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Department of Environmental Protection

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TEN YEARS OF WATER RESOURCES MANAGEMENT  
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TEN YEARS OF WATER RESOURCES MANAGEMENT  
N.J. Department of Environmental Protection

The activities of the Division of Water Resources center on the total management of water--protecting and upgrading its quality, guarding its purity for household use, improving its supplies (including the planning and development of future raw water supplies), and developing practical means to cope with flooding and flood plains problems.

WATER QUALITY

In order to protect and upgrade the quality of New Jersey's waters, several steps are being taken: investigation of present conditions; planning for protection and improvement, including regulation of water uses and activities affecting quality; and implementation of programs to improve quality, including the enforcement of appropriate standards and regulations.

Investigation

Several Division programs are designed to determine the present state of affairs. The most far-reaching program in this regard is the Ambient Water Quality Monitoring Network. Division personnel monitor biological and chemical characteristics of streams at 217 sites around the State. Thirty-two of these sites are tied into a national network of about 1000 sampling stations. The Clean Lakes Program staff monitors public lakes and ponds, observing and evaluating ecological changes (eutrophication) which would damage recreational value and public usefulness. Over 1100 such bodies of water have been inventoried; 600 have been surveyed. Forty New Jersey lakes are the subject of very detailed investigation, as part of a national program to develop a priority listing of lakes which require restoration for full recreational utility. Marine monitoring for occurrences of the potentially harmful red tide is performed seasonally. A separate Bureau of Shellfish Control regularly performs sanitary surveys of all shellfish waters.

A specially-equipped mobile laboratory permits the direct, continuous testing of industrial wastewater discharges for toxicity to fish. At present, this mobile laboratory is used in "worst case" enforcement matters, since it is "one of a kind", and testing requires about a week.

In addition to these routine, planned monitoring programs, considerable efforts are made in responding to occasional water quality-related incidents, such as spills of toxic chemicals, private well contamination from industrial/domestic sources of waste, or other causes of water quality degradation.

## Planning

The main water quality planning program in the Division is that responsible for the areawide Water Quality Management Plans required by Section 208 of the Federal Clean Water Act of 1977. By February of 1980 eight of these plans, covering seventeen counties, had been certified by the Governor. Plans for the four remaining counties are complete and are under review by the Division. These plans identify major water quality problems and propose solutions for meeting the State's water quality standards. The Plans project population to the year 2000, delineate sewage service areas, and provide the basis for setting effluent requirements for municipal sewage discharges. The Plans also regulate future discharge of pollutants, so as to protect existing high quality waters of the State such as trout streams and shellfish waters. Nonpoint sources of pollution including agricultural runoff, urban/suburban stormwater, septic tank problem areas, and landfills affecting surface waters are identified in the Plans. New legislation is recommended for stormwater control and the creation of septic tank management districts.

Under the Federal Clean Water Act, the Department is required to prepare reports to assess progress on meeting the national goal of water quality sufficient for fishing and swimming. In 1979 the Division of Water Resources released a summary report on water quality conditions which indicated that 32% of the State's drainage areas were satisfactory for swimming and 69% satisfactory for fishing. The same report projected that after completion of sewerage plant upgrading the waters suitable for swimming would increase to 53% and for fishing to 74% of the State's drainage area.

The Bureau of Shellfish Control's investigations have formed the basis for safe use of New Jersey's shellfishing resources. These efforts have resulted in the opening of 50,000 new ocean acres to this important industry, 7261 of these acres in fiscal year 1979 alone. It is anticipated that 14,500 additional acres will be classified for shellfishing during fiscal year 1980.

The Division is updating its Water Quality Standards this year, increasing their scope, and reflecting the additional data collected here and elsewhere on existing conditions and the toxicity of various substances.

(The USEPA has published and updated effluent standards for municipal and industrial discharges, and is still developing standards for many industrial categories, based on the available technology. The National Pollutant Discharge Elimination System is a permit program which implements these standards.)

## Implementation

Several programs seek to make the implementation of our planning and regulatory efforts a reality. One of the largest of

these is the Federal Construction Grants Program. The State is in the process of assuming full responsibility for administering this multibillion dollar program which provides funds for the planning, design, and construction of new regional sewage treatment plants, and the upgrading of existing plants, where local communities need and qualify for such support. State grants also contribute to this water pollution abatement program. During fiscal year 1979, \$123 million in federal and State funds were expended for improved wastewater treatment facilities in 50 municipal systems in New Jersey.

A full range of technological sophistication is represented by planned and newly constructed sewage treatment plants in New Jersey, both funded and independently financed. Factors such as the nature and volume of the waste stream, the sensitivity of the receiving stream to various substances in the sewage, the available space, etc., determine the degree of treatment appropriate for a particular plant.

The Parsippany-Troy Hills Sewage Treatment Plant is equipped to provide the highest level of treatment in the State, including nitrification /denitrification--a process which removes the nitrates which could otherwise "overfertilize" the receiving waters. The same sort of nutrients are removed in a final "polishing" step from the effluent of the East Windsor plant, by a low energy biological method. The effluent is sprayed over fields on which canary grass is grown as animal fodder. The use of nutrient materials by the growing plants and the filtering capacity of the soil itself produce an effluent of excellent quality. The semi-solid residuals from East Windsor's process are turned into the soil in a separate section of the site, where cattle corn is grown. In Camden County these residuals, known as sludge, are composted, much as leaves and/or garbage are composted by the home gardener. The composting process biologically sanitizes and reduces the volume of sludge, which can then be used as a conditioner which improves the texture, organic content, and moisture-holding capacity of the soil. This particular project is the subject of an in-depth study by a Rutgers University research team of over 40 members. The Rutgers team is considering optimization of the process from a variety of perspectives including pathogen kill, turnover time, and utility of the end product for various applications.

The other major implementation program is the permitting system mentioned above. The New Jersey Pollutant Discharge Elimination System will control the quality and quantity of industrial and municipal effluent discharges to waters of the State by applying the federal effluent standards mentioned previously. This will probably be the largest such permit program in the nation, since New Jersey's system will also affect non-domestic discharges into municipal sewage treatment plants, and virtually all waste disposal methods which can readily affect water quality, such as landfills and land application of septage and sludge. A system of self-monitoring, reporting, and spot checking will ensure that limitations are met.

Another approach to the improvement of "services rendered" by local sewage treatment plants involves the training of operators. A cooperative effort is planned with Rutgers, to train plant personnel in the classroom and in "on-the-job" training situations at a small State-owned plant located on the New Brunswick Campus.

New Jersey in particular, has found itself, over the last 100 years or so, in the position of paying for the employment benefits of highly industrialized communities with decreased water quality. Today's technology, the concerted efforts of the Division, and the cooperation of industry have resulted in major progress in the reversal of that penalty to our citizens. Industrial plants ranging in size and status from international corporate giants to small family businesses, and involved in fields as diverse as petrochemical processing and food packing, have all made progress in the improved treatment of waste discharges.

Another effort to reduce industrial costs to New Jersey's environment was initiated by the Spill Control Program. Now among the duties of the Division of Hazard Management, this program is based on the New Jersey Oil Spill and Compensation Control Act which establishes a \$25 million fund to pay cleanup costs and compensate persons suffering financial losses from spill damage.

Section 314 of the Federal Clean Water Act provides funds for the restoration of lakes suffering from premature aging. The Division administers this program at the State level, in conjunction with the lakes eutrophication study. A grant is about to be awarded for the restoration of Allentown Lake, where recreational utilization has been seriously affected by rural and agricultural runoff and siltation. Funds from the President's Urban Initiative program were granted for a diagnostic and feasibility study on Weequahic Lake in Essex County. Only ten such grants were given nationwide.

## WATER SUPPLY

New Jersey's usage pattern for fresh water is very different from most of the world, in that the surface to ground water use ratio is 50/50. For the earth in general, only 3 percent of the fresh water supply is located on the surface. Since only 0.7 percent of the water available on earth is fresh water, the management of our fresh water supply is very serious business.

### Planning

The Water Supply Master Plan was initiated in December of 1976, at the recommendation of the County and Municipal Government Committee and the Interdepartmental Committee on State Water Supply Needs, after the drought of the 60's and the Trenton water crisis. The Plan is a comprehensive statewide study which examines current legal, institutional, technical, and administrative aspects of water supply management in New Jersey, and makes recommendations on these matters for the future. The Plan is scheduled for completion in June, 1980, and will go to public hearing this July.

In 1977 New Jersey updated its drinking water statutes to make them compatible with the Federal Safe Drinking Water Act. The essential impact of the federal and revised State laws will be to increase the number of public community water supply systems and non-community public water systems that are subject to State regulation, and to more thoroughly control the quality of these potable waters. Detailed monitoring, and restrictions for characteristics not previously controlled, are required. New Jersey has assumed primary enforcement responsibility for the federal Act, and therefore will continue to directly manage the supply of safe drinking water throughout the State.

Among the new raw water supplies being planned for development are the Manasquan River and Raritan Confluence Reservoirs. These proposed reservoirs would provide the back-up supply not provided by ground water in these areas of the State during drought conditions.

### Implementation

Several water treatment plants around the State have been recently upgraded or newly constructed. A new, up-to-date facility serving Jersey City is located in Boonton. Renovations to the Atlantic City plant make it one of the most technologically advanced in New Jersey, as well. Other fine examples of today's potable water treatment methods are found at the facilities of the Monmouth Consolidated Water Company, the Middlesex Water Company, and the Haworth plant of the Hackensack Water Company. Construction is scheduled to begin on a new potable water plant in West Milford for the Newark service area, and a large modern treatment plant for the North Jersey District Water Supply Commission is currently under construction.

In addition to the increased protection afforded New Jersey's citizens by the provisions of the Safe Drinking Water Act, the Division seeks to improve and supervise improvements in services throughout the State. The Division is responsible for the operation and maintenance of the Spruce Run-Round Valley Reservoir Complex and the Delaware and Raritan Canal raw water supply systems. The Reservoir system can supply 190 million gallons of raw water daily; the D&R Canal system can supply 75 million gallons per day. In June of 1977, 3.6 miles of outlet pipe were finished to increase and improve the delivery of water from Round Valley Reservoir to nearby communities.

### Flood Plain Management

Several Division programs are aimed at minimizing flood damage within the State and assisting property owners in obtaining flood damage insurance.

Considerable time and work has been invested in the delineation of the floodways and flood hazard areas along our streams and rivers. To date, over 1100 miles of floodways have been

delineated. This work is expected to continue for some time, as a joint effort in cooperation with the Federal Flood Insurance Program. Through this program, the citizens in 540 municipalities have obtained low-cost flood insurance. Of this number, 225 have been studied to the satisfaction of the federal agency, and have been converted to the "regular" program. The remaining 315 municipalities in the "emergency" program have flood insurance available, but have not yet had detailed studies accepted by the federal agency. The Division has been assigned Flood Insurance Studies for 230 municipalities. Of these, 106 are completed, and 18 are among those which have been converted to the "regular" program.

The information generated in the delineation process is used to control the use of land adjacent to streams and rivers. The Stream Encroachment Program reviews all projects planned within the 100 year flood hazard area, for possible impact on flooding probabilities and aggravation of the severity of flooding events. In addition, the stream encroachment group investigates reports of violations of stream encroachment regulations, and enforces against such dangerous practices as filling in channels and flood plain areas.

In a cooperative effort with the federal government, the State is engaged in a dam inspection process. Each review considers the capacity of the structure to safely pass the design flood. The review also determines whether the dam is structurally sound, so as to reasonably preclude any chance of failure.

#### GEOLOGICAL SURVEY

This group is charged with mapping the geology and topography, and studying the mineral resources of the State. In addition, the expertise of the geology unit is applied to certain aspects of atomic and geothermal energy, groundwater supplies, and excavations for the purpose of underground storage or disposal of gas, oil, chemicals, and certain wastes.

Maps and reports generated by Geological Survey personnel are sold, to cover the costs of printing and mailing. Topographic maps from the United States Geological Survey are also stocked for public sale.

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In addition to these ongoing programs which contribute to long-term total management of New Jersey's water resources, the Division must respond to situations occurring over the short term which may endanger the State's supply of safe water for present and future needs. Last Spring, quick action by the Division, and sustained joint efforts with the Coast Guard, prevented a major health and environmental disaster during an 88-day strike by

tugboat operators, responsible for hauling sewage sludge to the ocean dumping site. The recent Pinelands legislation also illustrates such a response, involving the entire Division in both quality and supply issues concerning a sensitive, valuable, and irreplaceable source of safe water for the people of New Jersey.

The Division of Water Resources of the Department of Environmental Protection has provided New Jersey's citizens with improved water supply, centralized planning for wastewater treatment, and funding for the latter. The monitoring of ambient water quality today is well-organized to provide regular, properly recorded, defensible data. Overall, the quality of our streams and rivers has improved substantially, and improvement in coastal waters is reflected by the increase in ocean acreage classified for shellfish harvesting.

Nevertheless, the problems and the challenges--the job of managing our water resources--have only begun. The 1980's will see more and more emphasis on protecting the quality of our ground water, detecting and removing dangerous organic chemicals from potable water supplies, and obtaining the wastewater treatment we need by the most energy-efficient means reasonably available.

The role of our citizens in this management challenge cannot be overemphasized. Much of the regular monitoring of ambient water quality will become the charge of responsible, qualified local groups. As priorities are established for public lakes restoration, local support will be essential to our efforts to obtain federal funds. The Division of Water Resources is dedicated to providing an ample supply of safe, refreshing water for household use; sparking, unpolluted waterways for recreational purposes; and adequate reserves of high quality water to fill the needs of all our citizens. We can achieve these goals only with your full cooperation and involvement. Come on in--and the water will be fine!

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