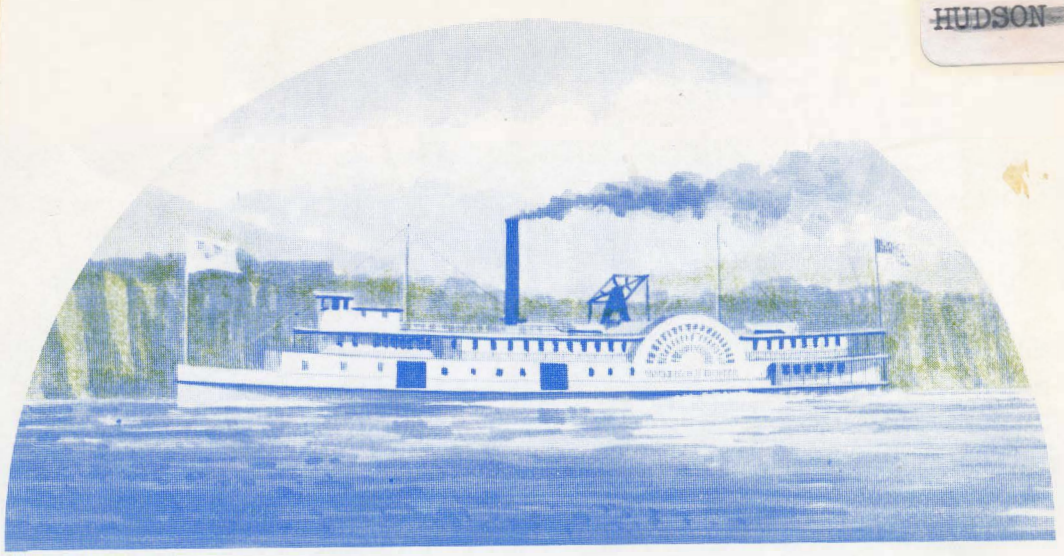

THE WATER AND RELATED LAND RESOURCES OF THE HUDSON RIVER BASIN

A SUMMARY

To those people interested in the future of the Hudson River Basin

The Hudson River and its tributaries have held the key to the civilization of eastern New York and affected areas of four neighboring States since long before the advent of recorded history.

It has been a pleasure and a great source of professional satisfaction to work with the hundreds of people both in and outside of government who have provided their unstinting assistance to assure that this study offers a set of recommendations best calculated to serve the people of the basin, and to maintain and indeed improve the overall economic and environmental viability of this magnificent area.

The recommendations in this Study call for actions at all levels of government and in the private sphere. Properly implemented, the Study will provide a balanced program for the management of the water and related land of the Hudson River Basin.

I ask that these recommendations be given your support and that you maintain an active interest and participation as the institutional structures are developed and the specific proposals are acted upon.

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SUMMARY

1

The Need to Manage Water

THE NORTHEASTERN UNITED STATES is blessed with an abundance of water. At this moment in history, when energy has gone critical, it is no small boon that most of this water is uphill from where we want to use it. Nature takes care of moving it downhill for us; all man has to do is use it wisely. This is an assignment that is vastly more complex than it was a hundred years ago.

The fact that water has been so abundant meant that until recently the people of this region were not forced to take extraordinary care of it. Decades of neglect and exuberant urban expansion brought a rising tide of human and chemical pollution and, as droughts occurred, ever more pressure to secure water supplies. The enormous population growth of the twentieth century, peaking in the nineteen-sixties, began to jeopardize the bountiful legacy of land and water. It was not only the fact of more people; it was more people seeking a richer life—high standards of personal cleanliness, sophisticated goods requiring formidable quantities of energy and water to manufacture, enormous suburban tracts planted with greenery, a style of living that burned electric power as though it were free air.

Many far-sighted measures to protect the flow of water were taken, it is true. Imaginative engineering for controlling floods, and for supplying water to the cities from remote hinterlands, have brought impressive results. And most recently alarm about the environment has spurred massive attacks on pollution.

But these actions have been essentially separate campaigns. Inevitably, they sometimes come in conflict. Water for cooling fossil-fuel-fired steam generating plants as well as nuclear power reactors returns heat to the rivers and threatens fish and wildlife survival and even alterations to climate; yet our energy demands are voracious and not yet abating. Moreover, demand for water continues to rise and the pressures on supply make pollution more intolerable.

The inevitable, but far from simple, answer to such complex problems is effective management. Since water supply and condition affect so much of our lives, management of water must be a large-scale cooperative effort by competing interests.

Management implies first of all conservation—that is, stopping wasteful use, and abating pollution. Management also means more effective utilization, adapting demand to supply, getting the most from every gallon. Thirdly, it means fair allocation to all who need it—which includes everybody—to drink, grow food, wash, produce goods, generate power, transport freight, provide natural enjoyment, make cities more habitable.

Water resources management is an idea whose time has come. But successful management requires, first of all, vast and detailed information and careful planning.

To come to grips with the necessity for planning and managing the largest river system in the Northeast, the states of the Hudson Basin joined with the federal government in January 1976 to initiate a Level B study. While Level A studies cover a much broader region, and Level C studies focus on such specific projects as flood control structures, reservoirs or supply lines, Level B studies examine in depth the needs of a single river basin. The Hudson River Basin Water and Related Land Resources Study was funded by Congress, administered by the U.S. Water Resources Council under the authority of the Water Resources Planning Act (PL 89-80), and managed by the State of New York.

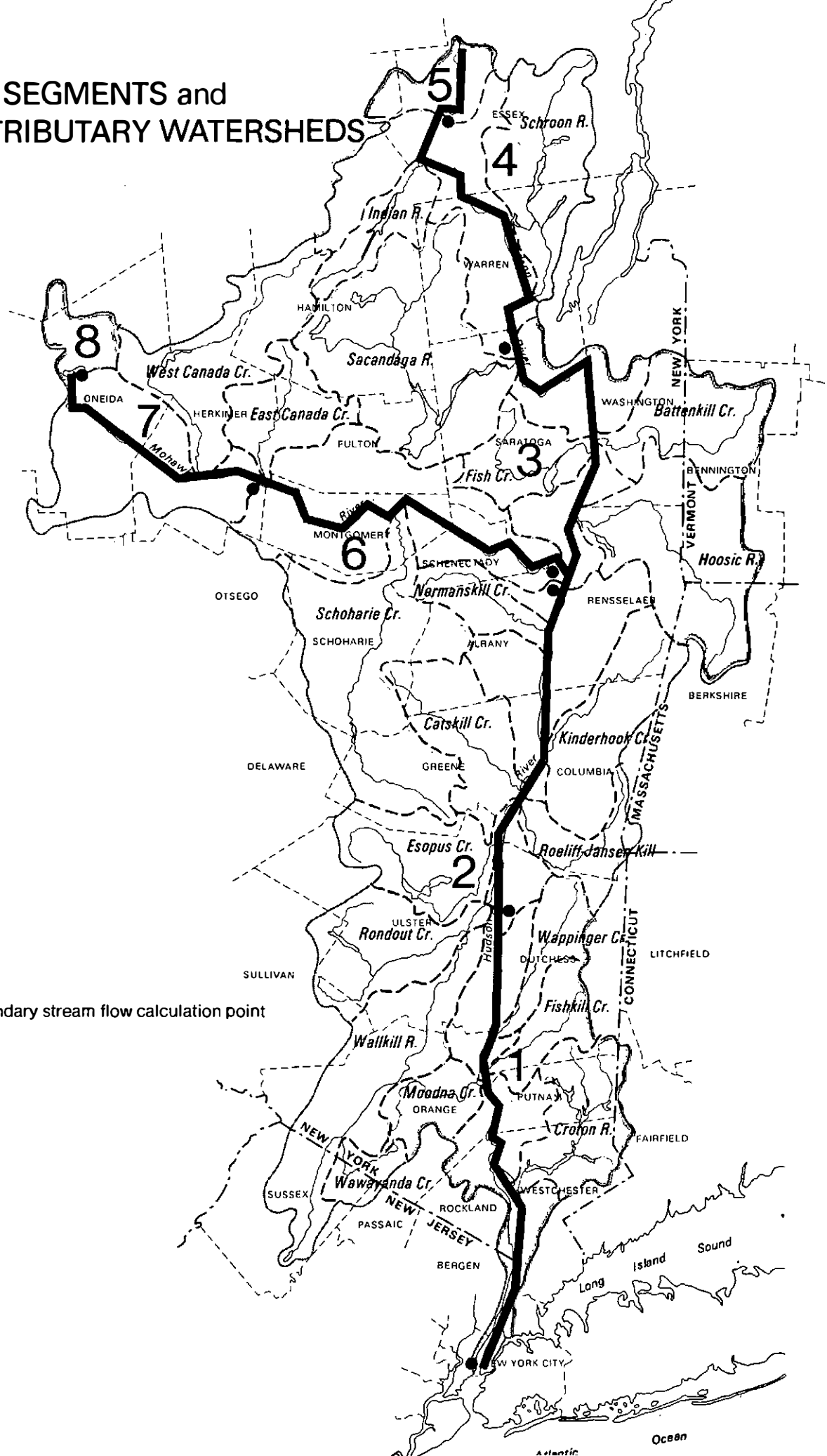
Most of the Hudson Basin's 13,500 square-mile area lies in New York State, but its headwaters include small portions of Vermont, Massachusetts, New Jersey and Connecticut. Projections show that by the year 2000 the Basin and its water will serve over fourteen million people. Today two-thirds of New York State's people use the Basin's resources for water supply, waste disposal, power generation, recreation and other purposes.

The Rivers

Rising in the Adirondack Mountains, the Hudson River travels over three hundred miles before flowing into the Atlantic Ocean at the Battery in New York City. Over six thousand years before Verrazano sighted the mouth of the Hudson in 1524, native Americans were fishing and traveling along this river system. After Henry Hudson's voyage of discovery in 1609, Europeans settled the Hudson valley rapidly, attracted by its rich resources and the easy communication routes which the region's waterways made possible.

Somewhat less than halfway downstream the Mohawk River comes into the Hudson from the west, cutting the only natural passageway through the Appalachians to the western plains between the St. Lawrence Valley and Georgia. It was this opening that made the Erie Canal

STREAM SEGMENTS and MAJOR TRIBUTARY WATERSHEDS



Segment boundary stream flow calculation point

possible, a powerful stimulus to the development of the great grain belt of America, which made New York City the gateway of the nation and the cities of the valley corridor—Albany, Utica, Syracuse, Rochester, Buffalo —thriving centers of commerce for a century.

The powerful currents of those historical events are blurred today by the wracking changes in the contemporary world, and the serious pressures they put on the economy and environment of the Basin.

The Study Process

The Hudson River Basin Level B Study proposed to assess the Basin's existing and projected water and related land needs and problems, to analyze how well current plans and programs resolved these needs, and to recommend action on those unresolved problems which fell within the scope of a Level B Study.

The Study management included representatives from all the states in the Hudson Basin and from sixteen federal and New York State agencies. Throughout its entire process the Study sought to involve the general public, both for the purpose of identifying needs and for proposing solutions.

Study guidance derives from the *Federal Principles and Standards* for Water and Related Land Resources Planning which became effective October 25, 1973. "The overall purpose of water and related land resources planning is to promote the quality of life, by reflecting society's preference for attainment" of the following national objectives:

- —"to enhance national economic development by increasing the value of the Nation's output of goods and services and improving national economic efficiency
- —to enhance the quality of the environment by the management, conservation, preservation, creation, restriction, or improvement of the quality of certain natural and cultural resources and ecological systems."

The Level B Study process entails a number of steps. After determining the Basin's needs and problems and selecting the areas on which the Study would focus, a specific Plan of Study for the Hudson River Basin was developed and submitted in final form on October 8, 1976. Among other things this document defined detailed work elements for the participating agencies and the manner in which they would integrate with the overall planning process.

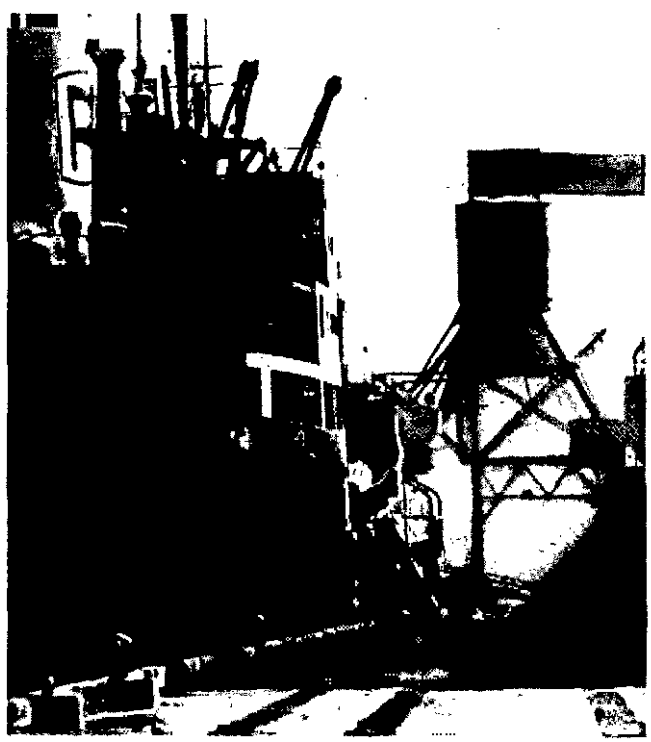
At the same time an Initial Plan was prepared. It presented the situation that would exist under preexisting plans and programs by the year 2000, if no Level B Study were made. Then followed a series of plans, addressed in the first instance to economic development and environmental quality objectives separately, then combined in a more balanced approach. At key points throughout, the public was invited to contribute opinions and suggestions in workshops and information meetings.

An assessment of the Hudson Basin's identified needs and problems to the year 2000 permitted focusing of the Level B Study on the following general areas: Consistency (compatibility of programs at different levels), Water Resources Management, Water Supply, Recreation, Flood Damage Reduction, and Dredged Material Disposal. These areas—called "focuses"—provided the organizational framework both for examining the problems and framing solutions. The final recommendations have also included an institutional focus, which comprehensively ties together total management of the Basin's resources.

Recommendations

The summary recommendations of the Report represent a balanced response to the Hudson Basin's water-related needs for the next twenty years. During the course of the Study the participants narrowed the available choices down to those actions which they found best suited to meeting the Basin's economic and environmental requirements. Chapter 2 of this Report contains a detailed presentation of the implementing recommendations. They are in brief:

Basin Management. To deal with the conflicting demands on the Basin's resources, set up a management



structure with a unified approach to conservation and development of land and water. Build in public participation. Put together a comprehensive data system and a five-year program, and publish an annually updated plan with investment schedule.

Consistency. To bring order to water programs, urge federal agencies to follow approved plans consistently, and require State agencies to do the same, while coordinating their efforts through the Governor's cabinet.

Water Resources Management. Anticipate future needs now, before problems become unmanageable. Implement a water conservation program, using a variety of means. Facilitate passage of laws for universal metering and leakage control. Seek out new sources of water. Regulate reservoirs to meet current needs. Prepare emergency-use plans for times of drought or flood, with a policy for priority of use. Manage watershed use. Relate land-use policy to water policy. Assess the need for further structural solutions for flood control, water storage and transport, and power generation.

Water Supply. Address the looming shortage for the lower Hudson Basin and metropolitan area to assure an adequate future supply. Continue the development of new supplies. Develop institutional arrangements—a purposeful cooperative mechanism among other municipalities and New York City.

Recreation. Make the river and its tributary waters better serve the dense urban areas with recreation and natural enjoyment as well as water to live on. Increase deficient capacity to allow more swimming, fishing, boating and camping. Protect and enhance cultural amenities—scenery, historic sites, unique natural areas.

Flood Damage Reduction. Further structural measures such as damming and channeling will not avert all serious future flood damage. Such measures are immensely costly. Develop nonstructural measures, including regulating development in the flood-plains and rigorously educating the public for protective action.

Dredged Material Disposal. Dumping dredged material causes both space and environmental problems. Reduce the need for maintenance dredging of navigation channels through better erosion control. Choose the most environmentally acceptable sites for disposal, most especially of contaminated spoil. Find more effective ways of disposing of the material, including using it. Cease low-priority dredging.

* * * * *

The tabulation below arrays the issues, solutions proposed and formal recommendations, somewhat elaborated. Chapter 2 of the Report presents them in detail, with a rationale for each major focus.

Major Issues and Recommended Solutions

BASIN MANAGEMENT

Issue Demands on the water resources of the Hudson River Basin presently are in conflict, and are expected to grow in the future.

Solution Set up a management structure and process that can handle the interrelated problems and provide a unified approach to the development, conservation, and preservation of the water and related land resources of the Basin. This includes establishment of a federal/state advisory group, a refined program of local government and public participation, a comprehensive data system, and a plan submitted annually that includes a plan update, a five-year program package, and a one-year investment schedule.

MAJOR RECOMMENDATIONS

Provide a means for continuing assessment and analysis of the condition of the Basin's resources.

Provide Basin management.

CONSISTENCY

Issue Programs affecting the water resources of the Basin lack coordination.

Solution Establish a vehicle to further program relationships and to bring various program activities into compliance with federal consistency requirements. This includes urging federal agencies to be consistent with approved plans, and continuation of a multi-agency effort to insure consistency at the State level under the auspices of the Governor's Urban and Rural Affairs Cabinets.

MAJOR RECOMMENDATION:

Continue coordination of program development activities.

WATER RESOURCES MANAGEMENT

Issue Although present quantities of water are generally sufficient to the year 2000, site-specific and functional needs currently exist; there is an opportunity to make better use of the resources; future needs should be anticipated now so as to provide the best possible solutions before problems become unsolvable.

Solution Develop a framework for the management of the Basin's water that will identify desirable water resources management actions. Especially important are:

- provision of leadership and staff assistance to encourage passage of laws mandating universal metering and leakage control programs.
- development of a water conservation education program.
- exploration of and encouragement for the use of other water conservation techniques.
- preparation of legislation to underlie a comprehensive program of emergency-use plan development.

MAJOR RECOMMENDATIONS:

Implement a conservation policy.

Establish an emergency-use plan.

Regulate reservoirs.

Manage watershed use.

Create a priority-of-use policy.

Consider out-of-basin transfer.

Support water-related land use policy.

Seek out new sources of water.

Update structural management solutions.

Address need for structural solutions.

WATER SUPPLY

Issue A deficit of 400 mgd is presently estimated for the lower Hudson Basin area; institutional and financial arrangements are complicated and need to be addressed.

Solution Assure an adequate water supply for the lower Hudson Basin area.
This includes:

- provision of leadership and staff to the Governor's Task Force on Institutional Arrangements and other bodies and groups contributing to the efforts to develop institutional arrangements.
- provision of federal funding for the next phase of the Corps of Engineers' studies, and construction of Stage 1 of New York City Water Supply Tunnel No. 3.
- creation of a New York State unit to provide leadership and staff to work with the Corps, other federal agencies, local governments, and citizens.

MAJOR RECOMMENDATIONS:

Develop institutional arrangements for water supply in southeastern New York.

Continue water-supply development effort for the lower Basin.

RECREATION

Issue More water-oriented recreational opportunities will be needed by the year 2000, especially for areas with high population density; given the Hudson Basin's great visual beauty and cultural and historical background, certain features of the Basin's resources should be maintained or enhanced, and available for the public to enjoy.

Solution Increase recreational capacity and enhance, preserve, and protect the unique features of the Basin.

MAJOR RECOMMENDATIONS:

Increase capacity where deficiencies exist by maintaining, improving, and expanding levels of services, multiple use, development of new facilities, and improvement of access opportunities.

Evaluate recreational resources and use.

Develop a comprehensive management plan for fish and wildlife.

Develop a public education program.

Develop a program to preserve cultural amenities.

Enhance, preserve, and protect visual quality and significant and unique natural areas.

FLOOD DAMAGE REDUCTION

Issue In spite of existing and extensive structural remedies, flood damage continues to be a serious problem.

Solution Reduce future flood damage losses, with emphasis on nonstructural solutions such as flood-plain use management and public education.

MAJOR RECOMMENDATIONS:

Carry out Flood Insurance Rate Mapping.

Develop a public education program.

Encourage flood-plain development regulation.

Change federal flood control project evaluation criteria.

DREDGED MATERIAL DISPOSAL

Issue Dredging is necessary for maintenance of navigation channels. Existing ways of handling the material, some of which is contaminated, are recognized to have significant negative environmental effects. Some methods which are neither economically restrictive nor environmentally detrimental need to be found in order to dispose of the material.

Solution Reduce the need for dredging by such measures as control of land and streambank erosion, locate environmentally acceptable sites for disposal, and continue research into more effective methods of disposal.

MAJOR RECOMMENDATIONS:

Control land and streambank erosion.

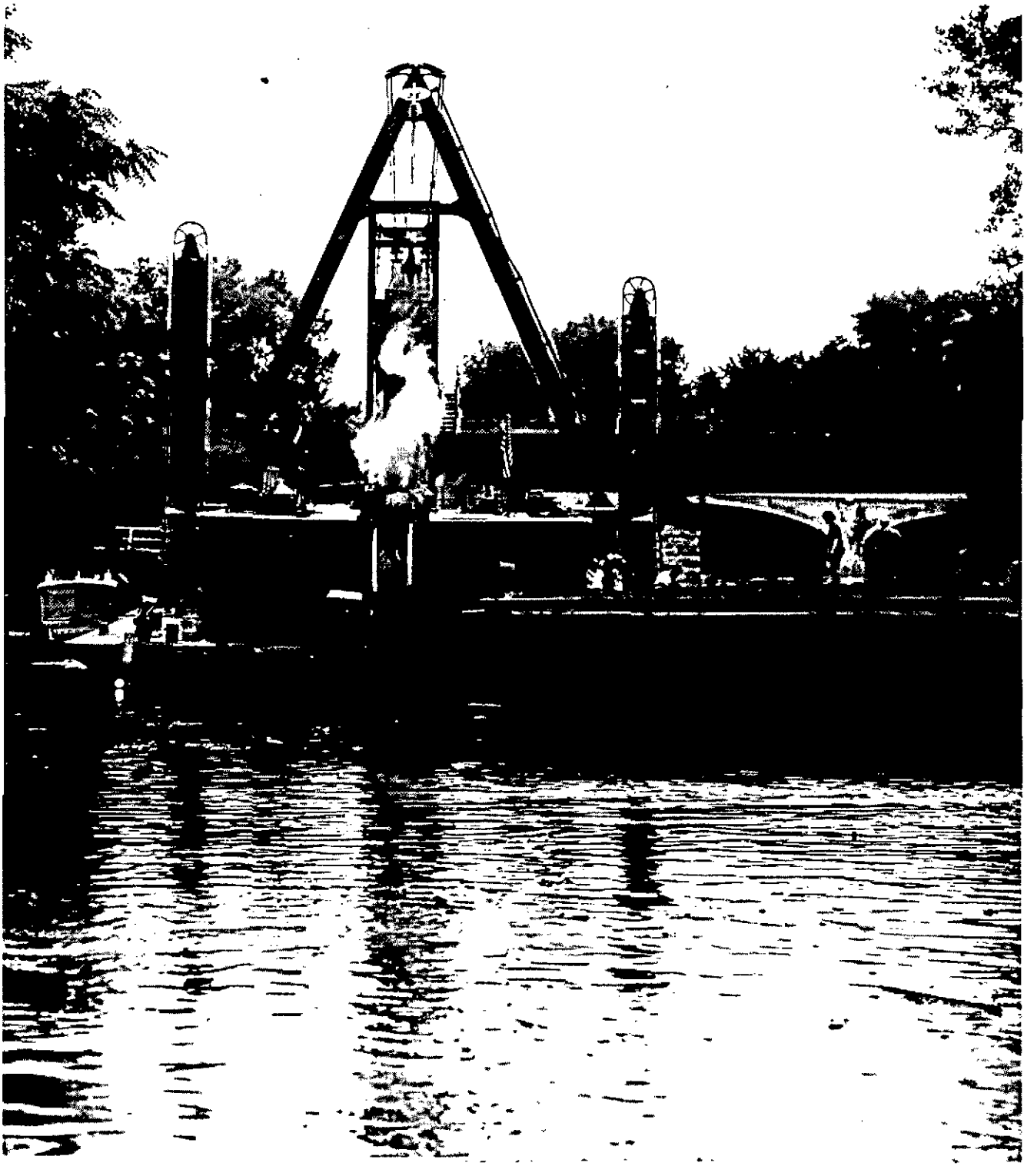
Support continued research.

Increase capacity of existing sites.

Eliminate low-priority dredging projects.

Locate disposal sites.

Coordinate planning.



Costs Associated With Recommendations

Estimates of one-time total cost outlays for the Hudson Level B Study recommendations are $725,682,700, and the estimated annual on-going costs for operation and maintenance are $121,589,000 per year to the year 2000. When no reasonable basis was available, costs have not been estimated; policy recommendations generally have not been assigned cost figures; some available figures are for total program statewide and cannot be segregated for the Basin.

The implementing recommendations are grouped according to the level at which they are to be carried out, namely, at the policy, program, or project level. When specific information was lacking or additional investigation deemed especially important, a study recommendation was suggested.

Below is a summary of estimated cost figures for each focus. More detailed information appears in Chapter 2 of the Report.

BASIN MANAGEMENT

	one-time	annual
Policy	N/A	N/A
Program	0	3,300,000
Project	35,125,000	0
Study	2,050,000	0
TOTAL	37,175,000	3,300,000

Not estimated: 3 programs, 6 projects, 4 studies

CONSISTENCY

	one-time	annual
Policy	N/A	N/A
Program	20,000	0
Project	0	0
Study	0	0
TOTAL	20,000	0

Not estimated: 3 programs

WATER RESOURCES MANAGEMENT

	one-time	annual
Policy	N/A	N/A
Program	36,170,000	667,000
Project	12,150,000	200,000
Study	1,100,000	0
TOTAL	49,420,000	867,000

Not estimated: 11 programs, 2 projects, 5 studies

WATER SUPPLY

	one-time	annual
Policy	N/A	N/A
Program	0	80,000
Project	510,000,000	240,000
Study	1,000,000	0
TOTAL	511,000,000	320,000

Not estimated: 1 program

RECREATION

	one-time	annual
Policy	N/A	N/A
Program	82,342,700	116,863,000
Project	1,696,000	116,000
Study	1,135,000	0
TOTAL	85,173,700	116,979,000

Not estimated: 5 programs, 1 project

FLOOD DAMAGE REDUCTION

	one-time	annual
Policy	N/A	N/A
Program	3,030,000	103,000
Project	364,000	20,000
Study	0	0
TOTAL	3,394,000	123,000

Not estimated: 6 programs

DREDGED MATERIAL DISPOSAL

	one-time	annual
Policy	N/A	N/A
Program	39,000,000	0
Project	500,000	0
Study	0	0
TOTAL	39,500,000	0

Not estimated: 4 programs, 1 project, 1 study

Implementation

Despite past waste and misuse, the lands and waters of the Hudson River Basin remain a splendid environment, offering good living to millions within its boundaries, and recreation for legions more within range of it. But little of the river and its tributaries remains wild, except near its remoter headwaters, and its preservation cannot be left to chance. It is up to the people of the Basin, New York and its bordering states, to protect this great natural resource through imaginative, vigorous, and continuing management.

If all those concerned—federal, state, local, and private interests—agree on the importance of this, then this Study supplies the elements of a permanent framework for accomplishing the task.

The recommendations can be turned into action by using this document for guidance in making policy, program, and investment decisions on the Basin's water and related land resources between now and the year 2000.

Existing agencies have the capability to budget and carry out planned actions. There is, however, a need to unify related water management concerns and to assure that there is a staff charged with specific responsibility for taking the next steps. Some activities were initiated by the Level B Study and are already underway, especially for basin management, consistency, water resources management, water supply, and flood damage reduction. What remains is to develop a way to incorporate the results of this and other efforts into a process leading toward a more comprehensive and official Basin Plan.

Since 95 percent of the Basin lies within one state, planning forfuture preservation and development should present a minimum of administrative difficulty. While no single government agency can be responsible for all of it, effective cooperation is both possible and practical. The need is compelling, and the stakes are high. Managed properly, the Hudson River Basin with its headwaters can be an incalculable asset for yet new jobs, for health and pleasure, and for all those innumerable uses that people make of a great river.

Now of all times, with the economy in turmoil and our demands for enough energy and for a better environment on a collison course, now is the time to grasp the chance to make a better future for this region.