Thirty-three years ago, the legislatures of Connecticut, Massachusetts and Rhode Island ratified the New England Interstate Water Pollution Control Compact, and the United States Congress granted its consent and approval for the States to enter into such compact. Subsequently, the States of New York, Vermont, New Hampshire and Maine became signatories.

The purpose of the Compact was to establish reasonable standards of water quality and to approve the States' classifications of the interstate waters of the Compact area for their proposed highest use. By becoming signatories, the States pledged to put and maintain the waters of the Compact area "in a satisfactory condition consistent with the highest classified use of each body of water."

In the discharge of its responsibility, the Commission has supported many studies on various aspects of water pollution and its control. Advancement of the state-of-the-art during the decade of the '70's identified the environmental interrelationships of water, air and solid wastes and the polluting potential of air-borne particulate matter and landfill wastes on the surface and ground waters of the Compact area.

As a result, the Commission during fiscal year 1980 examined its current role and the future needs of its member States in the light of emerging environmental issues and their impact on the water quality of the Compact area. It was agreed that in addition to its traditional functions, the Commission should broaden the scope of its activities to include the acid precipitation and groundwater issues and, within the limits of available resources, perform clearinghouse functions on the problems of hazardous waste management.

During the year, the Commission hosted a meeting of State and EPA water and air pollution control agency personnel to determine related data needs of the water and the air pollution control programs and to define respective areas of responsibility for developing such data. This meeting led to the establishment of a work group charged with assessing the environmental impact, within the Compact area, of the long range transport of air pollutants which generate the acid precipitation problem in the Northeast.

To assist the non-agency Commissioners to provide more definitive input into the development of water pollution control policies adopted by the Commission, the Commission changed its regular meeting format to that of a workshop approach. The workshop concept allows in-depth consideration of key issues which do or will impact the water pollution control program at the State and National levels, thereby providing for the development of sounder positions and recommendations pertaining to those issues.

During the report year, the Commission has continued its information gathering activities through staff participation in meetings, task forces, hearings and other functions. It has disseminated such information to the States and provided a forum for information exchange and discussion of mutual management level problems by the program managers. To be of greater service to the States, the Commission broadened the scope of its activities to include consideration of the acid precipitation problem as noted earlier and initiated an investigation of mechanisms used by the States in the water quality classification of groundwater aquifers as well as a study of the socio-economic impact of groundwater problems. The Commission also continued its operator training, public information, special project and research activities. This report describes the work of the Commission during fiscal year 1980 and sets forth the directions the Commission will take for fiscal year 1981.

The Commission expresses its appreciation to the many agencies and organizations concerned with the protection of water quality and the environment for the assistance they rendered. The Commission is aware of shrinking resources and fiscal constraints at the State and Federal levels but looks forward to continued support from the Governors, legislatures and administrative officials of the member States so that a coordinated regional approach to the problems of water pollution control can be maintained.

Reginald A. LaRosa
Chairman
Toward Quality Water

"There will never be more water, there will never be new water—only the same microscopic molecules used or stored, evaporated or frozen, recirculated and reused by human and beast, from now until the world ends."

Carol Keough
*Water Fit To Drink*

**Progress**

As early as the 1920's some New England States were aware that water quality problems needed legislative action, and efforts toward pollution abatement were begun. In 1947, the United States Congress authorize the establishment of interstate water pollution control commissions. But it was not until the 1960's that Americans fully realized that rivers and streams needed some serious attention and a plethora of tender-love-and-care. It was as if we had suddenly noticed what was happening and we were appalled. The public demanded action.

In the 1970's action was taken... strong federal and state laws were passed, monies were appropriated, wastewater treatment plants were built, and water quality management plans were formulated. The story of our progress was impressive by anyone's standards. By 1980, many formerly putrid waters were once again spawning grounds for long absent aquatic inhabitants like salmon and shad. Boaters and bathers ventured into formerly unpalatable rivers.

**An Introspective Into Water's Plight**

Water is the major component of life. Without water, there can be no life. Besides water's essence to our physical existence, it is also used... as a waste receptacle, a power maker, a transportation mode, a food source, a cooler. Water drawn from distant reservoirs or deep aquifers has provided the means for creation of cities in the desert or agriculture in the prairie. Unfortunately, where water has been plentiful it has also been taken for granted and, for that reason, abused.

From the beginnings of the Industrial Revolution in the 1800's, major rivers in the Northeast United States were requisite to the location and development of factories, towns, cities and populations. Even before this, man's economic lifeblood was the port. Throughout our industrial development, however, few people had been taking a close look at what was happening to the waters... in some cases they wouldn't dare for the odor, alone, was repelling. The rivers had strange colors, textures, and tastes. They were fairing badly.

Waterborne diseases, such as cholera and typhoid, did bring attention to water's indelicate condition, and water supply treatment plants were built in most major cities in the early 1900's. But this by no means improved water's plight, and its condition continued to deteriorate as it does even today, though in a more subtle way... as we shall see.
The Setbacks

But while we were seeing an improvement in our surface waters, we were also learning more about the dynamics and chemistry of natural resource systems in general. As more was understood, it became apparent that a Pandora's box of new problems had spilled into our waters. Among the findings was the widespread presence of an invisible and potentially more threatening water quality disgrace: groundwater pollution!

Buried waste has become today's environmental scourge—the price of the post World War II industrial boom and economic "good times." The unearthings of Love Canals, or aquifers tainted with synthetic organics... bring to mind the classic science fiction dilemma: how to squelch the invincible invader. Indeed, water pollution control technicians watch with anxiety for discoveries of new hazardous waste dump sites or contaminated wells.

Compounding our underground problems was another realization which came center stage by the end of the 1970's: airborne pollutants eventually end up on the earth where their slow but steady accumulation can cause ecological chaos. While this had been known in the theoretical sense, the phenomenon had to be realized and resultant damages noticed. "Acid Rain" emerged in the public dialogue and with this, images of silent and malignant chemical interactions taking place in the air, the water and the land. The first visible victims of this were brook trout in remote Adirondack ponds... ponds turned too acidic for trout habitation.

Fluid Boundaries

Can water be wrested from these external, unnatural and ever more complicated bombardments? If so, whose responsibility is it? The right to use water has been an issue since this country was settled... riparian rights in the east... prior appropriation in the west. The Colorado River has been divided up into more rights than it has water. The right to use water has been cause for the clashing of arms but the users rarely clamor for the right to clean up water they have taken. It is water's fluidity that makes its management so complex... it comes and it goes, so who should do what?

The lines on the map dividing Connecticut from Massachusetts or New Hampshire from Maine mean nothing to water's domain. Whether it's gushing through a ravine or creeping underground, an inch per year, water is constantly on the move and pays no attention to political jurisdictions. Consequently, water used and befooled in one location can become a condemned resource to its user down the road. Enforcement of protective laws in one city or town may prove to be futile if wayward waters meander in from over the border.

Water is dynamic. It moves as a precipitate from the atmosphere to the earth. Some of it then penetrates the ground, moving down and through the soil and rocks; some runs off the land surface into gutters, lakes and streams, and some evaporates back into the atmosphere to continue moving with the winds. The propensity of water to interact with the environment as it moves through the hydrologic cycle is a sobering reminder that the damage we do at one point seldom stops there. Thus pollutants ejected into Ohio's air may eventually be deposited into a Vermont trout stream. The chemicals stealthily buried in a fallow field may one day be identified as a carcinogen in a neighbor's well.
Waters Visible

There are three major water domains which must be addressed if we are to see to it that waters recover: surface water, groundwater, and atmospheric water. The most accessible water and, therefore, the most usable and abusable, is that water found on the earth's surface... lakes, streams, rivers, marshes, ponds, impoundments, oceans.

Our first major attempts to improve surface water quality were directed at those river miles most obviously blighted by direct discharges of human and industrial wastes. These waste contributions include typical household by-products such as feces, detergents, cleansers, and colorful toilet papers. Industrial contributions include dyes, paper, pulp, heat, undesirables from tanneries, canneries, tool and dye works and PCBs and PVCs... the list seems endless. From the streets and roof tops came oils, soils, salts and other spoils.

This waste was discharged directly into water bodies. Much of it was simply untreated or partially treated sewage flowing from its source through a pipe or storm sewer to the river. With all of this effluent, however, water did show an amazing capacity to assimilate and dilute. For water to become "polluted" it had to be seriously contaminated.

Cleaning up surface water requires a variety of approaches. Certainly one approach put forth for the treatment of wastewater prior to discharge has been the wastewatter treatment plant. While many towns and industries had minimal primary treatment of waste, the 1970's brought on line a much more sophisticated "secondary" level of treatment and in some instances an even more refined "tertiary" level of treatment. Our pursuit of a growing economy, employment and material wealth necessitates some degree of sewage and waste. Wastewater treatment has helped make our economic development possible with the immeasurable benefit of healthier, more aesthetic waters.

What do treatment plants do? Very briefly, raw sewage arrives at the facility where settleable material is removed from the liquid. The settled material is digested by very industrious, friendly bacteria and other microorganisms. The liquid portion is simultaneously acted on by other organisms to break down dissolved materials. In the end there is a tank full of sludge separated out from relatively clean water. The water is discharged back into the river where dilution takes over. While this treatment has been costly, the net benefits over time, as we discuss later, have proven and will prove to be well worth the price.

With all this effluent... water did show an amazing capacity to assimilate and dilute. For water to become "polluted" it had to be seriously contaminated.
Another problem for surface waters has been the more pervasive nuisance of indirect or nonpoint pollution sources such as soil erosion, stormwater runoff, road salts, and agricultural runoff. Some of this pollution is the result of poor land use management practices. Reducing this form of pollution often involves many relatively inexpensive and uncomplicated little actions which add up to significant water quality improvements.

For example, some communities now include stipulations in their subdivision regulations which require developers to keep soil on the site. Construction sites have traditionally been the sources of tons of sediment found in our streams. Certainly, maintaining something of the site’s vegetation, proper placement of soil blockades and catch basins contributes enormously to resolving the problem. Likewise, highway construction loses large amounts of soil to rivers and streams when simple methods such as hay bales, catch basins, or rapid reseeding significantly reduce soil loss. Farmers can follow plowing and planting procedures to reduce soil, fertilizer, and pesticide loss. Certainly, for nonpoint sources, prevention has proven to be the best cure.

Finally, one obvious action which improves surface water is the physical removal of shopping carts, cans, bottles, tires, boots, plastic wraps, automobiles, and fallen trees from the banks and bottoms of our waterways. This kind of improvement to lakes or streams has been accomplished in many places by citizen participation.

Waters Invisible

It’s groundwater. It is not visible unless it trickles out from a road cut, rises into your basement after a storm, or comes out of your faucet from a well. Groundwater has emerged as the single most important water resource of the future...the near future.

Approximately 25% of New England’s population depends on groundwater for its drinking water supply. In New York State, one third of the population or about 6 million people use groundwater. Of this number 3 million are located on Long Island in Nassau, Suffolk and Queens Counties and the remaining 3 million are located on upstate New York aquifers.

The most sobering aspect of groundwater pollution is the relative permanency of the condition once pollution has occurred.

As demand and drought conditions reduce surface water supplies, more and more communities seek to protect this underground resource. But while high yield aquifers are being sought out, some communities have discovered that thoughtless, inexpensive waste disposal practices (past and present) have already irreversibly contaminated sizable expenses of this water. The Environmental Protection Agency’s 1980 list of aquifers where organic contamination has been found doubled in size from the previous year.

The hard lesson we have learned about groundwater contamination boils down to that simple fluid characteristic of water; it wants to keep moving and, in transit, it dissolves or is chemically transformed by the materials which it encounters. Because groundwater is not visible and is thus enigmatic to many of us, an explanation of its dynamics follows.
Subterranean Dynamics

Water that filters into the earth travels through pore spaces in the soil and cracks in rocks. It works its way down through worm holes, rotted root systems, and all the paths that years of surface weathering have made. Eventually, however, it reaches a nonporous, impervious, water-tight layer such as bedrock. At this point, when water can no longer move downward, it begins to accumulate in the pores and cracks. Those spaces which become completely filled with water are said to be 100% saturated and comprise the "saturated zone" or "aquifer." An aquifer is the name for a rock or soil layer which contains or transmits water; it is thus a "reservoir" for underground water. The upper limit of the zone of saturation is the water table. The soil or rock above the water table is less than 100% saturated and is called the "zone of aeration."

During wet and dry seasons, the water table will rise and fall respectively. In the Northeast, spring rains coupled with winter snow melts cause more of the aerated zone to fill with water, thereby temporarily raising the level of the water table.

Groundwater also moves horizontally through the aquifer. The water is constantly moving downslope. The water table generally follows the surface topography to discharge points such as springs, streams, and lakes.

During dry periods, streams receive their "base flow" from springs and groundwater seepage. Water moves slowly through the ground that even in extended periods of dryness streams will still flow at this "base flow" level. Under drought conditions the groundwater may drop to such a low level that a stream bed will dry up. While groundwater usually discharges into streams, under certain conditions the reverse may occur. Thus groundwater cannot be thought of separately from surface water or atmospheric moisture ... it is all the same system. What we do to one part of the hydrologic system eventually affects the whole system in some way.

Man's activities can affect groundwater in a number of ways. Pumping water from a well changes the slope of the water table, drawing it down in the vicinity of the well. The pumping of the water creates a "cone of depression" around the well causing the water table to slope toward the well.

Removing or filling of soil, highway cuts, trenching, and other activities can create new discharge and recharge areas and affect the direction and quantity of water movement.

The groundwater supply can be affected if it is removed from the ground at a faster rate than it is being recharged. Most residential wells withdraw and discharge water onsite; the net loss of water in this case is negligible. In some instances, however, larger water supply systems, residential or industrial, will withdraw groundwater and discharge it through sewer lines to a remote location. If groundwater is to be used more extensively in the future, groundwater recharge and the effects of water draw-down from pumping will require careful management.

To begin to understand the problem of groundwater pollution, think of the process of preparing coffee using the filter paper method. The clear tap water is poured through the coffee contained in the filter paper. The water moves slowly through the pore spaces between the coffee grounds and eventually drips into the coffee pot. Eventually they become color, taste, and odor. Under natural conditions, precipitation passes slowly through soil, rocks and organic matter and, likewise, reflects the materials through which it has filtered. "Hard" or "soft" water is determined by the amount and type of salts dissolved in it due to passage through the various materials. Thus, it is easy to see how groundwater becomes a product of the material it passes through or has injected or drained into it, be it soil or waste.

Soils have varying capacities to filter and "decontaminate" water that passes through them. This purification results from physical filtering, chemical interactions with the soil, and the biological activity of microbes or plant roots in the soil. Most of the purification occurs in the zone of aeration. The slower the water moves through the soil, the greater the opportunity for purification. Sands and gravel deposits, while vulnerable to pollution, are also important as high yield aquifers.

The most sobering aspect of groundwater pollution is the relative permanency of the condition once pollution has occurred. Whole regions of high yield aquifers have been "written off" as future water supply sources. Their histories as waste receptacles cannot be erased within any of our planning scopes. Thus the task of identifying and protecting these resources takes on a note of urgency.
Atmospheric Waters

Nothing has demonstrated so well the interdependence of air, water, soil and biota as the "acid rain" dilemma. Just as water has been a convenient waste transporter and diluter, air, too, has been used in the same fashion.

Smokestacks and exhaust pipes emit thousands of tons of gases and particulates into the air each day. Since the Industrial Revolution, towns and cities have suffered localized acidic atmospheres and ill health. For years some of these local emissions have wafted high into the upper atmosphere and traveled great distances.

To ease local pollution the Clean Air Act of 1970 required higher smokestacks to purposefully get emissions into the upper atmosphere. But the ramifications of emitting from tall or short smokestacks were not clear until links were made between acidic precipitation falling in the Northeast United States and Canada and sulfur and nitric oxide emissions from the industrial States to the west. Precipitation carries in it by-products of power plants, industry and automobiles. The phenomenon has been called "acid rain" and while fish were the first known organisms affected, the list of effects has grown exponentially.

The acidity of Northeast precipitation has been distressingly high in the past decade. While a "normal" pH of precipitation is considered to be about 5.4 recent storm events in this region have been recorded at around 2.7: almost as acidic as vinegar.

The pH scale, a measure of a solution's alkalinity or acidity, ranges from 0 to 14. A pH of 7 is neutral and below 7 is acidic. Thus precipitation is normally mildly acidic. But it is to the "norm" that nature had adapted over millions of years. Slight changes in pH can have dramatic effects on the whole environment.

Once again, water is the victim, this time to acidification and all the other metals and chemicals falling from the sky. Depending on an area's geologic parent material, water can buffer the effects of acidity to greater or lesser degrees. But again, barraged with acidity over time, a water's buffering capacity eventually decreases... irrevocably. Though surface waters are the first to respond to acidification, groundwater too is affected... and thus continues water's plight for stability.

Tending the Collective Waters

Who is in charge of the water? As early as 1947, the New England States and New York recognized the need to set compatible water quality goals. These States also recognized the need for interstate cooperation in setting compatible standards and organized the New England Interstate Water Pollution Control Commission (NEIWPCC) to facilitate the process of setting and maintaining standards.

The Federal Government did not call for the establishment of water quality standards until a 1965 amendment to the 1956 Federal Water Pollution Control Act. This 1965 legislation set the stage for the current strategy for water quality management. After 1965 the next big Federal legislative leap came with the passage of significant environmental protection laws in the 1970's... the Clean Water Act, the Clean Air Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act, the Federal Pesticides Act, and the Safe Drinking Water Act.

While the States are the primary enforcers of water quality standards, in the past three decades Federal and State governments have worked cooperatively toward cleaner water. Upon passage of the Clean Water Act most of the New England States modified existing water pollution control agencies to form "super" environmental protection agencies to develop and carry out both Federal and State environmental programs. Local governments have had to respond to State pollution abatement orders and many have also written their own protective ordinances and regulations.

With these environmental laws go sanctions, monetary "carrots," abatement orders, and permit processes, but most important... goals. The primary goal of the Clean Water Act, for example, is "fishable and swimmable" waters, where attainable, by 1983. The goal for the Safe Drinking Water Act is to ensure that water supply systems serving the public meet minimum national standards for the protection of public health.
Although industry did not jump for joy at the prospect of either cleaning up or closing up, many firms did the job well. They spent millions, used ingenuity, created better environments for themselves and their communities, and won public respect. Some industries are still remiss as are some communities, and stretches of rivers remain defiled. But the overall process of cleaning the environment by sanction seems to be the only way possible in the current state of the world.

In asking who is in charge of the water, we must point out that the real caretakers and protectors of water have been the public. After all, it has been citizen concern over the many effects of water abuse which has served as a catalyst for water quality laws and programs.

...water is constantly on the move and pays no attention to political jurisdictions.

What is a New England Interstate Water Pollution Control Commission?

In many instances a community's or industry's effluent moves downstream and becomes another State's problem. The regional approach of gathering involved parties in round table forums provides a neighborly atmosphere, a compatibility of standards, a means for resolving disputes, and a way to accomplish goals less attainable on a State by State basis.

The New England Interstate Water Pollution Control Commission (NEIWPCC) is administered by 35 Commissioners, five from each of the Compact-member States (CT, RI, NH, ME, MA, VT, NY). Program development and coordination is carried out by an Executive Secretary and staff under the direction of the Commissioners and with the assistance of a Technical Advisory Board (TAB). The TAB is the primary source of technical input for the issues and activities addressed by the Commission.

The Commission (NEIWPCC) has three broad functions: 1) the coordination of interstate water pollution control efforts of the New England States and that part of New York affecting or affected by New England water, 2) the education and training of personnel for careers in water pollution control, and 3) public information.

Since 1947 the Commission has sought to coordinate the Compact-member States in their fight against water pollution. The NEIWPCC's various functions have included approval of interstate water use classifications; advising in the planning and construction of water pollution control facilities; the preparation of model legislation, regulations, and guidelines; funding of demonstrations in new developments in water pollution control technology; and close liaison with the regional EPA to implement national standards of water pollution control.

In 1980, the Commission took a close look at the function of the NEIWPCC within the context of the region's total water quality scenario. It became clear that the interstate interests of the Commission involved the total hydrology of interstate basin pollution. Put simply, groundwater pollution and acid rain were very much interstate problems. From this point on the NEIWPCC has chosen to direct coordinating efforts at the rivers and streams and the subterranean and atmospheric miasmas... inclusive.
Tools of the Trade

In the long run, the best and most cost-effective way to deal with water pollution is to avoid polluting... take pains to protect the water. Since this practice is not always followed, a variety of water pollution control techniques are available. For example, there are ways to remove pollution, ways to avoid pollution and ways to use pollution. Let's look at some of these tools-of-the-trade.

Policies, Laws, Regulations and Plans—Made Easy

A policy isn't really a tool, but it makes the development and use of all the other tools possible. A policy is a guiding principle which leads to subsequent actions. If honesty is your best policy then you will develop personal standards and rules which reflect honesty in your actions. The National Environmental Policy Act (NEPA) of 1970 essentially said that as a national policy we want a quality environment for this country. How do we do this?

We write laws to insure that the environment is cared for. The laws say there will be some regulating, fining, planning, spending, informing, persuading, coercing, research... the usual. Thus, the NEPA lead to laws which lead to the implementation of pollution combat tools for removing, avoiding and using pollution.

By regulating, a government is generally saying we have goals and standards to be attained and a community or industry must take the necessary actions to be in compliance. Communities often get funding assistance, or if non-compliant lose funds, and industries can be fined or shut down for non-compliance. Sometimes a show of good intentions goes a long way.

Planning is a very useful tool if the plan is good and is implemented. All too often, however, plans are indifferently prepared, bound in voluminous splendor, and ignored.

Section 208 of the Clean Water Act authorized the EPA to establish an areawide waste treatment management planning program to deal with nonpoint sources of water pollution. The "208" program stresses planning by local governments and the implementation of the cost effective water quality management practices developed under this program. Local governments within designated "208" planning areas are called upon to work together to find and implement solutions to their common water quality management problems.

As of September 1980, more than $21.1 million in grants were awarded to the sixteen designated areawide planning agencies in New England and to the six New England States. Under contract to the Massachusetts Department of Environmental Quality Engineering, the NEIWPCC provided staff for that State's "208" program. Several of the "208" agencies have been successful in achieving implementation of strategies identified by the "208" plans, and those strategies are already resulting in water quality improvements.

In the Compact area, the "208" programs are helping preserve and protect the quality of the region's groundwater resources. These efforts have focused on identifying high priority groundwater areas, identifying threats to groundwater aquifers, and developing and implementing aquifer protection regulations.

All kinds of plans are mandated in the various environmental Acts. For example, the Resource Conservation and Recovery Act calls for plans and procedures for siting hazardous waste management facilities, the development and implementation of State solid waste management plans, and plans for resource recovery facilities.

Wastewater Treatment

Our pursuit of a growing economy, employment and material wealth necessitates some degree of sewage and waste. Wastewater treatment has helped make our economic development possible with the immeasurable benefit of healthier, more aesthetic waters.

On-Site Sewage Disposal

Sometime in the late 1800's, Thomas Crapper pulled the cord that flushed an English toilet. Thus, the first flush toilet came to pass. At about the same time, a Frenchman, Louis Mouras was inventing the Mouras automatic, the first septic tank. The flush toilet in London magically carried waste to sewers and ultimately to the River Thames. But, as the toilet took up residence in the suburbs, the septic tank became an inseparable part of the flush toilet—domestic disposal system.

This "on-site" sewage disposal process, at its best, both treats waste and minimizes groundwater pollution. The septic tank system consists of an underground tank into which the sewage flows, and a leach field. The solids in the wastewater settle to the bottom of the tank and the liquid drains into the leach field. The soil system in the leach field is a filter for the wastewater which eventually enters the groundwater. Soil type plays an important role in determining how well this water will be renovated by the time it reaches the groundwater.

A properly designed and installed septic system can last indefinitely if it is well maintained. Periodically, though, the tank's contents of accumulated sludge and scum must be pumped out. (Disposal of this sludge, known as septage, is another problem.) Unfortunately, most people don't think about what happens to waste once it's flushed out of sight. Usually it is sanitary engineers or owners of "failed" systems who are most aware of these underground dynamics. Failed systems are odorful reminders that perfection in on-site sewage disposal systems has yet to come.
Centralized Facilities

One can only surmise that Victor Hugo’s hero, Jean ValJean, was desperate when he sought refuge in the Paris sewers... Les Misérables, certainly! While our “modern day” sewers were first installed in the 1800's, sewers have been around since at least the 7th century B.C. serving essentially the same function then as now; conduits for human waste.

Although on-site septic systems are less expensive than sewers, population density and soil characteristics dictate a community’s need for sewers. Populated, paved over urban areas cannot support on-site sewage disposal for obvious reasons. Unfortunately, however, many suburban communities are also forced to pay the costs of sewers because of past poor land use practices, such as the development of housing on tracts of land unsuitable for normal on-site disposal practices.

Sewer systems collect waste from individual households or businesses and transport it to a treatment plant (historically to a river or stream) for processing.

A treatment plant, like a septic system, improves wastewater and thereby prevents or minimizes pollution. The process of cleaning water is accomplished by using various physical, chemical and biological treatment processes.

Sewage can undergo three levels of treatment. The first level of treatment is called primary treatment during which solids are removed by screening and settling. While this process is an improvement over raw sewage, it only removes about 35% of organic pollutants. Ideally the effluent should move on to secondary treatment.

Secondary treatment removes organic matter in sewage through the use of biological treatment processes. These processes are similar to those purification processes occurring naturally in streams and rivers. The most widely used secondary treatment method is “activated sludge.” Upon completion of the secondary treatment process the effluent is either subjected to additional treatment or disinfected prior to discharge into a natural waterway.

Advanced waste treatment or tertiary treatment processes can, either separately or in combination, virtually achieve any level of pollution control desired. However, as treatment becomes more advanced, the costs get higher. Although this third level of treatment can be accomplished in a variety of ways, it is not a high priority because of its cost and the more pressing goals of constructing the necessary secondary plants.

WASTEWATER TREATMENT

The Activated Sludge Process

PRIMARY TREATMENT

- Raw Sewage
- Bar Screen
- Grit Chamber

SECONDARY TREATMENT

- Settling Tank or Clarifier
- Aeration Tank

DISINFECTION

- Disinfection

Where does all the wastewater go?

Once wastewater goes down the drain, it takes either a short trip to a Septic Tank (on-site disposal system) or a trip via sewers to a Wastewater Treatment Plant.
A Decade of Construction Grants

The Federal Construction Grants program began in 1956 and was later expanded by the Clean Water Act of 1972 and subsequent amendments which authorize Federal grants to cover 75 percent (and in some cases, 85 percent) of the cost of needed municipal wastewater treatment facilities.

The goals of the Clean Water Act have come closer to fruition because of the Construction Grants program. With the sizable Federal share and the State's approximate 15% contribution, a municipality is much more able to provide the balance of construction costs. But the cost and complexity of this program are the factors which have made the program a vulnerable and logical target for criticism and fund slashing. In 1980 President Carter froze all construction grants expenditures of FY-80 funds. Although the freeze did not last long, the stage was set for a possible bleak future for construction grant funds.

In 1980 the EPA made two hundred eight grant awards totalling over 600 million dollars to the seven Compact-member States.

- This innovative whey processing facility in Fairfax, Vermont has enabled the State to take a significant step forward in its pollution control program by removing whey, historically a disposal problem because of its high oxygen demand, from the rivers and streams. Five nearby cheesemakers use this facility to process whey (the liquid left after milk is made into cheese) into an edible high protein powder.

- North Attleborough's new tertiary wastewater treatment facility is the first known plant of its kind in Massachusetts to employ a combination of nitrogen conversion, phosphorus removal, and filtration. High removal efficiencies of up to 97% are being achieved by this award winning facility.
## Environmental Protection Agency Construction Grants Awarded to Compact-member States During Fiscal Year 1980

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** New York figures for Compact area only
** New York statewide figures

Step 1—facilities plans
Step 2—design and specifications
Step 3—construction
Step 4—combined steps 2 & 3

Figures in parentheses indicate number of grants awarded

## Compact-Member States Wastewater Treatment Facility Facts & Figures
For 1976-1980

<table>
<thead>
<tr>
<th>CT</th>
<th>ME</th>
<th>MA</th>
<th>NH</th>
<th>NY</th>
<th>RI</th>
<th>VT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of 1980 population served by:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WWTPs</td>
<td>63%</td>
<td>40%</td>
<td>87%</td>
<td>49%</td>
<td>—</td>
<td>60-70%</td>
</tr>
<tr>
<td>On-Site</td>
<td>37%</td>
<td>50%</td>
<td>13%</td>
<td>30%</td>
<td>—</td>
<td>30-40%</td>
</tr>
<tr>
<td>Other</td>
<td>&lt;1%</td>
<td>10%</td>
<td>—</td>
<td>1%</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

New WWTPs on line between 1970 & 1980:

| Municipal | 10 | 65 | 54 | 24 | 161 | 5 | 43 |
| Industrial | ID | 25 | 560 | 71 | 92 | 30 | 1D |

WWTP Upgrades between 1970 & 1980:

| Municipal | 34 | 2 | 29 | 5 | 130 | 5 | 16 |
| Industrial | ID | 0 | 32 | ID | ID | 35 | ID |

Amount & Source of Funds for WWT Projects between 1970 & 1980:

| Federal | $444M | $250M | $1,000M | $230M | $4,096M | $158M | $116M |
| State | 265M | 50M | 200M | 75M | 796M | 32M | 24M |
| Local | 72M | 30M | 200M | 17M | 905M | 21M | 27M |
| Industrial | ID | 200M | 73M | 45M | ID | ID | ID |

ID—Incomplete Data
M—millions of dollars
WWTP—Wastewater treatment plants
Research and Technology

Continued research on understanding the nature and extent of various forms of pollution and ways to combat them is a tool vital to our goals for a cleaner environment. While technology has caused many of our problems, it is also our most important means of resolving many of them.

Through research and technological ingenuity we are finding ways to clean, avoid, and use waste. It has long been known that waste like garbage or sludge from sewage treatment could be used to our advantage as an energy source, a recycled product or a fertilizer. In some instances waste is already being reused, but in our present economy large scale reuse is not yet considered to be cost effective. But we rely on research and technology to find better methods for the future.

While technology has caused many of our problems, it is also an important means of resolving many of them.

Completed Projects

“RI Certification”
A contract was awarded to York Wastewater Consultants, Inc. (YWC) to provide assistance to the Rhode Island Department of Environmental Management for the implementation of the recently enacted certification program for wastewater treatment plant operators. YWC developed regulations, forms and certificates, designed record keeping systems and developed certification examination questions. YWC also prepared a report outlining the pros and cons of a mandatory certification program for operators of industrial wastewater treatment facilities.

“Investigative Routines”
The investigation and development of a method for tracing the causes of upsets in activated sludge treatment plants was completed. A final report was submitted for approval in 1980 by Joseph Masselli of Wesleyan University.

“O&M Third Party Review”
A field test of a proposed EPA Program Requirements Memorandum (PRM) on operational reviews of Step I and Step II projects was completed and described in a report prepared for NEIWPCC by York Wastewater Consultants, Inc. The study examined several aspects of implementing the PRM including the timing and scope of such reviews, their effectiveness, and problems associated with third party review of Step I facility plans or Step II plans and specifications.

New Projects

“Midge Taxonomy Translation”
A contract was awarded to New York State Department of Health and Health Research Inc. for the German to English translation of taxonomic keys of a common group of non-biting midges with varying tolerances to pollution. The final product should prove very useful to aquatic biologists concerned with water quality in streams.

Research and Special Projects at NEIWPCC

Through the NEIWPCC, research and special projects related to water quality and wastewater treatment are conducted by the Commission’s staff, outside consulting firms, State agencies, and private researchers. Three studies were completed in 1980, one new project was started, and two projects started in previous years are still in progress.

New Publications
* IRC—(Instructional Resource Center, NERWI)
* Water Quality Standards Comparison—1980 (subject to change as State water quality standards are revised.)

In Progress

The groundwater monitoring at two septic disposal sites in Massachusetts by the Commission’s staff has completed over two years of data gathering. The purpose of the project is to evaluate the impact of septic tank waste leachate on local groundwater quality and to offer suggestions for improved site management. While future sampling is planned, two draft reports have been prepared: “Evaluation of Acton’s Septage Disposal Facility” and “Evaluation of a Septage Land Application Site.”

A study of the assimilation of phosphorus in stream sediments of different alkalinitities, sampling above and below wastewater treatment plants, is still in progress by the New York State Department of Environmental Conservation. The project is scheduled for completion in FY-81.
Training in Wastewater Treatment Technology

The New England Regional Wastewater Institute

Wastewater treatment plants represent a sophisticated state-of-the-art approach to wastewater management and stand as showcases of modern technology. The operators of these plants must be well trained in their field.

In 1969, the NEIWPCC, committed to the training and education of personnel for careers in water pollution control, established the unique New England Regional Wastewater Institute (NERWI) on the campus of the Southern Maine Vocational Technical Institute (SMVTI) in South Portland, Maine. Through NERWI the Commission has been able to provide the region with training and related educational opportunities in wastewater treatment plant operation and maintenance.

In 1980, twenty-seven students were graduated from NERWI's 9-month wastewater treatment technology certificate program. Three summer short courses were offered in response to a continuing need for training in more specialized and supervisory aspects of the field. Topics covered were “Management of Municipal Wastewater Treatment Plants”, “Electrical Systems and Instrumentation”, and “Basic Instructional Technology.”

expedited the project. With these EPA funds and other donations NEIWPCC expects to complete design work in 1981 and to begin construction by early 1982.

On the Road
Operating in a brand new, smaller, and more fuel efficient van, the Mobile Training Facility (MTF) traveled through the seven Compact States providing both introductory and upgrade training to a total of 349 operators.

Instructional Resource Center
The NERWI has developed and operates the Instructional Resource Center (IRC) located at the school. The IRC is intended to serve water and wastewater training programs in the Compact-member States. In February 1980, NERWI published a booklet which describes the audio-visual materials, printed matter and services available from the IRC. The booklet will be updated as the inventory of materials expands.
An Informed Public

The business of water clean-up and maintenance is a function of public demand and participation. In the 1970's the importance of clean water to the public was reflected in improved governmental and industrial environmental policies and expenditures. The importance of water quality to individuals resulted in more awareness of the need for environmentally responsible habits.

To keep a perspective on the environment values of the 70's, public information and education will continue to be an essential task for perpetuation of citizen awareness. Informed individuals can better assess and develop their own participatory roles. The NEIWPC, likewise, has deemed it essential to continue its information and education program developed in the 1970's. During 1980 the NEIWPC completed two major public information projects: a series of three water conservation publications and a film on the Nashua River clean-up efforts.

Water conservation is of growing concern in the Northeast. Increasing water demands coupled with the increasing costs of supplying and disposing of water prompted the NEIWPC to develop practical water conservation information. The resulting publications entitled "Why Should I Save Water?", "Municipal Officials Guide to Water Conservation", and "Water Conservation and Water Quality in New England" were designed for three types of audiences: the first is aimed at the general public, the second is for municipal officials concerned with overall management of their community's water supply, and the third is a technical document for professionals in the field and those familiar with the technical aspects of the subject.

The film "... And They Called The River Nashua" is a colorful 17 minute documentary on the history of the Nashua River: its downfall due to surrounding land uses; and its ongoing rehabilitation spurred by the cooperative efforts of industry and Federal, State and local governments.

In celebration of Earth Day '80 the NEIWPC participated in the "Year of the Coast" celebrations at the University of Massachusetts Boston Campus. Introduced were the Nashua River film and a new display emphasizing the importance of water in our lives and our responsibility to keep it clean.

The NEIWPC continues to make its many technical and non-technical publications, films, slide shows and displays available free or at minimal cost to the public. The quarterly newsletter, AQUA NEWS, provides information on current regional and national water quality issues, state-of-the-art facts on wastewater treatment, and jobs.

Technical Resource Manuals

Copper Sulphate: Its Use as an Algicide (1975)
Cost and Growth Implications of Reserve Capacity in Sewerage Systems (1978)
Comparison of State Water Quality Standards (1980)
Water Quality Index & The Nashua River (1978)
State/EPA Regional Policy on Municipal Sludge Management (1978)
Summaries of Unpublished Research Reports (1978)
The Use of Oxygen Uptake Rates in Activated Sludge Plants (1978)
Handling & Disposal of Transient Recreational Vehicle Wastes (1976)
Four Keys to New England Water Quality (1975)
Common Larvae of Chironomidae (Diptera) from New York State Streams and Rivers (1980)

Technical Reports

| TR-7 | A Simplification of Textile Waste Survey and Treatment (1959) |
| TR-9 | A Study of Small, Complete Mixing, Extended Aeration, Activated Sludge Plants in Massachusetts (1981) |
| TR-12 | White Water Wastes from Paper and Paperboard Mills—Pollution Sources and Methods of Treatment (1963) |
| TR-13 | The Effect of Industrial Wastes on Sewage Treatment (1965) |
| TR-15 | Controlling the Effects of Industrial Wastes on Sewage Treatment (1970) |
| TR-16 | Guides for the Design of Wastewater Treatment Works (1980) |
| TR-17 | Uniform Guidelines for the Prevention and Control of Oil Spills and for Oil Terminal and Vessel Handling of Petroleum Products (1971) |
| TR-18 | Uniform Guidelines for the Control of Wastes and Harmful Effects Attributable to Watercraft and Floating Structures on Inland Fresh Waters (1973) |
| TR-19 | A Guide to Chemical and Clarifier Selection for Wastewater Treatment (1975) |
| TR-20 | Effects of Spray Irrigation with Stabilization Pond Effluent on Surface and Ground Waters (1978) |
| TGM-1 | Guidelines for Septage Handling and Disposal (1976) |
Quality Water, Quality Living

The goal of the Federal Clean Water Act is the restoration of the nation’s waters to a quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water, where attainable, by July 1, 1983. While surface waters have shown steady improvement in the Northeast (see chart), the region and the nation will fall short of meeting this 1983 goal. Only 82% of New England’s major streams are projected to meet the fishable-swimmable goals by 1983. Combined sewer overflows are the major contributor to non-attainment of these water quality goals. Coliform bacteria levels and dissolved oxygen criteria are the most frequently violated water quality parameters. Major municipal and industrial discharges with inadequate levels of treatment have historically been responsible for these violations. Through the municipal construction grants program and the National Pollutant Discharge Elimination System (NPDES) program, these discharges are presently controlled and monitored with expectations for eventual compliance.

Neither the Northeast States nor the 1983 deadline need be criticized. The Congress set our water quality goals with honorable intentions, but the setbacks and complications could not be foreseen. The maintenance of our present course is important. The tragedy would be the evolution of a nation whose goals for increased and immediate productivity overshadowed its goals for the long term health and wellbeing of its people, its resources, and its environment.

Thus, perhaps some details of our water quality goals must be altered to conform with the realities of attaining those goals. But our overriding desire to attain quality water as soon as possible is certainly in the best interests of a flourishing economy and people. New England can boast of numerous success stories in which water quality improvements resulted in economic and environmental benefits to the affected communities.

Benefits

What can we include on our list of benefits from clean water? Who is benefiting? Atlantic salmon? Dragonfly larvae? People? How do people benefit? Better fishing? Swimming? Jobs? Living? Can we apply a dollar value to our benefits? Saint Exupery wrote that water is “not necessary to life, but rather life itself.” How then do we quantify or qualify the benefits of clean water?

There are those who have derided our national goal of protecting fish and wildlife. They exclaimed that human lives and jobs are more important! How dare the government shut down a factory because of some fish! But as we are learning in our efforts to document the effects of “acid rain”, dead fish are symptomatic of a far more pervasive problem. As we have looked closer at those rivers long deserted by fish, we have seen that somewhere along the line drinking water supplies become contaminated and that in some instances a curtain has been drawn to shield our own lives from those water-bodies. When a wide variety of organisms begins once again to live within and around a river we can begin to take stock of benefits to all organisms; fish and people. Many New England communities can again raise the curtain to their rivers... rivers which had evolved from being the foundation to the embarrassment of these communities. The rediscovery of our rivers has cleared a path to a new life for many tired New England towns and cities.

Studies have shown that water in the right setting is one of the most aesthetically appealing environments enjoyed by people. A clean river or lake draws people to its banks for a variety of reasons. Waterside greenways, walkways and parks are being planned and constructed in many communities. The Town of Hallowell, Maine plans to relocate its Main Street to run alongside the Kennebec River. Camping, boating, fishing and even swimming are now possible in rivers which were “deadly” only 10 years ago.

In 1979 the Kennebec River in Maine became the site for a popular annual celebration called the “Great Kennebec River Whatever Race.” Each year people come from all over to ride down the river on... whatever. In Connecticut, an annual raft race has become a big event on the Connecticut River for the past five years.
Water Quality Summary In New England

Main Stem and Major Tributary Mileage
Meeting or Exceeding the Fishable/Swimmable Goals of the Clean Water Act

<table>
<thead>
<tr>
<th>State</th>
<th>Miles Assessed</th>
<th>1980</th>
<th>%</th>
<th>1978</th>
<th>%</th>
<th>1977</th>
<th>%</th>
<th>1976</th>
<th>%</th>
<th>% Change 78-80</th>
<th>% Change 76-80</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Connecticut (1)</td>
<td>861</td>
<td>556</td>
<td>65%</td>
<td>519</td>
<td>60%</td>
<td>515</td>
<td>60%</td>
<td>481</td>
<td>56%</td>
<td>+ 5%</td>
<td>+ 9%</td>
</tr>
<tr>
<td>2. Maine (1)</td>
<td>2,382</td>
<td>1,718</td>
<td>72%</td>
<td>1,656</td>
<td>70%</td>
<td>1,656</td>
<td>70%</td>
<td>1,603</td>
<td>67%</td>
<td>+ 2%</td>
<td>+ 5%</td>
</tr>
<tr>
<td>3. Massachusetts (2)</td>
<td>1,715</td>
<td>772</td>
<td>45%</td>
<td>556</td>
<td>32%</td>
<td>402</td>
<td>23%</td>
<td>348</td>
<td>20%</td>
<td>+13%</td>
<td>+25%</td>
</tr>
<tr>
<td>4. New Hampshire</td>
<td>1,320</td>
<td>702</td>
<td>53%</td>
<td>691</td>
<td>52%</td>
<td>613</td>
<td>46%</td>
<td>584</td>
<td>44%</td>
<td>+ 1%</td>
<td>+ 9%</td>
</tr>
<tr>
<td>5. Rhode Island</td>
<td>329</td>
<td>217</td>
<td>66%</td>
<td>211</td>
<td>64%</td>
<td>211</td>
<td>64%</td>
<td>211</td>
<td>64%</td>
<td>+ 2%</td>
<td>+ 2%</td>
</tr>
<tr>
<td>6. Vermont (3)</td>
<td>879</td>
<td>635</td>
<td>72%</td>
<td>594</td>
<td>68%</td>
<td>533</td>
<td>61%</td>
<td>533</td>
<td>61%</td>
<td>+ 4%</td>
<td>+11%</td>
</tr>
<tr>
<td>TOTALS:</td>
<td>7,486</td>
<td>4,562</td>
<td>61%</td>
<td>4,194</td>
<td>56%</td>
<td>3,930</td>
<td>52%</td>
<td>3,760</td>
<td>50%</td>
<td>+ 5%</td>
<td>+11%</td>
</tr>
</tbody>
</table>

NOTE: (1) Connecticut and Maine 1980 values not directly comparable to 1976-1978 values due to increased mileage assessed in 1980.
* Taken from EPA Region I 1980 Annual Report

Cleaning up Water is Progress—Three New England Examples

The Naugatuck
For over a hundred years, the fast flowing Naugatuck River, a major tributary to the Housatonic River in western Connecticut, supplied water power to factories that lined its shores. Products manufactured along the river included brass, copper, bronze and iron goods, rubber, automatic machinery, cutlery, chemicals, textiles and automobile and airplane parts. In the early 1950's the river was considered to be Connecticut's most polluted river. Twenty years later a State sanitary engineer said without exaggeration: "When I came here in 1970, the river was totally annihilated. There wasn't even any grass on the banks, there were no fish, no insect life, nothing."

The region continued to experience growth in industry and population, and the Naugatuck was merely a dumping ground for everyone's untreated or barely treated sewage. The Lower Housatonic River received accumulated wastes from the Naugatuck and industry along its own banks. Due to pollution the once thriving oyster business at the mouth of the river declined after 1900 and was finally wiped out by a severe storm in 1951. Progressive pollution prevented natural recovery of the oyster beds.

Major Federal and State clean-up efforts began as early as 1967. Today virtually all of the Naugatuck's and the Lower Housatonic's once heaviest polluting industries have some kind of pollution control. The upper Naugatuck is now rated at a fishable and swimmable Class B. The lower Naugatuck is rated at Class C, a quality level capable of supporting recreational boating and a fish and wildlife habitat. The Lower Housatonic has achieved a Class B rating. All stretches had Class D or below ratings in 1967, fit only for navigation.

Bluefish now swim from Long Island Sound partway up the Housatonic. Previously pollution from the Naugatuck, alone, had precluded their presence in the Housatonic. The oyster industry has great hope for a comeback...and people are using and living with these two rivers...and much more can happen if progress continues.

Many New England communities can again raise the curtain to their rivers...rivers which had evolved from being the foundation to the embarrassment of these communities.
The Rivers Merrimack and Pemigewasset

The Merrimack is formed by the confluence of the Pemigewasset and Winnipesaukee Rivers at Franklin, New Hampshire. America's industrial revolution had its roots in the Merrimack River Basin. The prototypical industrial cities of Lowell, Lawrence and Manchester exist because of the Merrimack River. It is this industrial life plus hundreds of other textile and paper industries which sprang up along the river that made the Merrimack one of the most polluted waterways in Massachusetts and New Hampshire by the 1950's.

Through the cooperative efforts of Federal, State and local agencies the Merrimack River has undergone an amazing rejuvenation. Many of the mill towns which nearly died along with the river are now coming back to life along with the river. The most notable success stories are those of the Cities of Lowell and Newburyport.

Lowell is again a prototype, but for a new reason: it is a remarkable example of how a whole city can become a museum-like tribute to its industrial history by its national park designation, its Lowell Heritage State Park, its canal barge tours, its mill tours, and its architecture. But Lowell is also demonstrating that it can still thrive economically as new industry locates there.

While Newburyport is smaller than Lowell, it has had a complete face lift while maintaining a unique historic character. It has a special New England charm which now draws tourists from all over.

Both communities have always depended on and still focus on the Merrimack. In Massachusetts four major wastewater treatment facilities currently treat over 50 million gallons per day (MGD) of wastewater from the communities along the river. A 1.9 MGD Merrimack treatment plant is still under construction and an upgrade to 3.4 MGD is about to begin in Newburyport.

Salmon and shad are returning to the Merrimack. Upon completion of the construction of some key fish ladders these fish will soon reach their natural spawning areas in the upper reaches of the Merrimack.

Although the Pemigewasset River runs through the heart of a prime New Hampshire vacation area, the tourist and sport fishing public had avoided it since 1920. Due to an extremely high Biochemical Oxygen Demand (BOD) load, the river became anaerobic as rafts of paper mill sludge floated downstream on discolored waters. The river released hydrogen sulfide gas which smelled like rotten eggs and reacted with lead-based paints, turning houses along the river black.

Things have changed. Starting in the 1960's, an outraged public and environmental laws were the catalysts for changes. By 1971 the Pemigewasset had rebounded. As an elderly life-long resident of the area said, "We always thought that the Pemigewasset stank so we stayed away from it. Last year I saw the bottom for the first time. I couldn't believe it."

The river had its clean ups and downs as one paper plant in particular violated the terms of its NPDES permit. As controversy between social and environmental issues swept across the Valley, new businesses which had invested in the area because of the river's clean-up added their voices in protest to the paper company's violations. Today the paper company under new ownership employs about 40% of the original workers who previously lost their jobs. Other displaced workers and newcomers work for new industries in the Valley.

Along with restored fishing, swimming, boating, canoeing, hiking and camping, a host of tourist and recreation associated businesses have appeared along the Pemigewasset.

The Future

The future of quality water will depend on what the public demands. Presumably, if we better understand how our lives, our water, and our environment are eternally interdependent, interlocked and interlinked, we will see the necessity of protecting ourselves from ourselves.

Environmental ethics must not depend on governments alone. These ethics must be found in each of us—at home, at work, at large. In the 1980's, the NEIWPCC will continue its ethic and commitment of working toward quality water with the support and cooperation of government, industry and the public.
The Lowell National Historical Park mill and canal tour. The canals are fed by water diverted from the Merrimack River. Once one of the most polluted waterways in Massachusetts, the Merrimack now has a Class B (fishable/swimmable) water quality classification. State and federal water quality programs have been successful in improving water quality and creating fishways for fish migrations. With the rejuvenation of the river has come the rebirth of the city itself.
Officers
Chairman Reginald A. LaRosa
Vice Chairman Henry E. Warren
Treasurer George Burke

The Commissioners

Connecticut
George L. Burke, P.E., Winsted (1957- )
John J. Curry, P.E., Milford (1977- )
Douglas S. Lloyd, M.D., Commissioner,
Department of Health (1973- )
Rita Melley, Windsor (1979- )
Michael G. Morgan, Stamford (1977-1979)
Stanley J. Pac, Commissioner, Department of Environmental Protection (1977- )

Rhode Island
Walter C. Anderson, Cranston (1959-1980)
Hagop Boghosian, Department of Health (1980- )
Charles E. Dickerson, Warwick (1963- )
Carleton A. Maine, P.E., Chief, Division of Water Pollution Control (1974- )
Nelson Marshall, Ph.D., Kingston (1968- )
Walter J. Shea, P.E., Providence (1947- )

Vermont
Edward F. Kehoe, Commissioner, Department of Fish and Game (1965- )
Reginald A. LaRosa, P.E., Acting Commissioner, Department of Water Resources (1977- )
Lloyd Novik, M.D., Commissioner, Department of Health (1979- )
Peter A. Robinson, Newport (1975- )

Massachusetts
Anthony Cortese, Ph.D., Commissioner, Department of Environmental Quality Engineering (1979- )
Joan R. Flood, Lenox (1976- )
Alfred F. Frechette, M.D., Commissioner, Department of Public Health (1979- )
James K. Rogers, Chelmsford (1977- )

NEIWPC Staff
Alfred E. Peloquin, P.E., Executive Secretary (1967- )
Frederick K. Schaufler, Executive Engineer (1974- )
Jennie E. Bridge, Environmental Scientist (1977- )
Janet C. Larson, Comptroller (1971- )
J. Patricia Conway, Staff Secretary (1975- )
Stacy Buchler, Director of Public Information (1980- )
Ellen Frye, Public Affairs Specialist (1980- )

NERWI Staff
Kirk J. Laflin, Director (1975- )
Anthony L. Gordon, Instructor (1975- )
Ronald J. Rose, Instructor (1977-1980)
Gary M. Gagnon, Instructor (1977-1980)
Robert G. Belisle, Instructor (1980- )
Michael D. Pacillo, Instructor (1980- )
Chairman Ernest Trad

Technical Advisory Board

Hagop Boghosian, P.E., Principal Sanitary Engineer, Rhode Island Department of Health (1974- )

David L. Clough, P.E., Director, Water Quality Division, Vermont Department of Water Resources (1973- )


Merwin E. Hupfer, P.E., Director of Water Compliance, Connecticut Department of Environmental Protection (1967- )

Charles H. King, P.E., Director, Division of Municipal Services, Bureau of Water Quality Control, Maine Department of Environmental Protection (1978- )

James W. Fester, Chief, Division of Water Resources, Rhode Island Department of Environmental Management (1978- )

Thomas C. McMahon, P.E., Director, Massachusetts Division of Water Pollution Control (1966- )

Charles W. Murray, P.E., Director, Water Programs, U.S. Environmental Protection Agency Region I (1979- )

Ernest F. Trad, P.E., Director, Division of Construction Management, New York Department of Environmental Conservation (1975- )

David C. Wiggins, P.E., Director, Environmental Health Services, Connecticut Department of Health (1965-1980)

Statement of Revenues and Expenses

REVENUES
From Signatory States:
- Connecticut $15,900.00
- Maine 4,800.00
- Massachusetts 23,770.00
- New Hampshire 5,100.00
- New York 5,380.00
- Rhode Island 4,800.00
- Vermont 4,800.00
Total $64,550.00

From U.S. Environmental Protection Agency:
- Water Pollution Control Act Grant $287,208.00
- Training Grants 7,596.00
Total $294,806.00

From Massachusetts:
- Surface Impoundments Review Contract $16,800.00
- Program Liaison Contract 12,888.00
- Underground Injection Contract 16,200.00
- State Planning Contract 368,690.00
Total $414,578.00

Other Revenues:
- Interest from Banks 10,381.31
Total Revenues $784,315.31

EXPENSES
Personnel $108,070.94
Operating Expenses 53,646.45
Meetings 14,400.78
Public Information & Education 3,326.83
Special Projects 83,798.43
Wastewater Operator Training 110,697.87
Massachusetts Special Projects 423,758.56
Total Expenses $797,698.86

Financial Status Report

Balance of Cash on October 1, 1979 $261,269.35
Receipts 784,315.31
Disbursements 1,045,584.66
Balance of Cash on September 30, 1980 797,698.86

$247,885.60