the Future, Inc. by The John Hopkins Press, Baltimore, 1964).

Enforcement of Quality Standards

In Connecticut a water pollution control and abatement program not limited to the protection of the public health was initiated in 1925 by legislation creating the State Water Commission. The legislation creating the commission provided that no person, firm or corporation could begin any new source of pollution without a permit from the commission. The State Water Commission thus was given authority to limit and control new sources of pollution. While no permit system was established for parties responsible for existing sources of pollution, the Commission was authorized to investigate all sources of pollution and after a hearing to issue regulatory orders. In preparing orders to reduce or eliminate pollution, consideration must be given to the rights and interest of all persons concerned, and the cost of required treatment must not be unreasonable or inequitable.

The State Water Commission was originally authorized to deal with only matters of pollution control and abatement; several other functions were subsequently added. In 1957 the legislature established the Water Resources Commission which superceded the State Water Commission as well as the State Flood Control and Water Policy Commission and the State Board of Supervision of Dams.

With a very small staff, and budget, neither of which has been expanded in several years, the Water Resources Commission is responsible for pollution control, inspection and approval of dams, water system extensions, waterfront structures, registration of well drillers, dredging permits, flood control, tidal protection, beach erosion control, certain aspects of navigation, and stream encroachment. It is not surprising that pollution investigations have proceeded rather slowly. If the present wave of interest in water pollution abatement continues until the next legislative session there should be a substantial increase in staff and budget and possibly an increase in enforcement powers.

The Federal government has not been very active in the setting and enforcement of pollution control standards. After extensive conferences and negotiations the Department of Health, Education and Welfare has ordered a few cities to abate the pollution of interstate streams. The Water Quality Act of 1965 outlined a more active role for the Federal government. The Act contains provisions for prompt setting and enforcement of standards for interstate streams in all states failing to adopt their own quality standards and plans by June 30, 1967.

This spring the Federal Water Pollution Control Administration was moved from the Department of Health, Education and Welfare to the Department of Interior. Water pollution control was never one of the larger activities in the Department of Health, Education and Welfare. Most of the interests and activities in the Department of Interior are closely associated with water resources. Hence, this administrative reorganization may well be a factor in increased Federal action.

Incentive Payments

The incentive payment plan outlined by Kneese involves payments to waste dischargers who agree to reduce the amount of waste or improve the quality of the effluent. The payments could be from any general source of public revenues. The payment rates would be determined by downstream costs avoided and the costs of reducing pollution. An attempt to really minimize all costs associated with waste disposal in a region would probably involve paying some firms to close their plants. The approach has practical limitations in that some industries might adopt processes which generate much waste in order to be able to collect payment for reducing waste discharge. Moreover, payments would have to be made to firms which decide that not locating in the region would be the most economical way of not polluting the stream.

To my knowledge, there has been no attempt to implement a system of incentive payments based on the downstream benefits of preventing pollution. It should be noted, however, that federal and state grants to municipalities to assist in the construction of sewer treatment plants and tax exemptions to assist industries in constructing waste treatment facilities are forms of incentive payments.

Federal grants to municipalities are available for up to 30% of the cost of sewage treatment plants for eliminating existing pollution. Limited appropriations have resulted in delays in procurring grants and in a rationing of funds so that the grants have often been less than the maximum of 30%. Federal assistance may soon be expanded substantially.

Connecticut has no grant-in-aid program. However, recommendations in a recent report by the Governor's Clean Water Task Force included State grants of 30% of the cost of constructing municipal sewage treatment plants and a program for prefinancing by the State of Federal grants to speed up construction.4/

While federal and state grants to municipalities and regional agencies encourage the construction of treatment plants, the grant programs may have at least one undesirable side effect where industries discharge waste into a municipal sewer system. A major grant program would reduce the incentive for municipalities to pressure industries to minimize the creation of waste.

The Connecticut Clean Water Task Force recommended that the State Corporation Business Tax be revised to permit a one-year write-off of the cost of construction and enlargement of waste treatment plants. The Task Force also recommended a revision of the State Sales and Use Tax to exempt materials and equipment purchased for the construction or operation of industrial waste treatment. Implementation of these recommendations might be extremely difficult. The treatment of waste is often not clearly separated from the production processes. Industrial waste treatment does not simply involve a little plant behind the big plant.

Some processes are more efficient in physical terms and create less waste per unit of product than other processes. Increased production of by-products results in the creation of less waste. Kneese notes, for example, that the production of ethyl alcohol from wood sugars in waste liquors from sulfite paper mills greatly reduces the pollution load.5/ The value of the ethyl alcohol has been reported to exceed recovery costs.

In many cases, subsidizing the production of certain by-products would probably be more effective than tax exemptions and much easier to administer.

Effluent Charges

Effluent charges would probably be the most direct way of forcing waste dischargers to consider downstream costs. Under such a system each waste discharger would be assessed an amount equal to downstream costs resulting from the discharged waste.

4/ "Clean Water for Connecticut: An Action Program," by the Connecticut Clean Water Task Force (appointed in October 1965 by Governor John Dempsey), May 1966.

5/ Knesse, op. cit., p. 31.

The downstream cost resulting from increments of various waste materials would have to be estimated. The amount and content of effluent would have to be monitored for each discharger. This would not be a small task. It should be noted, however, that estimates of both downstream costs resulting from various levels of pollution and the costs of abating pollution to various degrees are needed for correctly establishing quality standards. All methods require a monitoring of effluent discharged.

Funds collected from effluent assessments could be used in a variety of ways including: (1) use as general government revenues; (2) cash compensation of parties damaged by pollution; (3) in-stream water treatment such as areation; (4) provision of alternative water supplies; or (5) provision of pools and lakes for public swimming and fishing.

Effluent charges would force dischargers to consider downstream costs irrespective of the use of the funds collected. The political and social acceptance of the system might, however, depend on the use of the funds.

Effluent charges with funds going into general government revenues might easily be branded as a prostitution of our rivers and streams. While the charges would certainly encourage a reduction in waste discharged, pollution would be a source of government revenue. Special interest groups opposed to effluent charges for any reason might effectively publicize the prostitution idea.

Compensation of damaged parties would administratively be difficult, particularly in the case of recreational users.

Effluent charges will probably be the most acceptable where there are opportunities for in-stream treatment, provision of alternative water supplies or construction of pools and lakes for public recreational use.

Current Events

Economist naturally focus attention on efficiency aspects of public questions. A focus on the distributional aspects is just as natural for a politician.

The Johnson Administration has proposed increased federal regulatory powers and consideration of effluent charges. Congress seems to clearly favor increased financial assistance.

I would like to read some selections from The Wall Street Journal, Thursday, June 23, 1966, page 28. The article is entitled, "Cleaning Up Dirty Water: Big Spending on Waste Purification Pushed by Key Lawmakers, Bucking Administration," and was written by Joseph W. Sullivan, a staff reported on The Wall Street Journal.

> In the judgment of important Democratic and Republican lawmakers, lots more Federal money for waste purification, rather than added stream-policing powers sought by the Johnson Administration, holds the key to pollution abatement. Despite Administration admonitions to the contrary, a Senate Public Works Subcommittee yesterday approved a bill that envisions within five years a tenfold expansion of the present $150 million-a-year Federal aid program for helping build municipal sewage-treatment works. In addition, municipalities would be encouraged to start cleaning industrial waste waters in city treatment plants.

"Just ordering a city or an industry to stop polluting isn't the answer. The costs of treatment are simply overwhelming," declares Democratic Senator Muskie of Maine, the subcommittee chairman. "If we mean it when we say our national policy is to enhance the quality of our water resources, then we've got to be willing to put up the money to get the job done; and the present spending level doesn't begin to reflect the magnitude of the problem," he asserts.

Almost certainly headed for the legislative scrap pile are Administration proposals for hauling polluters into court without any prior negotiation and for subpoenaing corporate water-use records and inspecting industrial plants. Instead, the Senate Public Works Committee will probably provide for periodic corporate submission of water-waste data to Federal analysts.

Equally frowned upon in Congress is a proposed directive to river basin clean-up agencies to consider imposing "effluent charges"--taxes on water users for all wastes they dump into a stream. Industry groups have won conservationists' sympathy by branding such a levy as a "license fee to pollute."

The lawmakers' determination to proceed this year, despite White House dissuasions, reflects the political importance many attach to "getting something done" about pollution. Easterners, in particular, see New York Gov. Rockefeller's $1.7 billion antipollution program as his single strongest reelection suit this fall, and Congreeemen of both parties are anxious to win similar credit.[6/]

Of the three approaches, financial assistance certainly seems to be the most popular with Congressmen. Economists should never confine their studies to those alternatives having current political popularity. There is, however, an urgent need for information and ideas contributing to the development of more effective forms of state and federal financial assistance in water pollution abatement.

6/ Joseph W. Sullivan, "Cleaning Up Dirty Water: Big Spending on Waste Purification Pushed by Key Lawmakers, Bucking Administration," The Wall Street Journal, Thursday, June 23, 1966, p. 28.