RICHARD A. HOGARTY

THE DELAWARE RIVER DROUGHT EMERGENCY

INTER-UNIVERSITY CASE PROGRAM #107

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Cases in Public Administration and Policy Formation

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The Delaware River Drought Emergency

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Foreword

What happens to intergovernmental relations and to local politics when, after several years of increasing drought, a large, four-state urban region faces the immediate prospect of a devastating water shortage? That is the subject of this study.

The complex network of interrelationships and cooperation among the many different governmental units in the Delaware River Basin was subjected to unprecedented strains by the drought years that came to a climax in the frightening summer of 1965. It was a situation that brought the leaders of the urban areas of Delaware, New Jersey, New York, and Pennsylvania into conflict over the limited water flow of the Delaware River. At one point it appeared that the Mayor of New York City, the Governor of New Jersey, and authorities representing eastern Pennsylvania might take conflicting unilateral actions to insure that their constituents (and their constituents' water-dependent industries) would survive a shortage that showed no sign of ending. These officials and others, including the governors of New York, Delaware, and Pennsylvania, were participants in the relatively new Delaware River Basin Commission, which stood to stand or fall as an effective regional unit by the outcome of the crisis. Ultimately, several parties turned to the White House and to Interior Secretary Stewart Udall, who was dispatched by President Lyndon Johnson to make studies of the situation in the large cities of Philadelphia, Camden, Newark, and New York.

EDWIN A. BOCK

President, The Inter-University Case Program

CONTENTS

CHRONOLOGY

1963

Jan. 1: INCODEL ceases operation; its staff and assets absorbed by DRBC.

Apr. 15: Drought makes first impact in upper Delaware Basin.

Oct. 11: New York City reservoirs reduced to 35 per cent of capacity.

Oct. 15: Mayor Wagner asks for voluntary conservation measures, but foresees no real shortage.

Nov. 10: Delaware Governor Carvel complains that New York City fails to maintain its Delaware release requirements.

1964

May 12: With city reservoirs at 64 per cent of capacity, Mayor Wagner announces that shortage is over.

Oct. 25: New York City water reserves dip to 44 per cent of capacity.

Oct. 30: North Jersey reservoirs reduced to 33 per cent of capacity.

Nov. 16: Governor Hughes alerts North Jersey area to severity of water shortage.

1965

Jan. 7: Cumulative effects of four year drought deplete New York City reservoirs to 26 per cent of capacity.

Apr. 7: Mayor Wagner orders strict conservation measures.

May 6: Mayor Addonizio declares emergency in Newark.

May 10: D'Angelo creates special Bureau of Water Conservation, rejects Hudson River as source of supply because of pollution.

June 1: North Jersey reservoirs short about 24 bg.

June 7: D'Angelo imposes more stringent restrictions on commercial water use.

June 12: Governor Hughes proclaims state of emergency in New Jersey.

June 14: New York City stops making required releases from its Delaware reservoirs.

June 21: River Master notifies U.S. Supreme Court of New York City's failure to comply with his order to cease all diversions.

June 28: Hughes threatens court action to restrain New York City from "illegally" diverting Delaware water.

July 1: Hughes holds special DRBC conference to settle water dispute, begins campaign for federal assistance.

July 7: DRBC holds public hearing and declares water supply emergency; New York City ordered to resume releases.

July 8: Mayor Wagner orders rebuilding of Chelsea pumping station to draw Hudson water.

July 10: Senator Javits urges appointment of presidential commission to study water shortage.

July 14: President Johnson directs Water Resources Council to recommend federal assistance measures for drought area.

July 16: Governor Hughes requests federal help at meeting with WRC.

July 22: Johnson directs implementation of WRC recommendations and signs Water Resources Planning Act.

Mayor Wagner appoints Connorton committee to study universal water metering.

July 23: Salt front at river mile 90, within boundaries of Philadelphia.

July 27: Four basin chief executives confer on water crisis at National Governors Conference.

DRBC extends emergency to September 10.

DRBC Advisory Committee recommends mandatory universal metering and underground leak detection.

Aug. 11: Regional governors and mayors meet with President Johnson at White House conference.

Governor Scranton threatens court litigation if New York City discontinues its Delaware releases.

Aug. 12: Federal crisis team visits Camden and Philadelphia. Udall praises Philadelphia for well-managed water system.

Aug. 13: Johnson asks Congress for $1.25 million appropriation to accelerate construction of five Delaware reservoir projects.

Udall criticizes New York City water management while Wagner warns of "water famine" if city is forced to continue releases beyond September 10.

Aug. 18: Johnson declares Delaware Basin a federal drought disaster area.

DRBC adopts Udall's proposal for water bank, allowing New York City to discontinue releases.

Aug. 21: Congressman Ryan discovers leak in Central Park reservoir and demands D'Angelo's resignation.

Aug. 27: D'Angelo suspends two high-ranking city engineers, charging that they concealed leaks in Central Park reservoir.

Sept. 3: Wolman panel recommends multistaged metering program for New York City.

Sept. 8: Deputy Budget Director Staats announces that federal government will require municipalities to charge for water service in order to qualify for financial assistance.

New Jersey requests permission from New York to lower bistate Greenwood Lake.

NYSWRC grants approval for New York City to draw Hudson water through reactivation of Chelsea plant.

Sept. 11: Wagner rejects Connorton committee's universal metering plan.

Sept. 13: DRBC allows New Jersey to withdraw water from Lake Hopatcong for diversion into Passaic River Basin.

Sept. 20: Reconstruction of Chelsea intake begins.

Oct. 7: DRBC renews emergency agreement until November 30.

Salt front within 10 miles of Torresdale intake.

Oct. 9: Salt front begins to recede gradually.

Nov. 2: Governor Hughes re-elected by overwhelming majority; Lindsay wins closely contested New York City mayoral election; New York voters approve Governor Rockefeller's $1 billion anti-water pollution bond issue.

Nov. 19: D'Angelo resigns as New York City water commissioner.

Nov. 20: Reconstruction of Philadelphia Torresdale intake completed.

Nov. 24: DRBC extends emergency to December 31.

Dec. 20: Salt front recedes to river mile 90.

Dec. 29: DRBC extends emergency to March 31, allows New York City to increase its Delaware diversions.

1966

Jan. 27: DRBC orders New York City to release 115 mgd from its water bank.

Mar. 15: WRC urges basin states to prepare for fifth year of drought.

Mar. 21: Chelsea pumping station opened; New York City begins tapping Hudson water.

Mar. 23: DRBC extends emergency and its jurisdiction over water bank until May 31.

Apr. 5: Governor Hughes lifts water-use restrictions in North Jersey.

Apr. 21: DRBC cites improvement of conditions in New York City watershed as reservoirs show signs of recovery.

May 25: DRBC continues emergency until August 31.

July 12: U.S. Geological Survey warns that ground-water levels are still dangerously low.

Aug. 18: President Johnson extends federal drought disaster until March 15.

Aug. 24: DRBC continues emergency until November 30 as drought conditions remain.

Nov. 28: DRBC extends emergency until March 15 to conform with federal extension.

1967

Jan. 13: Chelsea pumping plant ceases operation, is maintained on stand-by basis.

Feb. 27: Surface water storage conditions throughout upper Delaware Valley considerably improved over 1966.

Mar. 2: DRBC terminates emergency effective March 15. Banked water declared available to meet requirements of 1954 Supreme Court decree.

Mar. 15: Water supply emergency officially terminated. Court-sanctioned allocation formula prevails.

PRINCIPAL CHARACTERS

SAMUEL S. BAXTER, Water Commissioner of Philadelphia

ARMAND D'ANGELO, Water Commissioner of New York City

MAURICE K. GODDARD, Pennsylvania Secretary of Forests and Waters; alternate DRBC Commissioner from Pennsylvania

RICHARD J. HUGHES, Governor of New Jersey; DRBC Chairman

LYNDON B. JOHNSON, President of the United States

ROBERT F. KENNEDY, U.S. Senator from New York

WILLIAM MILLER, DRBC General Counsel

NELSON A. ROCKEFELLER, Governor of New York

ROBERT A. ROE, New Jersey Commissioner of Conservation and Economic Development

WILLIAM FITTS RYAN, U.S. Congressman from New York

WILLIAM SCHNADER, former Pennsylvania Attorney General; influential figure in state Republican circles

WILLIAM W. SCRANTON, Governor of Pennsylvania

JAMES TATE, Mayor of Philadelphia

GEORGE L. TERRY, Governor of Delaware

STEWART L. UDALL, U.S. Secretary of the Interior

ROBERT WAGNER, Mayor of New York City

JOSEPH WELLS, Delaware River Master

HAROLD G. WILM, New York State Water Commissioner; alternate DRBC Commissioner from New York

JAMES F. WRIGHT, DRBC Executive Director

Introduction

> To the contestants in water politics, each level of government is a different arena, with varying advantages and disadvantages for different participants and the resolution of differing issues.
>
> U.S. COMMISSION ON INTERGOVERNMENTAL RELATIONS (1962)

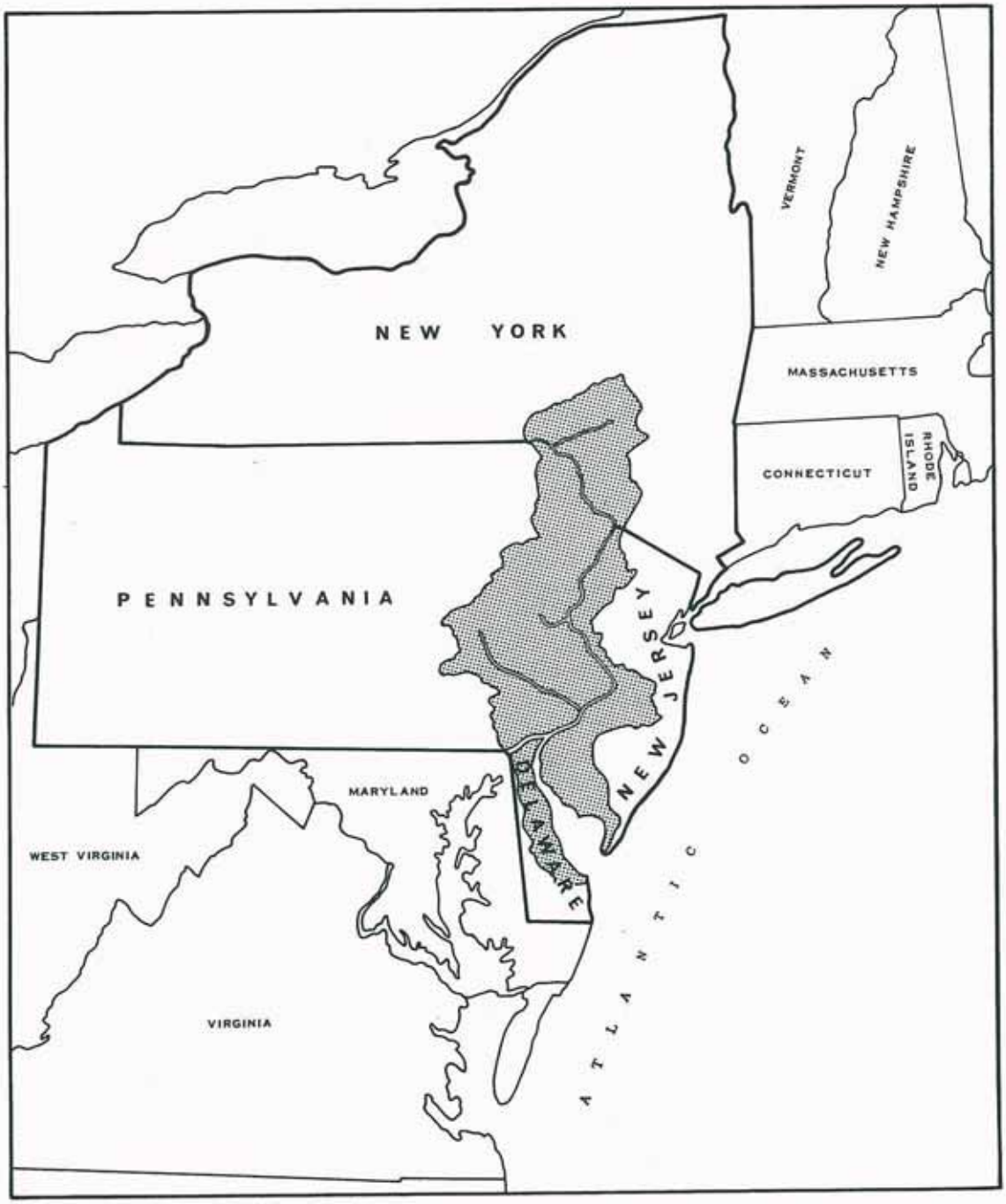
Good water is now regarded throughout the United States—not just in arid western areas—as a valued and potentially scarce commodity: a fundamental need of the city dweller and suburbanite, a basic requirement for the industrialist, the farmer, the sportsman, and the conservationist. Somehow their conflicting demands on an increasingly scarce supply must be resolved—usually through the political system. At times of severe drought this system must make allocation decisions under great pressure. A prolonged drought brings new claimants into the arena, and the prospect of an absolute shortage intensifies the demands of all parties. Under such pressures, every element of the total governmental system, political and administrative, becomes a possible battleground as well as a possible forcing bed for new remedies.

From 1961 to 1967, the northeastern United States suffered the most severe drought in its recorded history. An abundance of rain and snow in previous years had left the citizens complacent about water supplies. But the great drought changed all that. It altered public assumptions and public concerns about supply and demand.

Caught in the fourth year of the unprecedented six-year dry spell, some localities in the Delaware River Valley took extraordinary measures to protect their threatened sources of water supply. On June 14, 1965, New York City decided to withhold downstream releases from its Delaware-fed reservoirs, despite a 1954 United States Supreme Court decree that made these releases mandatory. The city's action inflamed a dormant dispute among the basin states of New York, Pennsylvania, New Jersey, and Delaware over the equitable allocation of the interstate waters of the Delaware River basin. The ensuing crisis presented formidable challenges for political institutions at all levels of the American federal system that had responsibilities for part or all of the Delaware basin.

The specter of the greater New York metropolitan area about to run dry loomed as an administrative nightmare for the newly created Delaware River Basin Commission. Its administrative difficulties were intensified by the political heat of election campaigns in both New Jersey and New York. Solutions to the water shortage seemed to be beyond the limited fiscal and territorial capabilities of the many state and local governments in the area. Faced by a possible emergency and a pinched tax base, the major political leaders in the region made a bid to tap the superior economic resources of the federal government. These efforts of the governors and the big city mayors focused initially on the White House and President Lyndon Johnson. The result was a federal task force and the incidental "use" of the crisis to serve larger presidential aims for national water policy.

One final introductory comment is in order. The 1965 drought emergency must be understood in the context of the four decades of Delaware water clashes that preceded it. At the beginning, the actors in this case were in a sense the captives of their predecessors' beliefs and resentments. Their attitudes had been shaped largely by the earlier encounters. Under the force of a crisis for which there was no comparable precedent, the antagonists buried some of their differences and improvised. Instead of resorting to litigation and a judicial settlement, as had been customary in the past, they broke new ground and sought to resolve the dispute by political pressure and administrative negotiation. Crisis alone made new forms of intergovernmental cooperation mandatory and at least temporarily legitimate.



Location of the Delaware River Basin

Water Politics in the Delaware Valley

> A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it.
>
> JUSTICE OLIVER WENDELL HOLMES
> (*New Jersey* v. *New York*, 283 U.S. 336 [1931])

Approximately 22 million people and a major segment of the nation's industry depend on water of the Delaware River. The region drained by the river holds about one-tenth of the U. S. population, employs one-seventh of the nation's labor force, and receives one-sixth of its aggregate personal income. "In the number of people served by its waters, and the economic importance of their activities, the Delaware ranks first among American rivers."[1]

Originating in the highlands of southern New York State, the Delaware meanders some 330 miles downstream along the borders of Pennsylvania, New Jersey, and Delaware before emptying into the Atlantic. It drains an area of approximately 12,765 square miles. The upper Delaware Valley is sparsely settled farmland; the lower valley is densely populated and highly industrialized. In 1965 the Delaware Service Area, as delineated by the Army Corps of Engineers, included the basin territory plus the 22 adjacent counties in metropolitan New York that depended on the river for a portion of their water needs.

Water problems and politics in the Delaware Valley in the 1960's were intense because of the concentrations of urban population. New York City drew on the Delaware for one-third of its water requirements, while Philadelphia relied on it for one-half of its supply. New Jersey, then ranked as the most urbanized state in the nation, was permitted to divert 100 million gallons a day (mgd) through the old Delaware and Raritan Canal to supply its cities of Trenton and New Brunswick, among others. Metropolitan areas such as Wilmington, Delaware and Allentown, Bethlehem, and Easton in Pennsylvania were increasingly dependent upon the waters of its tributaries.

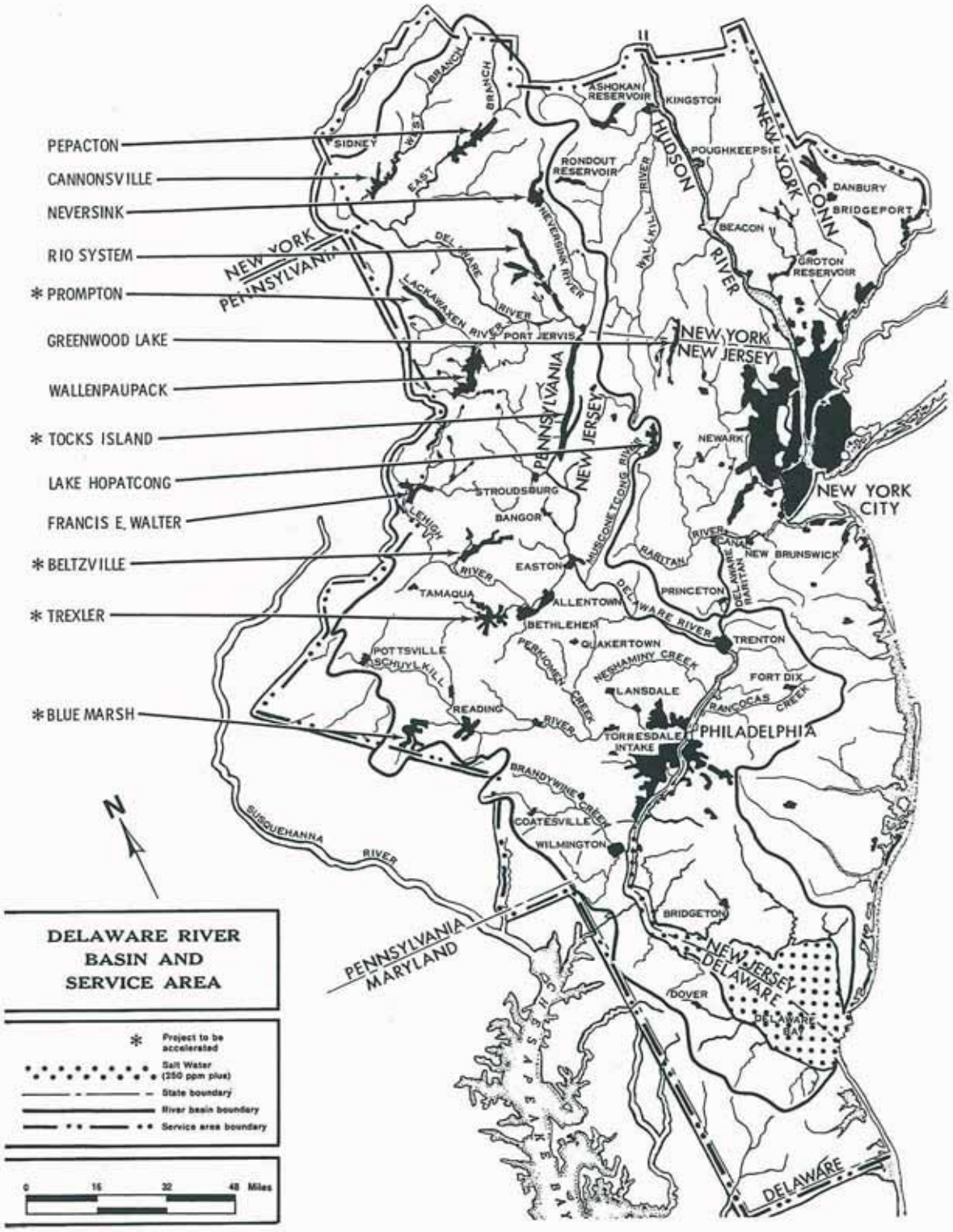
Delaware water meant different things to different people, from water supply to pollution and flood control, recreation, navigation, hydroelectric power, and irrigation. The cities and suburbs were particularly concerned with water quality and flood protection, whereas the rural areas emphasized the river's agricultural and recreational values.

From such a combination of fragmented jurisdictions and conflicting interests, disputes had often arisen over the use of the Delaware, especially in times of water shortage. New York City and Philadelphia had competed for its limited supplies since the early 1920's. Legal skirmishes had usually been between New York State and Pennsylvania, with New Jersey usually playing the role of broker. The fact that New York City was located wholly within the Hudson River Basin and yet steadfastly refused to tap this badly polluted source exacerbated the antagonism.

ALLOCATION THROUGH JUDICIAL DECREE

In the mid-1920's New York City first sought access to the headwaters of the Delaware, located on the western slopes of the Catskill Mountains, 125 miles north of the city. At that time, growing consumption was using much of the yield from the city's Croton reservoir and its existing Catskill

[1] Roscoe C. Martin *et al.*, *River Basin Administration and the Delaware* (Syracuse: Syracuse University Press, 1960), p. 30.



Delaware River Basin and Service Area

system. New York City's Board of Water Supply (NYCBWS), the agency legally charged with obtaining new sources and building storage and distribution facilities, considered both Hudson and Delaware water. It concluded, taking into account annual costs including debt service, that it would be less expensive to transport Delaware water by gravity through tunnels carved deep in bedrock than to tap the nearby polluted Hudson. It claimed that water from the Hudson would require extensive filtration, pumping, and other treatment. This questionable finding, coupled with the popular appeal of drinking spring-fed mountain water, led New York City to opt for Delaware water.[2]

Negotiations with the other Delaware Basin states to agree on an interstate compact were unsuccessful in 1925 and 1927, and the NYCBWS decided in 1928 to proceed unilaterally with its Delaware plans. Its engineering proposal called for construction of a series of reservoirs, including Neversink, Pepacton, and Rondout, on the upper headwater tributaries, and aqueducts to carry between 670 and 700 mgd to the city line. The NYCBWS proposed (1) to take water from a tributary into its reservoirs only when the flow exceeded the stream's "ordinary flow," and (2) to release the stored water to augment downstream flows during low-flow summer months. City officials requested and received approval for the project from what was then the New York State Water Power and Control Commission.

Both New Jersey and Pennsylvania objected to the proposed 660 mgd diversion of Delaware water into the Hudson River watershed. New Jersey sought to enjoin New York from taking any Delaware water out of its natural watershed, claiming that the diversion would deprive New Jersey of a common-law riparian right to the undiminished flow of the stream and interfere with recreation, fisheries, and municipal supplies. New Jersey also charged New York with extravagant use of its present supply. To protect its interest in the river, Pennsylvania intervened in the litigation. The controversy was then referred to a special master who collected testimony and evidence. In 1931 the U. S. Supreme Court held that the proposed diversion was subject to the doctrine of equitable apportionment and the mere fact that it was intended for use in another watershed did not stand as a valid objection.[3]

The Court permitted New York City to divert up to 440 mgd from the Delaware. However, in order to protect the recreation interests and oyster industry in the lower basin, the city was required to make specified releases of water sufficient to maintain a flow of 1,740 cubic feet per second (cfs) at Port Jervis, New York and Trenton, New Jersey. The Court's opinion was written by Justice Oliver Wendell Holmes, who summed up the regional implications of the water distribution problem:

> New York has the physical power to cut off all the water within its jurisdiction. But clearly the exercise of such a power to destruction of the interest of lower States could not be tolerated. And on the other hand, equally little could New Jersey be permitted to require New York to give up its power altogether in order that the River might come down to it undiminished. Both States have real and substantial interests in the River that must be reconciled as best they may be.[4]

New York City was granted approximately two-thirds of its requested allocation, but it received no permanent guarantee. Holmes warned prophetically that: ". . . the possible experiences of the future may make modifications of the plan as it now stands necessary in unforeseen particulars." He also added the *obiter dictum* that in regard to the navigable capacity of the Delaware and in some other particulars, "New York takes the risk of the future."[5] The Court stipulated that any party to the litigation might seek relief at a later date, and it retained jurisdiction.

ATTEMPTS AT A REGIONAL APPROACH

Regional efforts prior to 1961 failed to provide for the orderly development of the river basin. In

[2] For a critical analysis of this choice, see Jack Hirshleifer *et al., Water Supply: Economics, Technology and Policy* (Chicago: University of Chicago Press, 1960), pp. 266–288.

[3] *New Jersey* v. *New York*, 283 U.S. 336, 805 (1931).
[4] *Ibid.*, p. 342.
[5] *Ibid.*, p. 344.

1936 the Interstate Commission on the Delaware River Basin (INCODEL) was established by parallel legislation in the four basin states, but it operated on the principle of voluntary cooperation and lacked effective regulatory powers. INCODEL did succeed in keeping municipalities from pouring untreated sewage into the river. In combating industrial pollution it was less effective.

In the early 1950's INCODEL prepared a plan for the physical development of the Delaware and drafted an interstate compact to implement it. Approved by three states, the compact proposal failed to pass by a single vote in a Pennsylvania State Senate subcommittee.

Anxious to start the final stage of its Delaware reservoir construction, New York City reopened litigation in 1952. It petitioned the Supreme Court for a modification of the 1931 decree and requested an additional allocation from the Delaware. Once again New Jersey and Pennsylvania contended that the city's additional water needs could be "procured feasibly, practically, and more economically" from the Hudson. Attorneys for both states pointed out that southeastern Pennsylvania and northern New Jersey were totally dependent on the Delaware for future water requirements. A special master was again assigned to conduct hearings and negotiate with the parties-at-interest. Agreement by the four states was set as a prerequisite to any modification of the earlier decree. The states also concurred that no exceptions would be filed to the special master's report.

In 1954 the Supreme Court accepted the special master's report and amended its original decree accordingly. For the immediate period, its consent decree increased New York City's diversions only from 440 to 490 mgd.[6] Upon completion of the projected Cannonsville reservoir (still in the process of filling in 1965), New York City would be permitted to increase its diversions from 490 to 800 mgd. To protect the lower basin, the Court required both the impounding of excess waters and releases that would assure a minimum streamflow of 1,525 cubic feet per second at the Montague gauging station in New Jersey. This Montague release formula would increase to 1,750 cfs when the water storage in Cannonsville reached 50 billion gallons above its lowest outlet. In addition, the Court authorized New Jersey to divert 100 mgd for use outside the Delaware Basin; and it affirmed Pennsylvania's future right to petition for a modification of the newly amended decree. The Court appointed a River Master to supervise New York's diversion and release requirements.

The second Delaware River case, like the first, took over two years to litigate. Although the decision temporarily satisfied most, it caused some to question future reliance on the courts to divide Delaware water. As Roscoe Martin has pointed out:

> Twice had New York City come to the tap seeking water, and twice had it been turned away. In both instances the city sought relief in the Supreme Court, which both times gave it substantially all it requested. Throughout this period Pennsylvania threw up the gravest obstacles to interstate agreement. Her spokesmen felt that the States could gain more through judicial process than through interstate negotiation, and this confidence found at least partial justification in the Supreme Court decrees. The compensatory releases prescribed by the Court represented important economic values for the downstream States, for they provided water from New York City's reservoirs for augmentation of the river's flow during drought periods. Moreover, this considerable advantage was gained without capital investment by the beneficiary States. The right of diversion allowed New Jersey also was an important consideration. The downstream States therefore did not come away from the Supreme Court empty handed. Nevertheless the feeling was general that they had failed to maximize their gains and that, by comparison with New York they had suffered rather than profited from the policy of individual action in the three decades 1925–55. And the region's water-resource problems were not less but infinitely more complicated at the end of that period than at the beginning.[7]

CREATION OF THE DRBC

After the second Delaware River case there was movement to create a unified governmental

[6] *New Jersey* v. *New York*, 347 U.S. 995 (1954).

[7] Roscoe C. Martin, *Metropolis in Transition* (Washington, D.C.: U.S. Government Printing Office, 1963), p. 119.

unit to administer the water resources in the basin. The governors of New Jersey, New York, and Pennsylvania agreed in March 1955 that they would explore the possibility.

In August 1955 Hurricanes Connie and Diane struck the basin, producing devastating floods, 100 deaths, and over $100 million in property damage. In the wake of the flood destruction, Congress directed the Army Corps of Engineers to prepare a comprehensive, multipurpose plan for the development and control of the river. But the Delaware Valley still lacked an effective governmental institution with sufficient powers to implement such a plan and to enforce water allocation.

The region's water planning and policy machinery was balkanized, complex, and cumbersome: approximately 849 local governments, 42 counties, 4 states, and an estimated 252 water supply enterprises had some sort of policy-making responsibility in water management.[8] Superimposed upon this jurisdictional maze were about 18 federal agencies, 14 interstate agencies, and countless private firms including giants like United States Steel.

At this time (1955), the four governors and the mayors of New York City and Philadelphia appointed a six-man advisory committee to recommend a solution to management problems. Walter M. Phillips, a close observer, later wrote:

> The Advisory Committee's experience with the tangled web of governmental agencies involved with water convinced it that there was great need for a governmental study of what should be the future, on-going, management setup for the water resources of the Basin. It was clear that some agency stronger than INCODEL would be needed to serve as the keeper of the plan being made, to up-date it from time to time, and to assure adherence to it.[9]

The committee obtained a large grant from the Ford Foundation to study water management; then it created a nonprofit corporation to receive the funds. This corporation in turn contracted for a management study with a research group at Syracuse University. A second nonprofit corporation was also formed to arouse citizen interest in the two studies then underway.

The Syracuse report was accepted at a meeting of the four governors and two mayors in 1959. The governors and mayors decided to press for a permanent basin agency to be established by an interstate-federal compact. Sensing favorable public opinion, the political leaders directed an advisory committee to draft the proposed compact.

The committee produced a draft compact in 1961 after almost two years of negotiation. The compact designers wanted a new agency with power to settle water disputes so that the states would not have to go to court again. Skillfully drawn, the document successfully skirted the constitutional doctrine of preemptive federalism. The proposed Delaware River Basin Commission (DRBC) resembled in some respects the Tennessee Valley Authority, but no mention was made of this model for fear it would have alienated private power interests. There was wide and implacable opposition in the Delaware region to public ownership, production, or sale of hydroelectric power.

Within nine months the compact was passed in all four state legislatures and approved by Congress. Its swift passage was due in large measure to the strong political backing it obtained:

> The Governors and mayors played dominant roles; among them, Philadelphia Mayor (later U.S. Senator) Joseph S. Clark stood out, particularly in the early days of negotiations among the executives. They were anxious (or at any rate willing) to reach agreement, and there were no obstructionists among them as there had been on earlier occasions. . . . Finally, sponsorship of the compact in Congress by Francis E. Walter (of Pennsylvania) provided the spark for gaining swift approval by that body. Mr. Walter's home was in the heart of the Delaware Valley, and his arguments in behalf of the compact carried special weight.[10]

The only significant opposition came from the federal agencies fearful of losing some of their power in the realm of Delaware Basin water resources. Secretary of Interior Stewart Udall initially called it an "oddball compact." In September

[8] Martin, *River Basin Administration*, p. 51.

[9] Walter M. Phillips, *A Future for Penjurdel* (Philadelphia: mimeograph, 1965), p. 58.

[10] Roscoe C. Martin, *Metropolis in Transition*, p. 126.

1961 President Kennedy signed the bill making the federal government a party to the compact. The DRBC soon opened its permanent office in Trenton, New Jersey, where the Delaware's fresh water and tidal water meet.

The DRBC was a major innovation in water resource management and federal-state partnership. According to one account, "The terms of the Delaware compact represent as complete a marriage of federal and state law as has ever been achieved in our constitutional system."[11] Voting members were the four governors and a commissioner appointed by the President of the United States. This was the first time the federal government had participated as a voting member in a federal-state agency. (In practice the governors attended meetings only for major policy and budgetary decisions; the routine business was normally transacted by their designated alternates.) As authorized by the compact, the mayors of New York City and Philadelphia served as advisers to their respective governors.

The DRBC was responsible for multipurpose planning, management, and development of the region's water resources. Unlike its predecessor, INCODEL, the agency had strong regulatory powers and extensive authority over allocation, diversions, and releases of water in the basin. In signing the compact, the parties agreed to abide by the 1954 Supreme Court decree and, upon New York's insistence, waived their rights to apply for any further modifications. However, the DRBC had the power to declare a water supply emergency, suspend the Court decree, and arrange for the transfer of water from one jurisdiction to another.

Most of the commission's water resource projects were researched and designed by its staff, under the direction of James F. Wright. Wright, a leading water resource expert who had worked under California Governor Pat Brown, was selected as DRBC Executive Director after a nationwide recruiting effort. Other staff officers included the General Counsel, Secretary, and Chief Administrative Officer. By 1965 the DRBC staff numbered 39, most of whom were working under the Planning Division on such programs as water supply and demand, recreation, power, water quality, and flood loss.

[11] Frederick L. Zimmermann and Mitchell Wendell, "New Horizons on the Delaware," *State Government*, 36 (1963), p. 164.

The Development of the Crisis

In the water-rich Middle Atlantic states, water shortages are largely the result of delayed action and failures of management, sometimes exacerbated by political jockeying.

ABEL WOLMAN
Emeritus Professor of Sanitary Engineering
at Johns Hopkins University

In the early 1960's water seemed to the average eastern urbanite to be available in unlimited quantity. This complacency was shared by the region's political leaders. For decades New York City politicians, advocating "free water," had avoided the imposition of residential water metering. New Jersey legislators seemed reluctant to develop substantial reservoirs to meet the rapidly growing demand in four northeastern counties—Bergen, Essex, Hudson, and Passaic—where industry was highly concentrated. For nearly a decade both the Republican and Democratic parties in New Jersey had played a game of political beanbag over the location of two badly needed reservoirs. Most of the sites under consideration were located in rural Hunterdon County, where citizens were reluctant to have their land used for urban needs. A public referendum on the purchase of the Hunterdon reservoir sites at Round Valley and Spruce Run was finally passed in 1958. The $45.8 million bond issue, however, did not provide any funds for pipeline construction to transport the water to North Jersey.

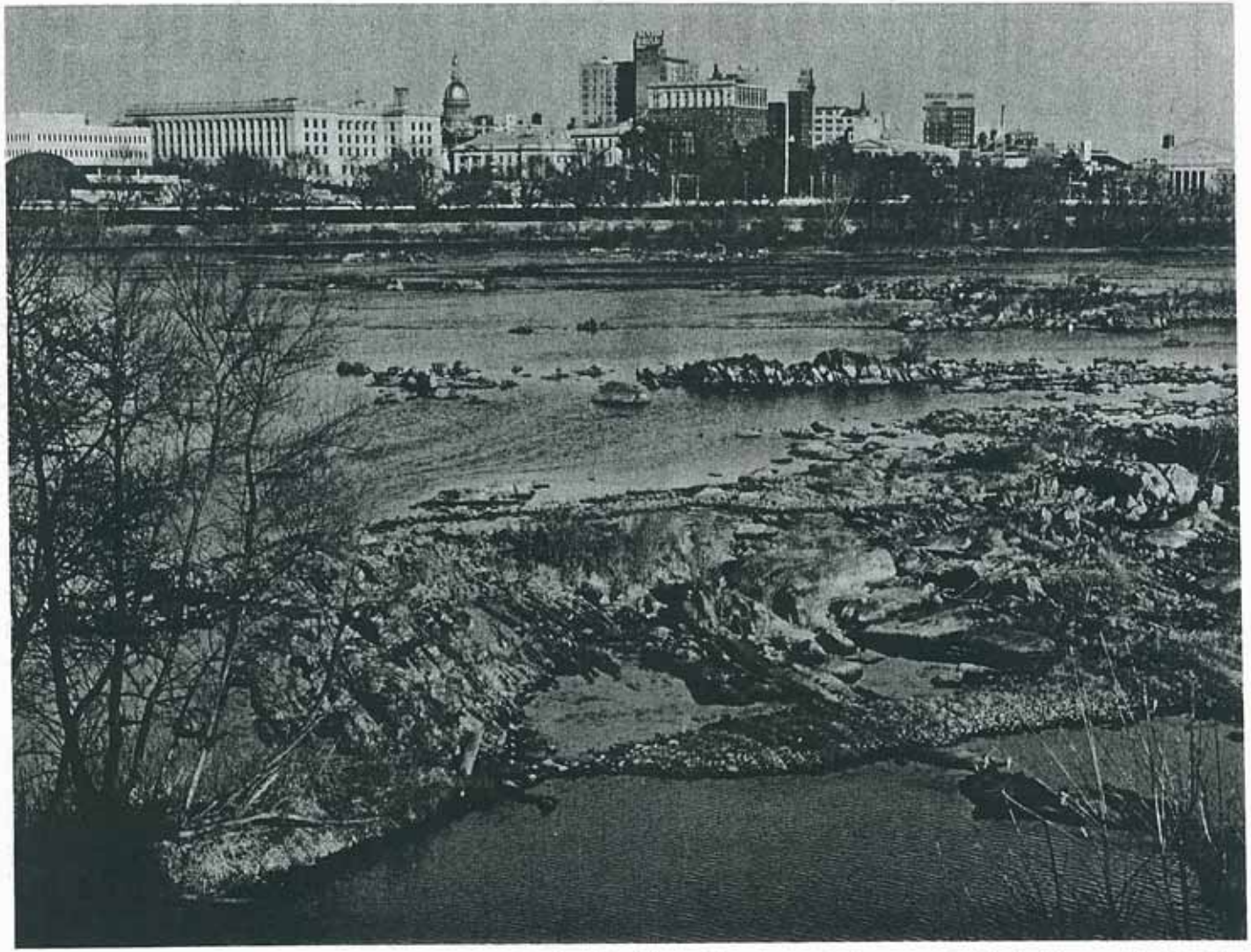
THE DROUGHT

In May 1961 water experts estimated that there were sufficient reserves to provide for the growth of the entire Delaware Service Area until the year 2010.[12] The drought in the Northeast began the following August and continued for 46 months, when the Delaware water crisis finally erupted. Precipitation was 5 inches below normal in 1961–1962, and each subsequent year was drier than the last. In 1964–1965 the annual precipitation declined 10 inches below the 44.1 inch norm. Northwest winds brought dry air masses that pushed rain-producing storm centers out into the Atlantic. In effect, the drought-stricken Northeast lost the equivalent of one year's rainfall during the 1961–1965 period. When rain did fall, most of it was absorbed by the parched ground, and there was an area-wide runoff deficiency of about 33 per cent. By July 1965 a condition of "extreme drought," as defined by the U.S. Weather Bureau's Palmer Index, existed over 100,000 square miles extending from the Middle Atlantic states to New England.

The drought became critical during the spring of 1965. Water in the reservoirs and wells in the region began to sink to dangerously low levels. There were extensive fish kills in the lower Delaware in mid-May as the dissolved oxygen content in the estuary declined. Salt water from the sea began its seasonal movement upriver well ahead of schedule. Corrosion and rust difficulties in boilers and cooling systems caused industrial shutdowns in some areas. Fire warnings were posted in forests. By early summer the drought had far exceeded the previous record dry spell of 1929–1932, with no letup in sight. In his annual report for 1965, the Delaware River Master declared:

> . . . a drought of this severity over a four year period has not occurred since at least 1820 and

[12] U.S. Army Corps of Engineers, *Delaware River Basin Report*, Philadelphia, May 1961, I, pp. 57–77.



The Delaware River at Trenton in November 1964, already affected by the water shortage. In the background is the New Jersey State Capitol Building.

The *Trenton Times*

Table 1 STORAGE IN FIVE MAJOR NEW JERSEY RESERVOIR SYSTEMS
June 1, 1965

Reservoir System	Maximum Capacity (bg)	Actual Storage (bg)	Per Cent of Capacity	Consumption (mg)
WANAQUE	29.5	14.5	49	115.3
PEQUANNOCK	14.4	3.4	23	40.3
ROCKAWAY	11.5	8.1	70	58.7
HACKENSACK	9.3	4.9	52	65.9
POMPTON	2.9	1.7	58	43.9
Total All Systems	67.6	32.6	48	324.1

Source: New Jersey Division of Water Policy and Supply

probably even long before that date. It has been variously estimated to be an event that might be expected on the average of only once in 200 to 1000 years.[13]

Meteorologists and Weather Bureau officials predicted that the drought would get worse before conditions improved.

DEPLETION OF THE NEW JERSEY RESERVOIRS

Drought conditions in northeastern New Jersey had reached critical proportions as early as October 1964, when it became clear to state and local officials that residents were actually overdrawing developed supplies. Water consumption during the previous month had soared to a record high of 388 mgd compared to an estimated dependable yield of 385 million. The combined storage in the 12 reservoirs supplying this region had been reduced to 21 billion gallons or 33 per cent of maximum capacity. Over two-thirds of the state's water requirements were sustained by the five systems that serve such large industrial cities as Bayonne, Clifton, Elizabeth, Hackensack, Hoboken, Jersey City, Newark, Passaic, and Paterson. The industrial vitality of New Jersey is centered within this 25-square-mile northeastern region.

As the dry spell persisted throughout the fall of 1964, state officials realized that some northeastern cities and suburbs were in serious trouble. For example, the North Jersey District Water Supply Commission (NJDWSC) was selling water from its Wanaque reservoir system in excess of safe yield. This area was served by 36 separate municipal, district, and private water suppliers, whose pipelines were either dissimilar in size, not interconnected, or manned by inadequate pumping stations.[14]

On December 2, 1964, the New Jersey Water Policy and Supply Council inaugurated an emergency water distribution plan designed to supplement, conserve, and interconnect the water supply of the northern four-county area. The unusually dry winter and spring made matters more ominous. On May 6, 1965, Mayor Hugh Addonizio

[13] Office of the Delaware River Master, *Report of the River Master of the Delaware River for the Period December 1, 1964–November 30, 1965*, Washington, July 1966, p. 6.

[14] Interview with George R. Shanklin, Director, New Jersey Division of Water Policy and Supply, April 19, 1966. See also Robert A. Roe, "New Jersey's Water Crisis: What Are We Doing About It?" *New Jersey Municipalities*, XLIV, No. 3 (March 1967), pp. 8–9.

of Newark declared a "water emergency" as the supply in the city's Pequannock system remained at 29 per cent of storage capacity.[15] Fourteen other cities and suburbs made similar emergency declarations as the levels in their reservoirs dipped far below the anticipated spring yield.

Many cities and suburbs in North Jersey had been operating on thin reserve margins, and hence several were caught short. Transmission lines to the northeastern area from the Round Valley and Spruce Run reservoirs, which had a potential combined output of 200 mgd, had still not been built. The state legislature had authorized the NJDWSC to construct a distribution network in 1962, but it had not appropriated any funds. Before it could float revenue bonds, NJDWSC therefore had to have formal contracts from the participating communities to supply a minimum of 50 mgd. Firm commitments had been received for only 41.6 mgd.

New Jersey Governor Richard Hughes, a Democrat in office since 1962, was seeking re-election in 1965. On June 12, 1965, Hughes declared a state of emergency in Bergen, Essex, Hudson, and Passaic counties and in the city of Elizabeth. The Governor acted under the 1942 wartime statutes that gave him extraordinary powers to deal with natural disasters. Under this authority, the state legally took direction of water management of the separate systems in its entire northeastern region. Proclaiming the emergency before a large group of mayors and municipal water officials, Hughes observed that water consumption had increased by as much as 40 mgd during early June and that voluntary restraint had failed. The Governor said: "I regret that conditions have compelled the state government to inject itself into what essentially is a local situation, but I am sure that this knowledgeable group of public officials fully recognizes the necessity for such action."[16] Hughes set a goal of saving 100 mgd for the next 180 days and appealed for public support.

New Jersey's Commissioner of Conservation and Economic Development, Robert Roe, was given broad powers to carry out the proclamation's emergency measures. He was specifically directed to assure early completion of several projects designed to interconnect the various systems serving the four-county area.

NEW YORK CITY RUNS SHORT

The situation was not much more promising across the Hudson. Built at the cost of more than $1 billion, New York City's vast complex of 26 storage basins had a theoretical capacity of 600 billion gallons. With the Cannonsville reservoir still incomplete, the city had a rated reservoir capacity of 473 billion gallons in 1965. In addition, it possessed a reserve of underground water on Long Island. Over 300 miles of tunnels and aqueducts and about 6,000 miles of trunk mains carried water to consumers. These facilities collectively constituted the world's largest municipal waterworks system.

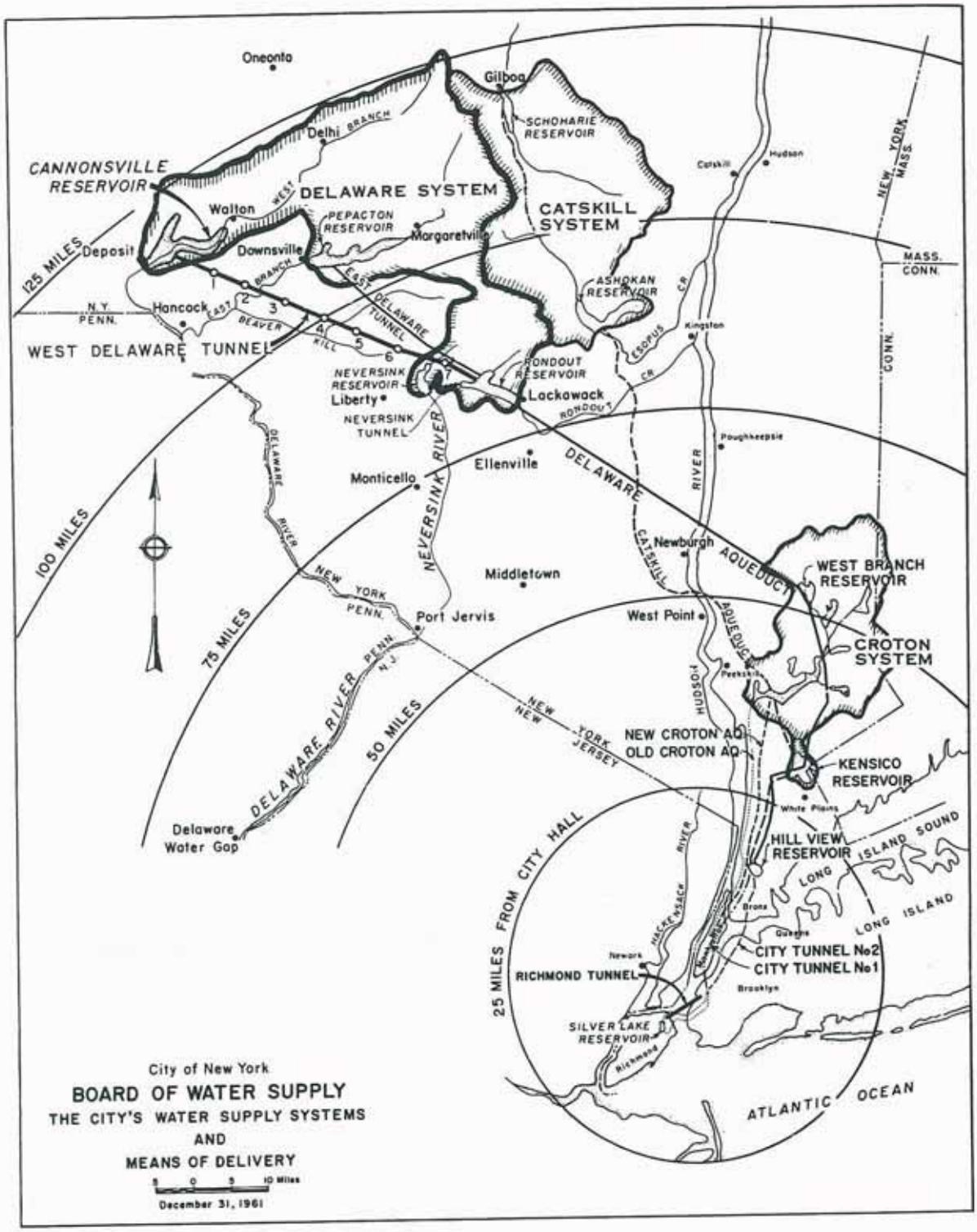
The system was administered by two agencies. The NYCBWS, a semi-independent board composed of three lifetime appointees, was responsible for acquiring reservoir sites and building dams and tunnels. The Department of Water Supply, Gas and Electricity (DWSGE), headed by Water Commissioner Armand D'Angelo, was responsible for operation and maintenance. This two-tiered structure, particularly the first tier, had been justified as a means of keeping the city's water affairs out of politics. Because of the city's tremendous storage assets, New York City officials did not foresee the peril of shortage as early as officials in New Jersey.

When reservoir levels had first dropped in 1963, Water Commissioner D'Angelo, backed by the Mayor (at whose pleasure he served), had called for reduced water use. He withdrew the appeal the following winter, as New York City entered its fourth year of drought. On October 25, 1964, he reported to Mayor Robert Wagner: "I do not at present see any danger of a water shortage in New York City."[17] At this time New York's watershed had already undergone the greatest accumulated loss of precipitation since the first

[15] *Newark Evening News*, May 7, 1965.

[16] Statement of Governor Richard J. Hughes, June 12, 1965, p. 2.

[17] *New York Times*, October 26, 1964.



New York City's Water Supply System

quarter of the nineteenth century. On Christmas Day 1964 the city's Delaware reservoirs were nearly empty. D'Angelo, however, assumed that the usual winter/spring precipitation would relieve the situation.[18]

His hopes were buoyed by heavy rains and melting snows in mid-winter. For a brief period, the charts appearing in the daily press showed a slight increase in reservoir storage. On February 19, 1965, a water department spokesman declared: "The department's present position is that if the rainfall continues to be normal, there will be no concern over the water supply in 1965."[19] The anticipated spring recovery did not occur. Less than a month later, D'Angelo reported the total storage in the city reservoirs at 182 billion gallons or 38 per cent of capacity. He hinted that a water conservation program might be necessary.[20] Reservoirs in the Croton, Catskill, and Delaware watersheds did not show any appreciable improvement during the next few months.

Daily water consumption in New York City then averaged about 1.25 billion gallons. In addition to its 8 million inhabitants and 3.5 million commuters who consumed city water during working hours, the city also supplied some 2 million people who lived along the lines of its aqueducts in Westchester, Putnam, and Ulster counties.

On April 7 Mayor Wagner, who was considering whether he would seek a fourth term, issued an executive order imposing stringent water-use restrictions on all residents and city agencies. His ten-point "save water" program prohibited sprinkling lawns, washing automobiles, filling backyard swimming pools, and flushing sidewalks. Upstate and suburban communities, which were drawing approximately 77 mgd from the city's water system, were requested to comply with the restrictions. Wagner tried to present a calm outlook: "I am advised by the Commissioner of Water Supply that there is no immediate danger of a water shortage but that the water supply situation can become critical in the fall if present drought conditions persist."[21]

Commissioner D'Angelo issued revised regula-

[18] Commenting on these events, Herbert A. Howlett, Chief Engineer of the DRBC, recalled: "I visited Arthur Ford, Stanley Dore and Vincent Terenzio [NYCBWS officials] in April 1964 for the purpose of discussing physical remedial actions which might be possible if the drought, which was then becoming apparent, were to persist. At that time Commissioner Ford and his associates were polite but clearly indicated that they saw no sign of danger or need to take extensive action."

[19] *New York Times*, February 20, 1965.

[20] *New York Times*, March 19, 1965.

[21] City of New York, Office of the Mayor, *Executive Order 137*, April 7, 1965.

Table 2 NEW YORK'S RESERVOIR STORAGE
June 1, 1965
(in billions of gallons)

Reservoir	Maximum Capacity	Usable Storage	% of Capacity
CANNONSVILLE	97*	15*	—
CROTON	97	54	56
CATSKILL	147	81	55
NEVERSINK AND PEPACTON	179	68	38
RONDOUT	50	42	84
Total	473	245	52

* These figures are not included in the total amounts at the bottom.

Source: New York City Department of Water Supply, Gas and Electricity

tions as storage conditions deteriorated. All public display fountains, except those at the World's Fair, were ordered turned off; fire hydrants were harnessed to prevent illegal opening; and water in restaurants was served only if requested. New Yorkers were advised to take brief showers instead of baths. The reservoir charts published in the metropolitan newspapers presented a bleak picture:

On May 9 D'Angelo created a special Water Conservation Bureau and warned of a "water famine" if consumption were not immediately curtailed by 150 to 200 mgd.[22] The city's water storage deteriorated rapidly. By June New York was about 152 billion gallons shy of normal storage for that time of year. City officials now realized that at existing rates of consumption their Delaware supply would run out by late summer. The city's Croton and Catskill systems would be exhausted by late fall. As Vincent Terenzio, Deputy Chief Engineer of the NYCBWS, later commented: "A water supply system of a large metropolis simply cannot fail, because the result would mean human catastrophe."[23] Confronted by the frightening possibility that the New York metropolitan area might run dry, city officials began to consider withholding some of the Delaware water that the city was obliged to release to downstream states.

THE TROUBLE SPOTS IN PENNSYLVANIA

Pennsylvania water shortages were largely confined to the heart of the state's anthracite coal district near the industrial cities of Bethlehem and Pottsville. Both cities were dependent upon spring-fed reservoirs that were replenished by the Lehigh and Schuylkill tributaries of the Delaware.

Bethlehem obtained its water supply from the Wild Creek and Penn Forest reservoirs, which had a combined capacity of 10.6 bg and served approximately one million people. The city managed to cut consumption through a voluntary conservation program, but on May 27 only 3.27 billion gallons remained in its reservoirs. Pottsville and ten nearby boroughs and townships were served by five reservoirs with a capacity of 1.47 bg. These reservoirs were owned and operated by the Schuylkill County Water Authority (SCWA), which served 43,000 people in the western section of the basin. The SCWA inaugurated a conservation campaign in early May 1965, as feeder streams nearly ceased to flow and the area supply became depleted. Reservoir storage was soon only 35 per cent of capacity, leaving the city with roughly a 92-day water supply.[24] Surface streams in the area had dried up.

Philadelphia's principal concern was the threat to drinking and industrial supplies from the intrusion of salt water up to Torresdale, where the city took in from the Delaware about half of its water supply.

NEW YORK CITY TRIGGERS THE CRISIS

Amidst the flurry of state and local emergency action in Pennsylvania and New Jersey, New York City moved to assure itself an adequate supply. Convinced that it could no longer risk further depletion of the city's already low storage, the Wagner administration decided to use the physical power to which Justice Holmes had alluded nearly 35 years earlier. On June 14, 1965, without advance warning, New York City ceased making the required downstream releases from its upper Delaware reservoirs. The DWSGE permitted the natural flows from Pepacton and Neversink to continue, but it did not release any water from storage. In apparent violation of the 1954 U.S. Supreme Court decree, the city continued to divert for itself an average of 421 mgd from Cannonsville. The Delaware River Master's daily monitoring at Montague quickly detected the falloff in flow. He sent a telegram on June 17 ordering New York to stop further diversions until the specified minimum release requirements had been met.[25]

[22] *New York Times*, May 10, 1965.
[23] Interview with Vincent G. Terenzio, April 11, 1966.
[24] DRBC Staff Report, *The Pottsville Water Supply*, February 7, 1966.
[25] Office of the Delaware River Master, *Report, 1964–1965*, pp. 4–5. Interview with Robert E. Fish, Deputy Delaware River Master, June 23, 1966.

Four days later the city had not obeyed the order, and the River Master notified the Supreme Court and the four basin governors. But New York continued to withhold water. Its defiance created an atmosphere of desperation and alarm.

Immediately there came loud protests from the downstream users. Unlike New York, Philadelphia and most lower basin cities drew water directly from the river, not from reservoirs. With releases from the headwaters cut off, their supplies were directly endangered. They felt the added fear that the curtailment would hasten the seasonal movement of salt water upriver from the Delaware estuary.[26] Both household and industrial water users were alarmed by newspaper reports about the accelerated movement of the salt water line upstream.

Delaware officials worried that the state's industries would be crippled by lack of water. They were concerned, too, for Delaware's depressed oyster industry, which with state financing was just becoming profitable again. New Jersey feared that salt water might intrude into the 22 underground wells that supplied Camden's population of 117,000. New Jersey officials were also worried that if the river flow fell much below 1,360 cfs at Trenton, they would have mechanical difficulties in pumping their current diversions of 90 mgd into the Delaware and Raritan Canal. (Besides supplying the central part of the state, this transmission system was also being used as the vital back-up for the increasingly inadequate supplies in the northeastern counties.)

Philadelphians were concerned that the salt (chloride) front of 250 parts per million (ppm) might reach the city's Torresdale intake plant and thus contaminate half of its water supply.[27] Fears were heightened by the daily alarms in the metropolitan newspapers, which graphically depicted the summer advance of the tidal sea water.

[26] Vincent Terenzio has taken exception to some statements in this paragraph. He writes: "The possible inference here, that the diminution of lower basin flows and consequent acceleration of upstream invasion of the salt was attributable to the withholding of New York releases, is not correct. It should be made clear that the upstream rush of salt water was the consequence of the general lowering of runoff because of the drought. The New York withholding may have contributed, but it was far from the major cause. Proof of this came later when New York was permitted to hold back and yet no serious modification of the frontal movement resulted. The fact here is that the releases required by the decree were much higher than needed to contain the salt movement."

[27] There is considerable confusion about the significance of chlorides. The United States Public Health Service has determined 250 ppm as the acceptable safe limit of salinity in municipal drinking water. Most people do not detect a salty taste until the chloride content has reached 400 ppm or more. In the Southwest, water supplies with up to 700 ppm are not rejected on sanitary grounds. While other impurities can be removed by filtration methods, chlorides cannot; this factor is particularly important to industrial water users concerned with rust and corrosion. Salt and sea water minerals also produce foaming problems in hot water boilers.

The DRBC Works for Agreement

> A Supreme Court is made up of human beings and they can write a legal document in which everybody agrees that certain terms and conditions must be lived up to. However, I know of no human being who can control a four-year drought going into its fifth year.
>
> ARMAND D'ANGELO
> Water Commissioner of New York City

In a crisis atmosphere intensified by press and television coverage, both New York City and Philadelphia sought support from their respective states to protect their threatened water supplies. Pennsylvania Secretary of Forests and Waters Maurice Goddard, his governor's alternate on the DRBC, charged New York City with "water piracy." He argued that the city should not solve its shortage at the expense of Philadelphia and other downstream communities, but he deliberately left room for negotiation: "We understand the seriousness of the situation in New York, but at the same time they should cooperate with us. One can't take all while the other gets none. Both sides have to give. I think we would be willing to do this."[28]

Philadelphia Water Commissioner Samuel Baxter contended that in New York City there was "no water shortage, but only a shortage of waterworks." Baxter saw the crisis as forcing the city to draw upon the Hudson River. "The real problem," he claimed, speaking of the Delaware, "is that, with less and less fresh water coming down, the salt line keeps coming up."[29] Baxter later invited newsmen into his office to sample water containing varying amounts of chlorides. Most of them experienced an unpleasant taste at 250 ppm.

On June 28 New Jersey Governor Hughes publicly accused New York of illegally taking water and announced that he had directed his legal staff to prepare an application to the Supreme Court requesting a restraining order to enjoin the city from making further illegal diversions. The Governor's action was significant because he was also serving that year as Chairman of the DRBC. He left the door open for bargaining. After threatening a legal fight, Hughes said: "I would hope, however, that such extreme action could be avoided through mutual efforts to arrive at an equitable allocation of the existing water supply during this critical period."[30]

New York Governor Nelson Rockefeller accused Hughes of breaking a promise to keep discussions on water diversions confidential.[31] The Wagner administration, in defense of its diversions, claimed that it could not maintain the river flow at the stipulated level without imperiling the lives of New York City's ten million water consumers. D'Angelo contended that the city's reservoirs would be dry by August if it had to meet the required downstream release standards. He also noted that the 1954 Supreme Court ruling applied to release of excess water, which was now a nonexistent item.

THE SEARCH FOR SOLUTIONS

Against this background, a decision had to be made about whether to turn back to the Supreme Court for resolution of differences or whether to use the new DRBC to find an agreed solution. At a June 23 meeting the DRBC alternate members,

[28] *Philadelphia Evening Bulletin*, June 27, 1965.
[29] *Philadelphia Evening Bulletin*, June 24, 1965.
[30] *Newark Evening News*, June 29, 1965.
[31] *New York Times*, July 1, 1965.

representing the four governors and the federal government, unanimously called for a public hearing to determine the extent of crisis conditions. Both a hearing and the unanimous consent of the five signatory members were necessary to invoke the DRBC compact's section 10.4 emergency powers, which enabled it to suspend the Supreme Court decree and transfer water from one jurisdiction to another.[32] Before the meeting adjourned, NYCBWS President Arthur Ford was asked to prepare an estimate of the city's minimum water needs for the next several months. The public hearing was scheduled for July 7.

The parties to the dispute had two options: either return to the Supreme Court for enforcement of the 1954 decree, or suspend the decree administratively under the compact's emergency provisions. There were strong advocates for each alternative. Some felt that the new regional agency ought to forego involvement because the DRBC was not yet firmly established. Others argued that the Delaware River Master already had authority under the decree to make emergency adjustments. Still others believed that the Supreme Court was the only body to settle a controversy among sovereign states.

Strong political forces in Pennsylvania favored court action. For example, the Greater Philadelphia Movement (GPM), an influential civic group, issued a position paper urging city and state officials to exert every "legal means available" against New York.[33] Another spokesman in favor of adversary proceedings was William Schnader, attorney general of Pennsylvania at the time of the first Delaware River case, who argued: "Pennsylvania must not allow her rights to be frittered away as the result of a misconstruction of the 1954 decree or the Delaware Basin Compact or both."[34] Schnader had been instrumental in persuading the high court to retain jurisdiction of the case.

On the other hand, Goddard and Baxter supported the DRBC alternative, arguing that the new regional agency had been expressly created for just such a purpose. They contended that the DRBC provided a means for settling the emergency dispute without lengthy court procedures. Finally, they argued that the Supreme Court always required parties-at-interest to exhaust all available administrative remedies before turning to it for judicial relief.

Meanwhile, the situation in New Jersey worsened, and anxiety mounted. Newark officials considered importing water by freight trains and tank trucks as that city's storage sank to a 90-day supply with no new sources in sight. They also requested permission from neighboring Elizabeth to build a pipeline across its boundaries, a request that had twice been rejected. It was apparent that the Governor's June 12 emergency measures had not alleviated the situation.[35]

In response to mounting pressures from his state's affected cities, Governor Hughes hastily called a special DRBC meeting for July 1 in hopes of settling the interstate dispute administratively. With a precariously balanced budget and without any broad-base state tax, Hughes knew that neither New Jersey nor its city governments had the money to deal with the crisis. Neither did the DRBC, whose budget was provided by the four participating states. In his telegram calling the meeting, Hughes stated his intention to request that President Lyndon Johnson declare the Delaware River Basin a federal disaster area. Federal assistance could then be made available.[36] Copies of his telegram were sent to Mayor Wagner of New York City and Mayor James Tate of Philadelphia. Hughes was using his DRBC chairman-

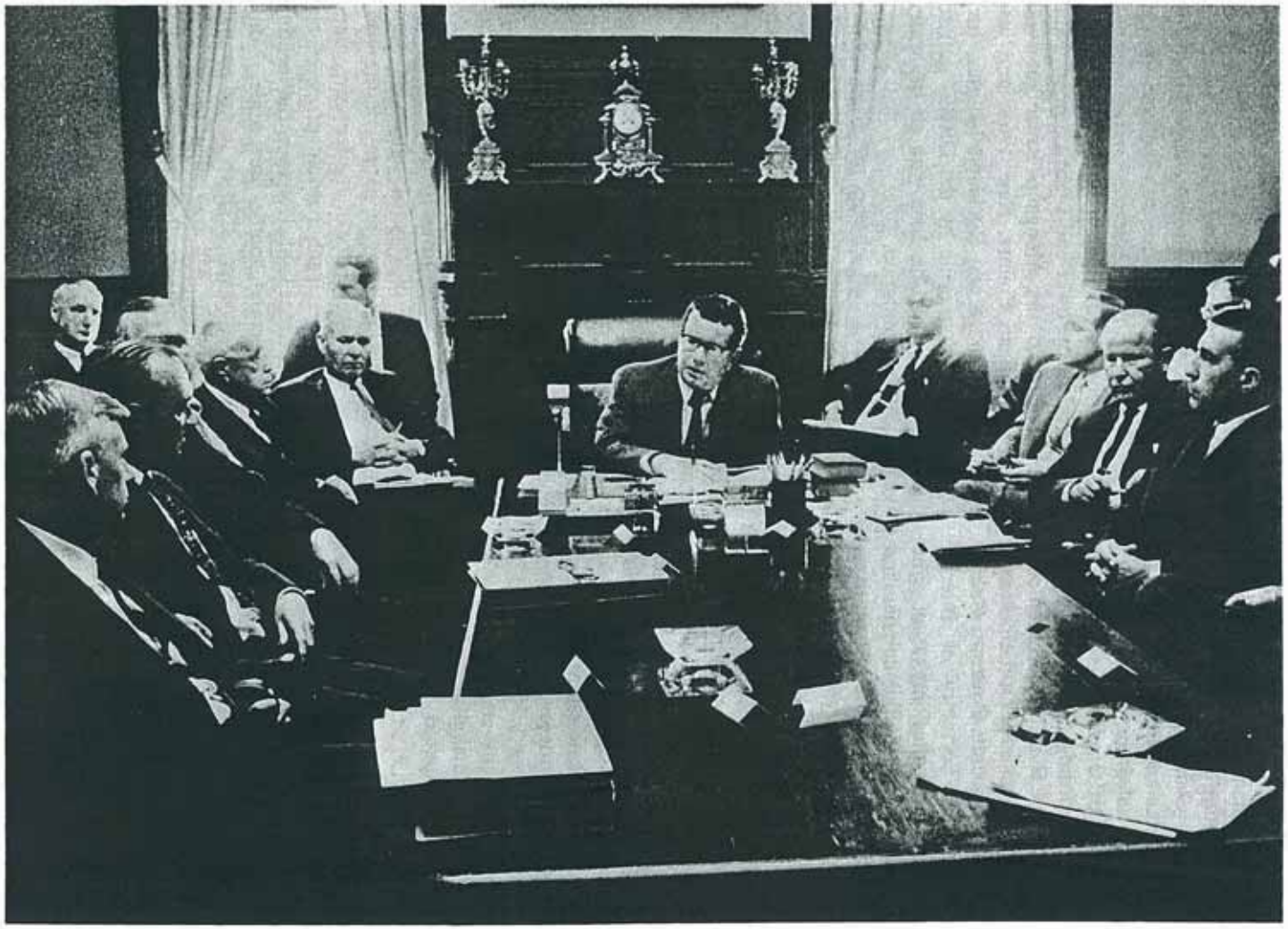
[32] Section 10.4 of the DRBC compact reads:
In the event of a drought or other condition which may cause an actual and immediate shortage of available water supply within the basin, or within any part thereof, the commission may, after public hearing, determine and delineate the area of such shortage and declare a water supply emergency therein. For the duration of such emergency as determined by the commission no person, firm, corporation or other public or private entity shall divert or withdraw water for any purpose, in excess of such quantities as the commission may prescribe by general regulation or authorize by special permit granted hereunder.

[33] Greater Philadelphia Movement, *A Position Paper On Delaware River Water* (mimeograph), September 1965, p. 18.

[34] William A. Schnader, *Pennsylvania, New York and the Waters of the Delaware River: A Supplement* (duplicated), September 27, 1965, pp. 27–28.

[35] *Paterson Evening News*, July 2, 1965.

[36] News Release from the Office of the Governor, State of New Jersey, June 28, 1965.



New Jersey Governor Richard Hughes holds high-level meeting in his office to discuss drought problems. Participants in this July 1, 1965 meeting include: Delaware Governor Charles Terry, Secretary of the Interior Stewart Udall, and Alternate DRBC Commissioners Harold Wilm of New York and Maurice Goddard of Pennsylvania.

DRBC

ship to initiate a regional campaign for federal help.

New York Governor Rockefeller and Pennsylvania Governor William Scranton refused to attend the DRBC meeting called by Hughes, but the two Republican governors did send their alternates, Harold Wilm and Maurice Goddard. In a strongly worded telegram, Rockefeller deplored the accusations of water thefts and criticized Hughes for disregarding the understanding that the deliberations were to be "undertaken confidentially and without fanfare."[37] Of the principal members, only fellow Democrats Governor George Terry of Delaware and Secretary of Interior Stewart Udall accepted Hughes' invitation. The Democratic administrations of Philadelphia and New York City both sent informal representatives. Udall was a key figure in the July 1 session. His aides informed the press that he was there as a peacemaker.

The Wagner administration came to the conference with a plan that would guarantee 8 bg in New York's Delaware reservoirs by December 1. Underlying the plan was the assumption that the 1964 drought would continue through May 1966. City Water Commissioner D'Angelo informed the DRBC commissioners that New York City's strict conservation program had reduced daily water requirements from 1.250 bg to 1.125 bg. He estimated that the city could obtain 700 mgd from its Croton and Catskill watersheds and that 400 mgd would be required from the Delaware system.

DRBC STAFF PLANS

The New York City proposal was flatly rejected by New Jersey and Pennsylvania. Having anticipated such a disagreement, the DRBC staff then advanced a package of four possible plans that it had hastily put together. The choices were based on the following assumptions: (1) the apportionment formula must serve all parties; (2) the 1965 drought would equal in severity the 1964 drought, except that the July 1965 conditions would approximate those of August 1964; (3) the drought would continue at least through December 1, 1965; (4) the critical point of salinity for Philadelphia was 250 ppm of chlorides at Torresdale at high water slack; and (5) the water storage in Pepacton, Neversink, Wallenpaupack, and the Rio reservoirs could be used in combination. The latter two reservoirs were privately owned and operated. Wallenpaupack was run by the Pennsylvania Power and Light Company, and Rio belonged to the Mongaup River reservoir system in Sullivan County, New York, and was operated by Orange and Rockland Utilities, Inc. Studies were being made by the DRBC staff to determine what could be done with all the water available for manipulation.

The four DRBC staff schemes proposed various ratios between the flows to be maintained at the Montague river gauge and the amounts of water New York would be permitted to export. The fourth plan involved lowering the prescribed flow at Montague to 1,025 cfs, with an average five-month flow of 1,835 cfs at Trenton. In this way, New York City would be permitted an export of 335 mgd.[38] New York turned down the first three schemes, but D'Angelo indicated that the city would study the fourth, which came closest to its requested 400 mgd diversion.

No formal action was taken at the July 1 meeting. Failure to arrive at an agreed formula threatened prospects of achieving accord through the administrative process provided in the interstate federal compact. Prospects of agreement were hampered by the impromptu nature of the conference and the uncertainty of the tentative plans presented. Moreover, each participant perceived the crisis in a different light. However, the meeting did ease tensions and soothe hurt pride. Udall said after the conference: "There is not enough water to go around. All are going to have to tighten their belts. I think that going to court is a last resort solution." Attempting to mollify hard feelings, Governor Hughes apologized for his accusations against New York. "When I was on the bench," the former judge said, "I never hesi-

[37] *Philadelphia Evening Bulletin*, July 1, 1965.

[38] Interview with W. Brinton Whitall, Secretary, DRBC, December 23, 1965. See also the *Wall Street Journal*, July 12, 1965.

tated to reverse myself. I am sorry about this, and I withdraw the statements." D'Angelo then joined Hughes and others in calling for a spirit of reasonableness. Everyone at the conference had been put on notice to come up with a workable solution within one week or else go back to the Supreme Court.

FEDERAL COMPUTER STUDIES

The DRBC staff announced at the end of the meeting that it had requested the Corps of Engineers to conduct a round-the-clock simulation study of the Delaware to determine the location, extent, and movement of the salt front. The study was conducted at the Army's Waterways Experiment Station in Vicksburg, Mississippi, on a huge hydraulic model that simulated river currents and tides. A full year of tidal ebbs and flows in the Delaware could be simulated in 90 hours. The DRBC also requested the U.S. Public Health Service (USPHS) to run digital computer studies. Both agency studies were then compared with a third statistical experience model. The basic question asked of the two federal agencies was: "What sustained flow would be required at Trenton to prevent the 250 part line of chlorides from reaching the Torresdale intake by December 1, 1965?"[39] On initial run the two agency computer studies gave different answers. (The Corps of Engineers study predicted the location of the 250 part line of chlorides at high water slack, while the USPHS study predicted the location of the mean salinity concentration under stabilized hydrological conditions.) The DRBC staff began to compare the real movement of the salt front with the predictions of the two computer studies. Although the fresh water flow from upstream to the estuary below Trenton was greater than assumed by either of the federal agency studies, by July 4 the saline front had already moved to river mile 88, six miles above Chester and about twenty-two miles below Torresdale.

[39] DRBC Staff Report, *Location of 250 ppm Chlorides*, August 17, 1965, pp. 3–4.

A PUBLIC HEARING CONFIRMS THE CRISIS

Some 31 witnesses, representing public and private groups, testified at the public hearing on July 7.[40] They recited in great and vivid detail the extent of crisis conditions, and most called for an emergency declaration by the DRBC. The first witness was the DRBC's Executive Director, James Wright, who briefly outlined the impact of the drought in the Delaware Basin. Using the results of the Vicksburg and USPHS simulation studies, he stated:

> We estimate that if the present condition of the river continues unchanged, the chloride front at the present rate of advance will reach the Torresdale intake of the city of Philadelphia by October 1, plus or minus 15 days. This would render approximately one-half of the City supply unsuitable.

He further indicated that if the 250 ppm front reached Torresdale, there would be a chloride concentration on the order of 1,200 ppm off Camden which could pollute its wells. Wright testified that it was "physically impossible" for New York to maintain its Supreme Court decree obligation to release 1,525 cfs downstream, but he said that if the city continued to divert water, downstream users would be severely affected.

Following Wright was Delaware River Master Joseph B. Wells, who said: "Studies clearly show that if the drought persisted at the 1964 level or became even worse, the [Upstate New York] water supply reservoirs in the Delaware Basin would all empty in late summer if releases were designed to satisfy the Montague formula and New York City diverted at a rate of 490 mgd." After his testimony William Miller, the DRBC's General Counsel, asked:

> MR. MILLER: In connection with the Supreme Court decree, Mr. Wells, is it your understanding that the decree does or does not provide any guidance for action on your part in the event there

[40] The following account is taken from the transcript of DRBC Public Hearing, July 7, 1965.

is not enough water to satisfy both the diversion and release requirements?

MR. WELLS: No, I do not think there is any provision for that operation in such emergencies.

MR. MILLER: And I am sure you are familiar with the report of the Special Master which the Supreme Court approved and adopted?

MR. WELLS: Yes.

MR. MILLER: Does the Special Master's report provide any guidance to you as to what to do in a case of this situation?

MR. WELLS: No Sir. We have been through that special report; we have been through the testimony leading up to it, and we can find nothing that gives us emergency powers during such conditions we now have.

Armand D'Angelo testified next, staunchly denying that New York City was in violation of the 1954 Court decree: "New York City has never diverted more than its legal allocation of these waters. The city is entitled to an average of 490 million gallons daily, and during the past four-year drought has taken far less than this figure." An experienced political infighter, D'Angelo argued that the city did not take water directly from the Delaware, but rather from its own reservoirs that stored Delaware River flood waters. "The city's operation of its reservoirs today has in no way whatsoever diminished or otherwise adversely affected the natural flows of the Delaware River." He also demanded that the DRBC require all downstream cities to institute a water conservation program. Philadelphia had not found it necessary to impose any water use restrictions. In the question period that followed his testimony, D'Angelo stated:

MR. D'ANGELO: Our position is, Mr. Chairman—and if you want an expansion to that, we will present a brief to you prepared by our attorneys—we are not in violation of the terms of the Supreme Court decree under the existing situation.

MR. MILLER: And is that because the decree doesn't cover the existing situation?

MR. D'ANGELO: I would rather our counsel discuss that.

MR. MILLER: Well, you have taken a position in your formal statement that you are not in violation. I take it you must have some reason for that.

MR. D'ANGELO: We have a very basic reason for it, and again I will tell you that because I am not an attorney and because I don't know what trap you are laying for me legally, I won't answer the question. (Laughter)

DRBC COMMISSIONER HAROLD WILM OF NEW YORK: In light of this most recent argument, I think all I can do is to reassert most forcefully what Commissioner D'Angelo has said, that the reason for reducing the releases, as New York City has done, was not to be in violation of the decree, but to conserve what water was left in Pepacton and Neversink reservoirs. Because if New York City had obeyed the letter of the decree, [releasing downstream] the 1525 cubic feet per second, as directed by the River Master, there would now be no water for us to discuss today.

Furthermore, you must recognize that as a part of the decree there is one little clause which does allow perhaps some interpretation: "The River Master shall conserve the waters in the river, its tributaries, and in any reservoirs maintained in the Delaware River watershed."

Philadelphia Water Commissioner Samuel Baxter urged the DRBC to require New York to maintain the Montague formula. "Our main concern in Philadelphia, of course, is not with the ability of the flow to meet our quantity demands, but with salinity intrusion at our Torresdale intake." He stated that at a cost of $175 million Philadelphia had modernized its water treatment plants and sewage disposal facilities, metered all properties, and maintained systematic underground leakage checks—all on the assumption that New York City would comply with the fixed requirement in the 1954 decree. These improvements were financed by the water and sewer rates charged to Philadelphians. The city charter adopted in 1952 required that the municipal water department be self-supporting. "Now while I recognize the large sums spent by New York in recent years on the tunnels and dams of the Delaware system," Baxter said, "I cannot help but point out that New York has not done those things, which if done, would have prevented them from being in the position in which they find themselves today."

Baxter criticized New York City's failure to tap the Hudson and its political timidity in not

adopting water metering and a realistic water rate structure. The following exchange then took place:

> MR. MILLER: I take it from your testimony that there is no shortage of quantity of water; you are concerned solely about the salt front which affects the quality; is that correct?
>
> MR. BAXTER: Yes, there is no shortage in terms of quantity . . . there is four times as much water coming over the falls at Trenton today than what we take out. And of course we put it all back in again.
>
> I would like to comment that that is a very important matter in maintaining fresh water in the Delaware River estuary.
>
> MR. MILLER: Is there any possibility of your taking it out further up the river by pipeline or otherwise?
>
> MR. BAXTER: There is no immediate possibility because the construction of such structures would take quite some time. And as I also pointed out in my testimony, based on the fact that we thought we always were going to have a minimum flow in the river as set by the court, we decided we would take it from the river here in Philadelphia, and we have invested millions of dollars in our structures here.

New Jersey Conservation Commissioner Robert Roe pointed out that the five major reservoir systems serving New Jersey's critical northeastern region could all run dry within less than five months; the state's northeast section was "absolutely and unconditionally dependent" upon New Jersey's 90 mgd Delaware diversion to back up its supply. In pleading his case, Roe argued:

> . . . when we stop to reflect a bit upon the enormity of the problem, we begin to see that if we don't have water in the greatest industrial complex in New Jersey and if the City of Philadelphia doesn't have the quality of water they need, their pharmaceuticals, their electronic industries, and what-have-you, will not be able to function. We know this is the case in the Camden area with the Campbell Soup Company, with the Radio Corporation of America, and what-have-you.

Roe also urged that the DRBC reevaluate its comprehensive plan and accelerate the proposed construction of its eight major reservoir projects. These facilities, which were to be largely federally financed, had received congressional authorization in 1962, but most were still in the early developmental stage.

Joining the chorus of those requesting the DRBC to declare a water supply emergency was John Groot, the state geologist of Delaware. Groot contended that allowing the River Master to change the terms of the decree would set an undesirable precedent. Delaware's interest in the river, he indicated, would continue to increase, particularly for industrial usage. Camden Mayor Alfred Pierce implored the DRBC to provide the facts that would enable local officials to educate the public to the seriousness of the situation. Similar testimony was presented by officials from the cities of Allentown, Easton, Bethlehem, and Reading, Pennsylvania; Dover, Delaware; and Trenton, New Jersey.

Industrial users testified next. A representative from the Scott Paper Company testified that in 1964 the salt problem had cost the company's Chester, Pennsylvania, plant about $500,000 in damage to equipment and reduced operating efficiency. A witness for the Atlas Chemical Industries, Inc., testified that salt corrosion required frequent repairs and replacements. "We have already experienced some failures in alloy metals which our consultants have identified as stress cracking. We can expect this problem to accelerate with continued elevated chloride content in the river water." Small business was represented by F. William Thatcher, Jr., president of the Sherman Carwash Equipment Company, who testified:

> There are over 400 small businessmen operating production-type carwashes in the Delaware River Basin withdrawal area who would be immediately affected by limiting the water supplies. The total volume of these businesses runs in excess of $25,000,000 annually and the loss of water supplies would obviously represent a tremendous financial burden on these operators.

The rest of the hearing was devoted to testimony presented by conservation groups and small watershed associations. All echoed the plea for an emergency declaration by the DRBC.

OPERATION WATER STRETCH

After hearing a full morning of testimony, the DRBC commissioners and staff members adjourned into a five-hour executive session. The three downstream states wanted to reduce New York's diversions to 225 mgd. Commissioner Wilm said his state could live with 350 mgd,[41] but New York City Water Commissioner D'Angelo argued for 390 mgd. The signatory parties to the DRBC compact would have to achieve unanimity to invoke emergency powers. They finally agreed on a New York exportation rate of 335 mgd.[42]

The DRBC then convened an open meeting and announced its findings. Among other things, it found that it was "hydrologically impossible" for New York to satisfy both its diversion rights and its release obligations. It also found that:

> An equitable apportionment of the waters of the basin between the City of New York and the lower basin cities and other users, giving due weight to the necessity to distribute the risks of shortage, and to the alternatives open to the parties, requires a reduction in the releases, a reduction of diversions by the City of New York, and the supplementation of the New York City storage with other storage to augment the low flow in the Delaware River.[43]

The DRBC then unanimously adopted two resolutions: the first declared a water supply emergency in the basin and invoked DRBC rationing powers under section 10.4 of its compact; the second provided for a temporary three-way modification of the 1954 Supreme Court decree. Emergency Resolution No. 2 lowered the Montague benchmark from 1,525 to 1,200 cfs; reduced New York's diversions from 490 mgd to a 30-day average of 335 mgd; and ordered a resumption of its releases from storage up to 200 mgd. This resolution was to remain in effect until August 10. In addition, the DRBC promulgated Conservation Order No. 1, which directed two privately owned utilities, the Pennsylvania Power and Light Company and Orange and Rockland Utilities, to make supplementary releases from their reservoirs in accordance with a schedule furnished by DRBC Executive Director Wright. Conservation Order No. 1 was calculated to generate sufficient flows to prevent intrusion at Torresdale and to safeguard the Camden wells. It also authorized the creation of an advisory committee to propose measures to conserve and protect the available water supplies. Conservation Order No. 1 took effect immediately and carried no termination date.

Downstream releases of 200 mgd from Lake Wallenpaupack and 66 mgd from the Rio system were arranged. Despite the threat to production, the Pennsylvania Power and Light Company complied with the DRBC's directive without too much difficulty. The Orange and Rockland Utilities firm was much more reluctant. In effect, the company acknowledged that it had a moral obligation to assist in alleviating the drought, but it did not consider itself legally bound to abide by the conservation order.[44] After a few visits and informal discussions with Commissioner Wilm, William Miller, and James Wright, the Orange and Rockland Company agreed to go along on a voluntary basis. Later Wright publicly praised both companies for their "public spirited cooperation."

The July 7 accord was the first of a series of difficult agreements negotiated by the DRBC. Each monthly revision was based on up-to-date hydrologic information and was devised to maintain a flow at Trenton sufficient to retard the upstream rush of salt water. Meanwhile, Governor Hughes, as DRBC Chairman, continued his efforts to obtain federal assistance. He presented a six-point program requesting federal help to the Cabinet-level Water Resources Council in Washington on July 16. (The outcome of this effort will be described in a later section.) Hughes made sure that his request contained something for all affected parties. He recommended a crash program of well-drilling in New Jersey's Wharton Tract to

[41] Interview with Harold Wilm, former DRBC Commissioner from New York, April 5, 1966.

[42] For an insightful story of this stage of the deliberations, see the *Wall Street Journal*, July 19, 1965. See also the *Wilmington Evening Journal*, July 9, 1965.

[43] DRBC, Minutes of meeting of July 7, 1965.

[44] Interview with William Miller, General Counsel to the DRBC, February 1, 1966.

provide an emergency supply for Camden. (Located in the sandy Pine Barrens of South Jersey, the Wharton Tract was a 100,000-acre state-owned woodland preserve regarded as likely to be an enormous source of underground water.) Hughes also requested federal funds for several other projects: construction of a large desalting plant on the coastline of either New Jersey or New York; moving the Torresdale intake on floating barges upstream to avoid the advancing salt front; monitoring wells in Delaware and South Jersey to determine the extent of saline intrusion; and hastening the reconstruction of New York City's pumping station at Chelsea, on the Hudson.

On July 22 the DRBC Advisory Committee on Water Conservation met to consider further restrictions on water use. Appointed by DRBC Executive Director Wright, the seven-man committee included Baxter of Philadelphia; Alfred Pierce, Mayor of Camden; Edward Clark, Chief Engineer of New York City's DWSGE; Raymond Snyder, Bethlehem Public Works Director; Frank Dressler, Executive Director of the Water Resources Association; and William Foster, editor of *American City* magazine. Five days later, the Advisory Committee submitted a report urging the DRBC to order universal metering.[45] According to one committee member, this recommendation was meant to prod Mayor Wagner into the politically hazardous role of proposing water metering for residents of New York City. The Advisory Committee also recommended that all water utilities establish vigorous programs to detect underground leaks. The DRBC's legal authority to order such measures was questioned, and the regional agency deferred action. At the recommendation of the committee, however, the DRBC published a brochure describing conservation measures and distributed over 100,000 copies.

On August 6 the DRBC held a second emergency session and heard more grim testimony from New York City. Edward Clark testified that the city could run completely out of water by February 15, 1966, if conditions continued. He said that at the present rate of use Neversink and Pepacton would be empty on November 25. "Should water supply conditions not improve in the next 30 days," Clark warned, "it will then be disastrous for New York City to make further releases from storage."[46] Clark seemed to be setting the stage for New York City's refusal to release more water.

In mid-August the New York *Daily News,* under the banner front page headline "Water War Looms," reported that New York City might have to break off even its curtailed commitment to the DRBC. The DRBC responded by renewing until September 10 New York's diversion rights to 335 mgd and relaxed its concomitantly lower downstream discharge obligation.[47] The DRBC amended Emergency Resolution No. 2 so that the flow at Montague could be adjusted below 1,200 cfs while the flow at Trenton would be sustained at 2,000 cfs. The amendments stipulated that the adjustments had to be approved by the DRBC Executive Director.

The DRBC also asked the Corps of Engineers to start storing water in its Prompton and Francis Walter flood control reservoirs in northeastern Pennsylvania. Because the reservoirs normally were kept dry to collect excess flood waters, the request for emergency impoundment required a decision from Washington. Under Conservation Order No. 2, the DRBC placed the Prompton and Walter projects under temporary water storage use.[48] Actually, only the Walter reservoir was used, since the gates on Prompton had not yet been installed. During 1965–1966 the Corps of Engineers held approximately 11 billion gallons behind the Walter dam and released it in accordance with a schedule provided by the DRBC.

[45] DRBC Advisory Committee on Water Conservation, *Report,* July 27, 1965, p. 3.

[46] *New York Times,* August 7, 1965.

[47] DRBC, Minutes of meeting of August 6, 1965.

[48] *Ibid.*

DELAWARE RIVER BASIN COMMISSION

CONSERVATION ORDER NO. 1

Objective: Divert 335 mgd to New York City and maintain 2000 cfs at Trenton until all reservoirs are depleted. Begin Operation July 9, 1965.

Month	Nat. flow Montague	Goal at Montague	Deficiency	Nat. flow into Res.	Total Releases	Releases			Div. NYC	Storage, end of month			Flow, Trenton	
						Wall	Rio	P & N		Wal	Rio	P & N	Nat	Mod
	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	mgd	mg	mg	mg	cfs	cfs
(1)	(2)	(3)	(4)=(3)−(2)	(5)	(6)=(4)+(5)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
July 8										33,000	7,000	67,000**		
July*	363	1154	791	3	794	394	100	300	335	26,700	5,400	55,400	1341	2000
Aug.	363	1157	794	3	797	397	100	300	335	18,100	3,300	39,800	1341	2000
Sept.	325	1386	1061	22	1083	683	100	300	335	4,700	1,100	24,900	1073	2000
Oct.	320	851	531	83	614	243	71	300	335	0	0	9,700	1316	1700
Nov.	387	538	151	99	250	35	0	215	233	0	0	0	1449	1412
								***	***					
Sum	1758	5086											6520	9112
Avg.	352	1017											1304	1822

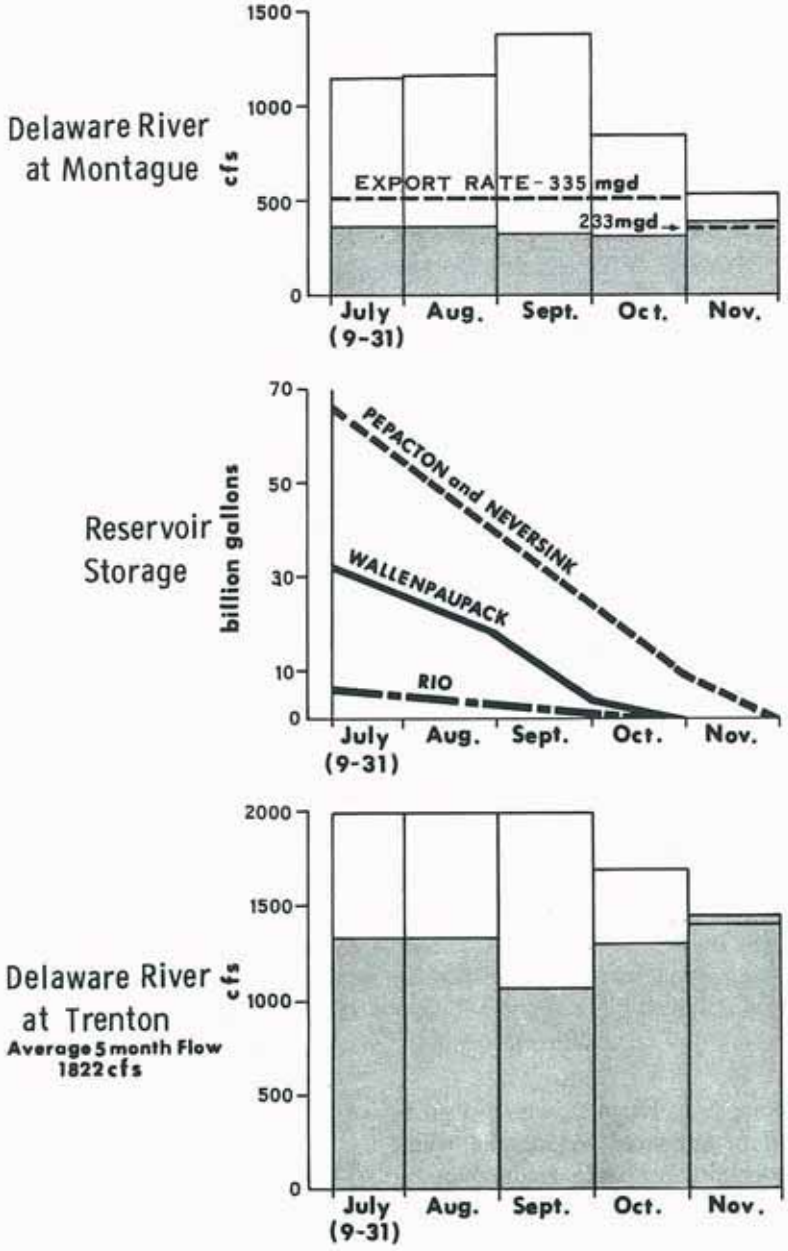
* 23 days

** Assumes 3 bg available in Cannonsville

*** 26 bg release + 46 bg diversion = 67 bg storage + 5 bg inflow

Source: Delaware River Basin Commission

CONSERVATION ORDER NO. 1



SOURCE: DELAWARE RIVER BASIN COMMISSION

State Actions

> In the Delaware Valley, where each of the participant states is highly urban with a chief executive closely attuned to urban interests, the water requirements of the metropolitan areas of the four states are not likely to be slighted.
>
> U.S. COMMISSION ON INTERGOVERNMENTAL RELATIONS (1962)

Prolongation of the drought produced some harmony among leaders of the four basin states. On July 27, 1965, the four governors, conferring during the National Governors Conference in Minneapolis, agreed (1) to press for designation of the region as a federal disaster area, and (2) to coordinate their respective water conservation measures. They also announced the formation of a Middle Atlantic Governors Conference to deal with the drought emergency and other common metropolitan problems such as air pollution and mass transportation. Pennsylvania Governor William Scranton was named temporary chairman of this group. State responses to the water crisis, however, consisted mainly of participation in DRBC efforts and the extension of limited technical assistance to their respective cities and similar local water authority political subdivisions.

NEW JERSEY

Of the governors, only Hughes, who was running for re-election, appeared to see the water crisis as an opportunity for state leadership. As noted above, he outlined a pattern of state action in his June 12, 1965, proclamation. In addition, he personally mediated the pipeline dispute between Newark and Elizabeth and pressured the various localities to complete financing the proposed $60 million distribution system from the two Hunterdon reservoirs to northeastern New Jersey.[49] Hughes' efforts, however, were largely negated by intermunicipal conflict over shared costs and difficulties in arranging a revenue bond issue.

As the 1965 summer crisis intensified, New Jersey officials turned to plans for tapping two large recreational lakes. The very idea evoked a storm of protest from those who used the lakes for recreation and from local real estate men. Although Lake Hopatcong was located wholly within the state, Conservation Commissioner Roe would have to obtain DRBC approval to divert 4.3 bg from the lake outside the basin into the Passaic Valley. (He did, later, in September.) The withdrawal plan, which would have lowered the lake about seven feet, was vehemently opposed by the Lake Hopatcong Protective Association as "absolutely illegal" and "Communist front" activity. Lake Hopatcong is normally lowered once every five years in order to repair the bank walls along its shore, and Roe's plan fortunately coincided with the five-year repair. Consequently, Roe's proposal received strong endorsement from the Lake Hopatcong Regional Planning Board and the mayors of the four municipalities encircling the lake.[50]

Commissioner Roe ordered the diversion of 679 million gallons from Lake Wawayanda into Newark's Pequannock system. No available source was left untapped. The state government also installed

[49] For a detailed account of the pipeline dispute see the *Newark Evening News*, July 13, 1965, and July 21, 1965.

[50] Interview with Robert Roe, New Jersey Commissioner of Conservation and Economic Development, April 19, 1966. See also the *Dover Daily Advance*, August 24, 1965.

a booster pump to divert some 400 million gallons of dead storage out of Newark's Echo Lake reservoir. By mid-July 1965 Mayor Addonizio of Newark publicly admitted that the city's water restraint campaign was an "utter failure." He thereupon ordered a 50 per cent cutback in deliveries to the suburbs supplied by Newark. At Roe's urging and sometimes painful prodding, Newark and Bayonne entered into agreements with neighboring Jersey City to buy water and obtain standby supplies.

New Jersey also got ready to tap six-mile long Greenwood Lake, which was half in New Jersey and half in New York. Plans for drawing down the lake by 14 feet to yield an estimated 10 bg had been formulated in November 1964. In August 1965 Commissioner Roe assured surrounding communities that the gates to Greenwood Lake would only be opened as a measure of last resort. Legally, taking water from Greenwood Lake would require New York State approval.

PENNSYLVANIA

Pennsylvania's Republican Governor Scranton was reluctant to assert preemptive state responsibility for the drought problem, preferring to work through the DRBC. However, Scranton faced potent opposition to this policy from William Schnader and the Greater Philadelphia Movement. During the critical period in August 1965, Schnader, a major figure in state Republican circles and his party's unsuccessful reform candidate for Governor in 1943, forcefully argued in a report to the GPM that Pennsylvania should vote against any further DRBC administrative revision of the Supreme Court decree, unless New York City immediately implemented three reforms: (1) universal metering; (2) tapping the Hudson; and (3) spending municipal funds to repair its leaky water distribution system.[51]

Schnader openly criticized State Forest and Waters Secretary Maurice Goddard (who usually represented Scranton at DRBC meetings) and General Counsel William Miller for their handling of the crisis. In addition to his prominent earlier role in the Delaware Supreme Court cases and his influential Republican contacts, Schnader had personal ties with Philadelphia's Democratic Mayor, James Tate. Late in November 1965 the former Pennsylvania attorney general asked Tate to write Governor Scranton urging him to stop DRBC intervention and to reopen the Supreme Court case. Tate's Water Commissioner, Samuel Baxter, refused to agree to the draft of the letter, and it was never sent.[52]

These stirrings led Scranton to move cautiously. Though he had complete confidence in Goddard, the Governor instructed him to clear all his DRBC actions with the Governor's office in Harrisburg and not to do anything that might embarrass Philadelphia. Both Goddard and Baxter were subjected to intense pressure by the Schnader-GPM critics. In the meantime, Scranton joined with Hughes and Udall in pressuring New York City for water metering and other conservation measures, and he kept alive the threat that Pennsylvania might have to resort to throwing the whole matter back to the Supreme Court, as Schnader and the GPM wished.

State action in Pennsylvania was primarily remedial. Scranton's chief concern was to limit his state's liability to measures necessary to ensure the continuance of water service in the shortage cities of Pottsville and Bethlehem. The Governor and his officials had two projects for which they were ready to ask federal assistance: (1) several billions of gallons of usable water could be pumped from abandoned strip mine areas into the headwaters of the Schuylkill River to augment Philadelphia's water supply; (2) a plant could be constructed to purify acid mine drainage water near Pottsville, using techniques developed by the Westinghouse Electric Corporation after considerable research.

NEW YORK

In New York State Governor Rockefeller and his aides were primarily concerned with water pollution legislation. Early in 1964, on the advice

[51] William A. Schnader, *Pennsylvania, New York and the Waters of the Delaware River: Preliminary Statement* (mimeograph), August 27, 1965, p. 25.

[52] Interview with Samuel Baxter, Water Commissioner of Philadelphia, April 8, 1966.

of the New York State Water Resources Commission (NYSWRC), Rockefeller had recommended an expenditure of $1.7 billion to combat and eliminate water pollution throughout the state. The proposal received bipartisan approval. A referendum on a $1 billion bond issue for the construction of sewage treatment plants was scheduled for a public vote in November 1965. Rockefeller used the summer water shortage to dramatize the magnitude of the pollution problem and to appeal for public support of his bond issue.

Rockefeller sought to demonstrate that New York could use Hudson River water once it had been properly treated. Appearing on television at the height of the crisis, he said:

> The interesting thing is that New York State is not short of water. We have plenty of water in the state, but the trouble is so much of it is polluted that we can't use it. . . . Our hope is that we can clean up all of New York State's waters in six years. And whether it's New York City's water supply or other supplies, they won't have to draw just from reservoirs. They will be able to draw from the existing rivers and lakes which now are unusable in so many parts of the state.[53]

Rockefeller emphasized that such an ambitious undertaking could not be financed entirely by the state government. He urged that the federal government provide 30 per cent of the $1.7 billion cost.

Rockefeller wanted to keep pollution control, like Hudson River development, strictly under state regulation, limiting federal participation to enforcement measures and financial assistance. However, the Hudson was bordered by New York and New Jersey. Some 15 federal agencies, including the Corps of Engineers and the Federal Power Commission, had already claimed jurisdiction over important water resource projects in the Hudson area. Rockefeller's perspective on the Hudson differed significantly from that of other principal participants, who envisaged some sort of cooperative federalism. Several political, business, and civic leaders on both sides of the Hudson advocated some new kind of region-wide mechanism, similar to the DRBC, to give each participating governmental unit an appropriate voice.

In their dealings with New York City officials and agencies concerning the water shortage during 1965, Rockefeller and State Water Commissioner Wilm often found themselves in the role of protectors rather than deciders. This was particularly true in the dispute over releases and diversions and the negotiations for the water bank. Albany officials saw no practical alternative but to defend New York City's position in the competition for Delaware water, and the channels of communication between state and city officials were open and continuous. At DRBC meetings Commissioner Wilm sometimes found it necessary to request "time out" for talks with his city advisers.

An effective negotiator, Wilm diplomatically sought to resolve the crisis so that New York City would be protected without tearing apart the prospects of interstate cooperation in the DRBC. At times, he recalled later, this meant reading the riot act to New York City officials who frequently placed their need above regional considerations and thereby sought to weaken DRBC authority. From Wilm's standpoint, there was never any question about his backing up New York City. State officials could not concede that the city was violating the 1954 Supreme Court decree. But for Wilm the paramount issue was to make the Delaware compact work. Otherwise, all the painstaking effort that had gone into evolving the compact would have been wasted.

[53] From the transcript of "CBS News Special," WCBS-TV and WCAU-TV, telecast, August 25, 1965, "The Water Crisis," hosted by Jim Jenson and John Facenda. For a journalistic account of the political interaction among the region's major political figures, see the *Philadelphia Evening Bulletin*, August 26, 1965.

New York City's Concerns

> I must say in all candor that I know of no practical measure which we could have taken nor which could now be taken looking to the future, immediate, the middle-range, or the long-range, which we are not already taking, or pursuing, or studying or proposing. No city in the United States, or in the world, has water reservoirs of comparable capacity. How could we have known that the drought would make a mockery of our reservoir capacity and reduce us to our present situation?
>
> MAYOR ROBERT WAGNER

Twelve million of the twenty-two million people affected by the Delaware Valley water situation depended on the New York City water system and lived in the Hudson River Valley. But the city controlled the only reservoirs at the head of the Delaware, so, in fact, the fate of all in the Delaware Basin hinged on what happened in Mayor Wagner's Manhattan City Hall.

In May 1964 Mayor Wagner had announced that the water shortage was over. Other official optimistic statements since then had given residents of New York City little reason to worry about water shortages. As a result, most New Yorkers did not take the warnings of water shortage seriously when they were sounded again in the spring of 1965.

Solutions to the drought conditions were beyond the fiscal and jurisdictional capabilities of cities, even big ones like New York. Mayor Wagner described his city's situation in this way at the height of the 1965 summer crisis:

> There are only two ways to ease a water shortage—one is to increase the supply and the other is to reduce consumption. New York City is limited in what it can do to increase supply. We do not have primary jurisdiction over the upstate rivers from which we draw our water, or even over the Hudson River which flows at our feet. The federal and state governments have the primary jurisdiction.[54]

Given these constraints, New York officials initially concentrated their efforts on reducing consumption. New York's response to the regional water problem during 1961–1967 evolved through three distinct phases. At first, the city assumed a passive role during the summer of 1963, imposing only minimal and temporary water-use restraints. Next, the Wagner administration launched a stepped-up public restraint campaign during the early spring of 1965 and created a special Water Conservation Bureau. Finally, during mid-summer 1965 City Hall instituted extraordinary measures to conserve and increase supplies. The withholding of downstream Delaware releases was one of these emergency actions.

The initial public restraint campaign undertaken during the early spring of 1965 resulted in an estimated 150 mgd water saving. Later in the summer, when more severe restraints were placed upon central air conditioning, the amount saved increased to 200 mgd. Overall, the city slashed its water consumption by 20 per cent, saving a full day's consumption of 1.2 bg every five days.[55] Throughout the summer of 1965 New York City officials responded to criticisms of waste and prodigality from other states by repeatedly claiming that the city was doing everything possible to reduce consumption, while other cities in the Dela-

[54] *New York Times*, July 23, 1965.
[55] DRBC, *Annual Report* for 1966, p. 19.

Mayor Robert Wagner (left) and Water Commissioner Armand D'Angelo make an aerial inspection of New York City's reservoirs on July 13, 1965.

Goodyear Rubber Company

ware Valley, like Philadelphia, had not imposed conservation measures.[56].

As reservoirs continued to empty during the spring of 1965, it became increasingly clear to City Hall that New Yorkers would have to do more than practice conservation. Wagner and his aides then prepared a comprehensive contingency plan for increasing supplies. The plan included suspending releases from the city's Delaware reservoirs and everything else "from tapping the Niagara to sawing off part of a glacier and floating it into New York Harbor."[57]

A city proposal to tap the Great Lakes was immediately ruled out by State Water Commissioner Wilm because these waters were under U.S.-Canadian treaty arrangements. Another idea of damming Long Island Sound and turning it into a fresh water lake fell quickly on cost, timeliness, and jurisdictional grounds.

Mayor Wagner called upon the federal government to develop new approaches to urban water problems. He believed that development of desalination technology was a federal problem. Wagner also advocated the development of a national pipeline system so that water, like oil, natural gas, and electric power, could be allocated and transported on the basis of national availability and need, an extension of a concept advanced by Luther Gulick, former city administrator of New York and chairman of the board of the Institute of Public Administration.

DRAWING ON POLLUTED HUDSON WATER

The most immediate and practical way for New York City to increase its supply was to tap the polluted Hudson. Adequate precedent and more than ample engineering data supported such a solution. But this alternative of processing polluted water had for years appeared psychologically unpalatable to many New Yorkers, including City Hall officials. As late as May 10, 1965, D'Angelo said: "Until the Hudson River is rendered free of pollution, it is impossible for us to consider it as a source of water supply."[58]

During a 1949–1950 water shortage, the NYCBWS had developed plans for an emergency pumping plant on the Hudson at Chelsea, some 65 miles north of the city. There the Delaware Aqueduct crosses under the Hudson, and the tidal salt water portion of the river tapers off. New York State officials had given the city permission to build on the condition that the plant would be dismantled when the emergency terminated. The plant was completed in 1951, after the drought had ended, and it was never used. The small cities and suburban towns along the Hudson were united in their opposition to a permanent New York pumping station. Leaders in Dutchess and Putnam Counties feared that the city might preempt the Hudson. Hence, in accordance with the original state-imposed condition, the Chelsea plant was torn down in 1956 and the entire property sold for about $3 million.

After the 1949–1950 drought, New York City Mayor Vincent Impellitteri had appointed a panel of nationally known water experts. In 1951 the panel urged development of the upper Hudson as a source of supply superior to the proposed $140 million Cannonsville reservoir. It stressed that modern filtration processes could make Hudson water superior in quality to that obtained from the Delaware and at a much lower cost. Nevertheless, the "dam- and tunnel-oriented" NYCBWS proceeded with its previous policy of developing "upland" sources and began building at Cannonsville. Its engineers were convinced that the true costs of developing a Hudson supply would turn out to be higher than the national experts had estimated.

By the time the water shortage became severe in June 1965, D'Angelo and his permanent of-

[56] In explaining the political interaction that took place on this issue, Maurice Goddard said: "The real reason that Philadelphia did not restrict water use is . . . that the danger of Philadelphia's water supply was not one of quantity but rather of quality. For political reasons, the New York City officials felt that their own water restrictions would be more palatable to their citizens if Philadelphia would also impose restrictions. According to Commissioner Baxter, however, there was no real reason for Philadelphia to impose restrictions since the problem was one of quality and sufficient water was available for Philadelphia's needs." Letter from Maurice Goddard to author, August 29, 1968.

[57] *New York Times,* August 14, 1965.

[58] *New York Times,* May 13, 1965.

ficials began to reconsider their department's long-standing opposition to tapping the Hudson. On June 21 he told newsmen that he would explore the matter further. It was a mayoralty election year, and two days later the Republican-Liberal mayoral candidate, John Lindsay, attacked the Wagner administration for its failure in water planning and advocated tapping the Hudson. At the same time, the nonpartisan Citizens Budget Commission (CBC) issued a report entitled *Action on Water* advocating the use of Hudson water. Its report seconded Lindsay's recommendation that the NYCBWS and the DWSGE be consolidated into a single municipal water management agency. It also advocated the creation of a Hudson River Basin Commission like the DRBC.

Echoing similar views about unified management, regional development, and tapping of the Hudson was New York's junior senator, Robert Kennedy, who had taken office in January 1965 and who was becoming increasingly active in city politics. Kennedy, like Wagner a Democrat, understood the political realities of an off-year local election. Nevertheless, he made sharp criticisms of the city's defensive and negative positions with regard to the use of the Hudson, the initiation of water metering, and the invigoration of leak detection. Kennedy showed that he had reservations about D'Angelo's ability to resolve the water crisis.

On July 8, three weeks after the city's unilateral decision to halt downstream releases from its Delaware reservoirs, Mayor Wagner, prodded by attacks from other states and from inside New York, finally reversed his water department and ordered the rebuilding of the Chelsea intake. On July 14 the city requested permission from the State Water Resources Commission to take 100 mgd from the Hudson. But New York now found itself obliged to press for a new state permit from the NYSWRC and to reacquire the site at a much higher cost.

Once again, cries of alarm were heard from the upstate area. The opposition was led by Dutchess County leaders who contended that New York's withdrawals would cause estuary sea tides to push salt water upriver to Poughkeepsie. On July 24 the New York City Council approved a $7 million appropriation for rebuilding the pumping plant.

The NYSWRC held its hearing on the Chelsea proposal on August 6 in Poughkeepsie. Spokesmen for business and civic interests in Dutchess and Putnam counties underscored their own need for a plentiful Hudson supply if projections for the industrial growth of the mid-Hudson area were to be realized. Westchester County officials, mindful of their stake in New York City's supply, supported the application for the pumping station.

(The NYSWRC would approve the city's plans for tapping the Hudson on September 1, endorsing the Chelsea proposal as "imperative."[59] It would also urge the city to institute universal metering and attach several conditions to its approval. The city would be required to provide a quality control program and to stop or limit withdrawals that endangered the water supply of upstate communities already taking or proposing to draw Hudson water.)

WATER SAVING AND RAINMAKING

The new plant would not come into operation until March 1966. Meanwhile, by July 1965 the city's water situation was alarming the officials as well as the mayoral candidates and the newspapers. Mayor Wagner initiated a city campaign urging each New Yorker to save 25 gallons of water a day by bathing, washing dishes, shaving, brushing teeth, and flushing toilets only when necessary. Two blimps cruised over the city flashing conservation messages: "Take Brief Showers Instead of Baths" and "Stop Running Hot Water on Dishes."

One month later, with the city's water reserves falling below 180 billion gallons, Wagner began an all-out water restraint drive. D'Angelo placed tight restrictions on central air conditioning in office buildings, factories, restaurants, nightclubs, supermarkets, department stores, and more than 200 luxury apartment houses.[60] He banned the use of city water to wash taxicabs, buses, and trucks. At the same time, the Mayor hurriedly sent a team of engineers and meteorologists to southern California to observe artificial rainmaking techni-

[59] *New York Times*, September 9, 1965.
[60] *New York Times*, August 12, 1965.

ques. "Our need for water is so great," Wagner said, "that I favor looking into suggestions from any responsible source, no matter how unorthodox these suggestions may be."[61]

Congressman William Fitts Ryan, a reform Democrat seeking the mayoral nomination, now began a campaign critical of Wagner's administration of the water system. To the accompaniment of much publicity, he discovered a series of leaks, especially in parts of the city system that were over 100 years old. At a time when New York was being criticized by Pennsylvania and New Jersey for stealing Delaware water because it was a prodigal, unmetered water spendthrift, the Ryan "exposures" were doubly embarrassing. On August 21 Ryan uncovered a gaping leak in the Central Park reservoir, and posed for photographers in front of a faulty sluice gate while asserting that the leak was costing the city a daily loss of 750,000 gallons. He demanded D'Angelo's resignation.

An angry Mayor Wagner called a special water staff meeting. Later he announced that he was "beefing up" the city's leak detection force with an extra 150 people from the Department of Public Works and the Transit Authority. Meanwhile, Ryan told the press of another large leak in the Nostrand Avenue subway station in Brooklyn. Then, in the early morning of August 22, a forty-eight-inch, cast iron water main burst in Brooklyn at Willoughby Street between Bridge and Lawrence Streets. A torrent of water flooded cellar basements, disrupted subway and telephone service, caused a massive roadway cave-in, and blocked traffic.[62]

These incidents led critics to spotlight the Wagner administration's failure to undertake a water-main modernization program. Of the city's 5,800-mile network of water mains, better than 100 miles of pipe were over 50 years old. City officials argued that the age of the mains was not a major factor in their breaking and that replacement would cost more than $100 million.

Irritated by the unfavorable publicity, D'Angelo suspended two of his top-ranking officials, John Crowley, Manhattan Borough engineer, and William Melnichuk, Manhattan distribution engineer, for allegedly concealing a Central Park leak. He also threatened to dismiss the chief of the department's water waste division, who told newsmen that the leak was insignificant, and to purge anyone who attempted to cover up any further leaks. Finally, D'Angelo forbade departmental employees to talk with reporters. Several days later the *New York Times* editorialized that Ryan's ". . . repeated discovery of leaks that had eluded the leak detection 'experts' of the city has given point to his demand for the firing of the political hacks he says have been running the water department and their replacement by an expert of national standing."[63]

A long-standing rift between career engineers and political executives within the DWSGE was exposed by the summer water crisis. One disgruntled engineer told a reporter: "I pray for rain not just to get water, but also to get these politicians off my back. None of this political grandstanding will add a drop of water."[64] The engineers resented charges in the headlines that blamed them for policies that had for years been decided by City Hall, often, they alleged, against their professional advice and judgment.[65] They openly criticized the commissioner, citing a staff report submitted to D'Angelo in early 1964 urging him to alert the public to the impending drought danger, step up efforts to curb leaks, and plan emergency measures. This report allegedly had been suppressed by the commissioner's office. Department engineers also contended that for years the Wagner administration had skimped on repairs in the city's water system. Budget requests for such purposes were ignored or assigned lowest priority.

WAGNER AND WATER METERING

As concern over the drought mounted, the pressure on New York City to adopt universal meter-

[61] *New York Times*, August 8, 1965.
[62] *New York Times*, August 24, 1965.
[63] *New York Times*, September 9, 1965.
[64] *Ibid.*
[65] From Charles G. Bennett, "New York: Engineers vs. Politicians," *Saturday Review*, October 23, 1965, p. 43.

ing to measure and control water use increased. In 1965 only industrial and commercial enterprises were required to be metered, and they accounted for only one-quarter of all water consumption. The DRBC Advisory Committee recommended that the DRBC require universal metering. More adamant pressure came from the Greater Philadelphia Movement, which urged the DRBC to require that New York City meter all users as a condition for reducing its downstream release obligations.[66] Similar pressure for city metering came from communities along the Hudson, the NYSWRC in Albany, and federal officials. For over 70 years, survey after survey had urged the city to require installation of water meters and water charges. According to one local journalist, "Water metering has been considered such political dynamite here that none of the reports made over the years ever has reached the public hearing stage."[67]

The 1965 metering debate for the first time questioned the city's method of financing water service. Maintenance and operating costs were met by revenues from direct water charges. The charges to commercial users were based on an antiquated and unrealistic rate structure of a flat rate of 15 cents per 750 gallons. Homeowners were charged at frontage rates based on a complicated formula involving such factors as width and height of the building and the number of water-using appliances.

By July 22, 1965, the deteriorating storage situation prompted Wagner to ask City Administrator John Connorton and five other top city officials to review all aspects of the metering question. On television Wagner announced that the worsening crisis was forcing him to reconsider his long-term opposition to universal metering; but he stressed that he wanted to be sure such action would be practical before any decision was made. Seared by criticism, Wagner rebuked the mayoral candidates for attempting to make political mileage out of the drought predicament. Wagner repeatedly claimed that the city was doing everything possible to conserve and increase its supply. He criticized Philadelphia for not restricting its own water use.

Wagner sent a team of investigators into several large cities to examine their experience with water metering. This survey indicated that reductions of at least 15 per cent could be expected in single and two-family dwellings when meter readings were used to compute the water bill. Water usage in Philadelphia had dropped from 400 to 325 mgd after the installation of universal metering in 1955.

Connorton's committee reported that universal metering would involve meter installation in 390,000 private family dwellings and 140,000 apartment houses at a cost between $60 million and $84 million, depending on whether they were installed by city or private plumbers respectively. The program would take about five years to complete, but it would save New York City about 150 million gallons a day.

The most difficult metering problem concerned apartments. Installing separate meters in each individual apartment was impractical, but apartment house owners were adamantly opposed to a master meter because they contended that a tenant who never received a water bill would not save water. Some feared aggrieved tenants would keep faucets open just to run up their landlords' bills.

Connorton's committee unanimously recommended immediate universal metering and a simultaneous increase in water charges. It concluded that a more realistic rate structure was essential if water service were to be operated on a financially self-sustaining basis. It also pointed out that universal metering would aid in the detection of underground leakage.

The first draft of the Connorton report apparently was intentionally leaked to the press. The *New York World-Telegram and Sun* published it in detail on August 19. Major civic and business associations quickly protested. The Commerce and Industry Association objected on the grounds that mandatory metering might have an adverse effect on multiple dwellings. Its executive vice president argued that the Philadelphia experience with meters was not a valid comparison. "In Philadelphia the households are predominantly individual homes, but in New York barely 20 per cent of the households are in this category . . . landlords

[66] Greater Philadelphia Movement, *Position Paper*, p. 9.

[67] Joseph C. Ingraham, "Major Cities Use Water Metering," *New York Times*, July 23, 1965.

cannot police the use of water by tenants."[68]

To placate homeowners and landlords, city officials hastily explained that the report was not finished and might still undergo several changes. Then on August 13 President Johnson's federal crisis team arrived at City Hall, led by Secretary Udall. After a brief inspection of the city's waterworks and talks with city officials, Udall declared that New York and the nearby drought-affected areas in northern New Jersey were "walking on the thin edge of disaster." He added that New York had "one of the leakiest and most loosely managed water systems" in the country.[69] One week after Udall's visit, Senator Kennedy came out in favor of wider use of meters, but stopped short of endorsing universal metering.

In response to these federal pressures and in conjunction with an agreement worked out with Udall, Wagner on August 23 invited a panel of four national experts to make "an impartial outside review" of the city's water system.[70] The panel was headed by Abel Wolman, emeritus professor of sanitary engineering at Johns Hopkins University.

After two days of exploring the city's waterworks system, the Wolman panel submitted its initial report on September 3. Favoring a gradualist approach to metering, the panel stated:

> From a strictly waterworks management standpoint, there is no question that universal metering of all water services is desirable, but we question whether a crash program for universal metering will bring about savings in water consumption commensurate with the large expenditure required and the time necessary for carrying out such programs.[71]

The Wolman panel recommended a multistaged program of meter installation.

Confronted with conflicting advice from the panel and his own Connorton committee, Mayor Wagner released the Connorton report on September 11 and announced that he was rejecting its mandatory metering recommendation in favor of the Wolman panel's gradualistic suggestions. Wagner ordered meter installation in all city-owned buildings and asked quasi-public institutions (such as hospitals, schools, religious and charitable institutions) as well as the owners of large private housing projects to install meters voluntarily.

With the mayoral election less than two months away, Wagner stressed that he did not intend to use meters for assessing charges. The *New York Times* editorialized: "Mayor Wagner is apparently determined to make the water shortage a monument to the ineffectuality of his administration. That is the only conclusion we can draw from his rejection of the unanimous recommendation of his own panel for immediate compulsory metering."[72]

[68] *New York Times,* August 20, 1965.
[69] *Ibid.*
[70] *New York Times,* August 24, 1965.
[71] *New York Times,* September 3, 1965.
[72] *New York Times,* September 13, 1965.

Federal Action

> The drought experienced now in our most populous region reminds us anew that we cannot and must not rely alone on building bigger reservoirs, longer pipelines, or grander schemes of water works to supply this essential of life.
>
> PRESIDENT LYNDON JOHNSON

The 1965 summer water emergency in the Northeast brought the tide of requests for federal intervention and assistance on what had always been regarded as state and local territory higher upstream than it had ever been before—at least in the eastern part of the country. But the Johnson administration saw the requests from the Delaware Valley states and cities in terms of the President's desire to establish for the first time an overall national water resource policy. When the crisis erupted in mid-summer 1965, Congress had just passed landmark water legislation, and the White House used the drought to dramatize the importance of implementing these new laws. Hence, federal action was a response not only to exhortations from the four states, but also to what was happening in Washington.

THE QUEST FOR FEDERAL AID

As noted above, Governor Hughes, uncertain of both his state's and the DRBC's fiscal capacity to meet the emergency, was the leading exponent of federal assistance after New York City halted its releases in the summer of 1965. Hughes had been a strong supporter of Johnson in the presidential election, and there was a positive political relationship between the two men. The President was also conscious of the presidential vote turned out by the party machinery of Mayor Tate of Philadelphia—and of the political importance of New York City to any President.

Delaware's Democratic Governor Terry was more than willing to go along with Hughes' bid for federal aid. For political reasons Hughes wanted the Republican governors of New York and Pennsylvania to join in a request for federal assistance. Otherwise, Rockefeller and Scranton could conceivably have argued that federal help was unnecessary because their state water and fiscal systems were properly run. And for Hughes this was an election year.

Hughes' intensive drive for federal involvement struck some responsive chords. On July 10, three days after the DRBC had declared an emergency and one day after Mayor Wagner had announced that New York City would tap Hudson River water, New York Republican Senator Jacob Javits called for the appointment of a presidential commission to: (1) develop programs to conserve fresh water supplies; (2) survey all potential water sources; and (3) expand disaster relief programs.[73] Javits urged that the four governors appoint task forces to work with the presidential commission.

On July 22 President Johnson signed the Water Resources Planning Act of 1965. The Act, intended to eliminate internecine rivalries within the federal bureaucracy, empowered the Water Resources Council (WRC) to coordinate federal water programs. The WRC could set guidelines for federal multipurpose water resource projects, assess the adequacy of water supplies in the various regions of the country, and review river basin commissions' water plans.

On July 14 President Johnson had discussed

[73] *New York Times,* July 11, 1965.

the water problem with Buford Ellington, Office of Emergency Planning (OEP) Director and former governor of Tennessee, who was assigned the task of coordinating federal and state drought relief activities. At a news conference later that day, the President had expressed concern over the continuing drought. He asked the WRC to submit a report within one week recommending federal measures to assist the states and local governments in meeting the "urgent water problem" in the Middle Atlantic and New England area.[74] At that time the WRC was composed of the Secretaries of Interior, Agriculture, Army, and HEW, and the Chairman of the Federal Power Commission. WRC Chairman Udall had been waiting for DRBC action and avoiding federal involvement. Henry Caulfield, WRC Executive Director, first learned of the President's directive from the Interior's news ticker.[75] The WRC undertook the presidential assignment as an initial "shakedown cruise."

At two WRC meetings on July 16, Governor Hughes, speaking also as DRBC Chairman, described the severity of the drought and the need for immediate federal aid. The Council report, entitled *Drought in the Northeastern United States*, was submitted by the President's July 21 deadline. Written by WRC staff, the report emphasized that water was historically a matter of state and local concern. No mention was made of federal financial help, and the federal role recommended was technical and advisory. The report noted that the cities most adversely affected were operating with "inadequate and hazardous reserves." "There is virtually no excess or reserve supply, the average use being about equal to safe yield."

The WRC recommended temporary storage of water in the Army Corps of Engineers' flood-control reservoirs in northeastern Pennsylvania (as requested by the DRBC) and the accelerated planning and construction of recently authorized federal Delaware water resource projects. In addition, the report listed numerous measures that could be taken by federal agencies to assist the states and local units—assistance in locating sources of pollution, designing emergency intake plants, and surveying groundwater supplies.

At the July 22 ceremony of signing the Water Resources Planning Act, the President directed that the action recommended in the WRC report be carried out promptly. He said: "The long term solution is drought proofing major metropolitan areas and their farm regions by advances in desalting sea water. This has become a must and we are giving it high priority in the executive department and Congress."[76] The President also instructed Udall to consider with state and local officials in New York and New Jersey the feasibility of building a large desalting plant.

Federal officials flew to New York to discuss prospects for desalting ocean water. On August 5 Governor Hughes met to consider desalting techniques with Udall; Glenn Seaborg, Chairman of the Atomic Energy Commission; Joseph Swidler, Chairman of the Federal Power Commission; and New Jersey Senators Clifford Case and Harrison Williams.[77] After these deliberations, Udall sent a team to determine the feasibility of building a large desalination plant in the New York metropolitan region.

Udall presented a separate "situation report" in the form of a memorandum to President Johnson on August 7, urging that coordinated intergovernmental planning be initiated at once if crippling shortages were to be avoided. However, he warned: "In our judgment present circumstances do not warrant issuance of a national disaster proclamation."[78] Udall wanted to be certain that the states and local units were doing everything possible to cope with the water problem before asking for new federal money. His caution was prompted by OEP reluctance to recognize the drought as an emergency or to part with any of its $25 million in disaster reserves. The WRC would have to present a strong case for federal financial assistance if the President were to succeed in getting OEP disaster funds.[79]

[74] *New York Times*, July 15, 1965.

[75] Interview with Henry P. Caulfield, Jr., Executive Director, WRC, January 19, 1966.

[76] *New York Times*, July 23, 1965.

[77] Memorandum from the WRC to President Lyndon B. Johnson, August 7, 1965. The text of this memorandum is fully reproduced in Appendix One.

[78] *Ibid.*

[79] Interview with Henry Caulfield.

President Lyndon Johnson talks about the drought with the four area governors and various federal officials at the White House. In the front row, from left to right, are: Atomic Energy Commission Chairman Glenn Seaborg and Governors Nelson Rockefeller of New York, Richard Hughes of New Jersey, William Scranton of Pennsylvania, and Charles Terry of Delaware.

United Press International

Udall's memorandum suggested that the President invite the four basin state governors and the mayors of Camden, Jersey City, Newark, New York, and Philadelphia to attend a meeting in Washington. Udall proposed that this group organize concerted action to meet the immediate crisis, devise contingency plans, and consider long-range attacks on the problem of water supply and conservation.[80]

THE WHITE HOUSE CONFERENCE

President Johnson invited the governors and mayors to a White House conference on August 11. The President used this occasion to sign the Saline Water Conversion Act of 1965, which provided $185 million for research on desalination. At the signing ceremony in the White House rose garden, the President stated that desalination was not "a far-out and far-distant goal." He called upon science and industry to develop plans for desalination plants capable of producing 100 mgd economically by 1970.[81] He noted that the three cities with plants then in operation could produce only 1 mgd. The President proposed that by 1968 plants with from 1 to 10 mgd capacity should be operating for smaller towns and cities. Treatment plants to purify brackish groundwater which underlies much of the United States should be developed, and resultant technological information should be shared with other nations.

That afternoon the governors met with White House aides and representatives of the involved federal agencies. They requested federal financial assistance. Governor Scranton indicated that, with federal backing, Pennsylvania was prepared to build a large neutralization plant to reclaim acidic water from the abandoned strip mines near Pottsville. Governor Rockefeller asked for $1 million in federal aid to help New York build a $4.5 million atomic-powered desalting plant at Riverhead, Long Island. Governor Hughes discussed the possibility of experimenting with a "pneumatic air barrier" in the Delaware.[82] This proposal entailed pumping a barrage of air bubbles into the river to increase its oxygen content, thereby containing the advancing salt front.

JOHNSON ORDERS FEDERAL INSPECTION-DECISION TEAMS

The White House conference brought Johnson's promise of swift federal action. He directed the Secretary of the Army and the Chief of Engineers to speed up construction of federal water resource projects in the Delaware Basin. The Bureau of the Budget was directed to request a supplemental appropriation for fiscal 1966 to initiate a $4 million comprehensive study of water and related land resources in the Northeast. Finally, Johnson directed the Secretary of the Interior and the Army Chief of Engineers to make on-site inspections in Philadelphia, Camden, Newark, and New York.[83]

These federal teams, headed by Udall and General William Cassidy, the three-star chief of the Army Corps of Engineers, included water engineers, scientists, and staff technicians. The President directed the teams to make "hard and fast decisions immediately" and to render "on the spot assistance to each affected community."[84] He assured the conferees that he would take additional measures if the WRC so recommended. However, he reminded the assembled leaders that water supply was a local responsibility: "Only you are going to be able to conserve the water that you now have. There is not much I can do about the third of Bob Wagner's water that we don't know where it is going."[85]

The federal crisis teams made a brief inspection of Philadelphia and Camden on August 12. Udall's chief water expert was Rolf Eliassen, professor of sanitary engineering at Stanford University. Eliassen carried a check-off list of about 30 items and, according to Baxter, he knew the "right questions" to ask.[86] After a brief inspection of both cities, the

[80] WRC memorandum, August 7, 1965. See Appendix One.

[81] *New York Times*, August 12, 1965.

[82] *Ibid.*

[83] U.S. Senate, Committee on Interior and Insular Affairs, *Hearings, Northeast Water Crisis*, 89th Cong., 1st Sess., September 8, 1965, p. 26. (Hereafter cited as *SIC Northeast Hearings, 1965.*)

[84] *New York Times*, August 12, 1965.

[85] *Ibid.*

[86] Interview with Samuel Baxter, April 8, 1966.

team discovered that the 250 ppm of chlorides peaked at high tide and that the salt content was about 50 per cent less at low tide. This finding was the basis for the proposed new two-stage solution to the salt problem. The team proposed expediting the construction of a new intake system at Torresdale to divert water from different levels in the river depending upon the tide. Then if the salt front swamped the existing Philadelphia intake, it could be temporarily moved four miles upriver on a system of floating dredges. The plan was to keep it there until the spring thaw in March 1966.[87] That evening in Philadelphia the federal officials evolved the water bank strategy to minimize flows downstream and to maximize storage upstream.[88]

Udall publicly praised Philadelphia for its sound and efficiently managed waterworks system. He singled out its unified operation of water and sewers, its leak detection and metering programs, and its rate structure and self-financing features. In his report to the President, Udall noted: "It is clear that if all American municipalities were organized as Philadelphia is organized, with water and sewage under one management and with authority to provide all necessary service and to set rates, the problem of municipal pollution of rivers would be quickly and effectively controlled."[89] Udall also reported "that Camden does not have a serious water shortage problem. Camden is already drilling a series of inland wells which can readily replenish their supply."

The metropolitan region of northern New Jersey, on the other hand, Udall reported, "faces the greatest threat" of any of the drought-stricken eastern areas. Udall's assessment was underscored by the fact that only 90 days of water supply remained in Newark's reservoirs. "Fortunately," the Interior Secretary said, "there are two large natural lakes [Greenwood and Hopatcong] which can be tapped to provide sufficient water to get northern New Jersey through to the spring run-off in March, assuming that the people of the area continue their aggressive program of water conservation."[90] The federal team then sought to persuade New York State officials to go along with the withdrawals from the bistate Greenwood Lake if they were needed. New York agreed.

THE FEDERAL TEAM'S EFFORTS IN NEW YORK CITY

An advance federal team spent two days inspecting New York City's water system. Upon his arrival on August 13, Udall sought to persuade Mayor Wagner and his water officials to implement leak hunting, Hudson pumping, conservation discipline, metering, and other planned water reforms. At the same time, he wanted to gain New Yorkers' acceptance of the water bank idea that would put the water remaining in their Delaware reservoirs in a strategic reserve at the disposal of all four states through the DRBC.

In Udall's presence Wagner opened a public hearing in the church-like Board of Estimate Chamber by reading a position paper on water conservation. Anticipating pressure for universal metering, Wagner indicated that he had always opposed this reform, but he did not rule out the possibility of its adoption. The Mayor also informed Udall that the city simply could not continue its 200 mgd Delaware releases. Deploring newspaper accounts of a water war, Wagner called for intergovernmental cooperation and negotiation. He continued:

> It is clear that we must all work together and stand together. We share the same water resources. We share the same danger. Let us share equally in the resolution of it. . . .
>
> We want to cooperate. We want to help Philadelphia. . . . We would like to see Philadelphia's intake moved upstream. If we could help in this, we would. We sympathize with the problems of Philadelphia and Camden. We want to cooperate with them in every way. We cannot, however, agree to the continued sacrifice of 200 million gallons per day at the expense of 12 million human beings here in New York City and in the area served by

[87] Interview with Henry Caulfield.

[88] *Ibid.* According to Harold Wilm, a similar proposal was at the same time being developed by New York City and state officials.

[89] *New York Times,* August 18, 1965.

[90] *Ibid.*

> our water supply. Let us talk, let us deliberate, let us work together. But do not ask us to do the unaskable.[91]

Udall's response was to subject D'Angelo to a vigorous cross-examination, seeking to establish that the city was not doing enough about the short-term danger and that its reservoirs would be dry by mid-February 1966. Replying that the city should not "push the panic button," D'Angelo flatly refused to discuss what possible new water-saving measures the city planned. Udall described the next six months as most critical and said that the federal government wanted to help "work out some interim solution that will get us by until next spring." Under further questioning, this sharp exchange occurred:

> UDALL: It would be a chaotic thing, a disaster of national significance, if this city ever found itself out of water, even for one morning. It cannot be allowed to happen. . . .
>
> D'ANGELO: We are acting, sir, under your instructions.
>
> UDALL: New York has a reputation, whether it is deserved or not, of having one of the leakiest and most loosely managed water systems.
>
> D'ANGELO: We have some 6,000 miles of underground water mains and leakage of 2 to 3 per cent or 25 to 30 million gallons a day. We have 50 well trained men with modern devices to detect leakage and 24-hour work crews. Some cities lose as much as 10 per cent of their water in leaks. In comparison, we have a very tight system.

At this point Senator Kennedy interrupted, appealing to D'Angelo to "smile on occasion." D'Angelo replied that the remarks made by Udall the previous day in Philadelphia made him wonder "if New York City had been indicted before it was heard." He then obligingly smiled. Senator Kennedy then tried to elicit D'Angelo's commitment not to cut off New York's Delaware releases unilaterally again: "I understand New York City has some very serious legal problems in that regard." D'Angelo answered: "I am sure they are very serious, but a legal problem is not to be compared to people's lives." Said Kennedy: "I am all for keeping people alive."

Udall's report to the President was sharply critical of D'Angelo. New York "has obviously been laggard in taking stringent conservation measures," he said, continuing:

> After a close comparison of the varying city systems studied, it was the considered opinion of the federal team that New York City's unmetered system results in great waste. However, the Philadelphia experience demonstrates that even if action were commenced today to modernize the New York City system, it would take several years to implement all the constructive action measures that are needed. Some belated action is now underway, and at the New York hearing we were assured that additional water conservation measures will be commenced.[92]

White House Press Secretary William Moyers released Udall's report on August 17 and announced that President Johnson had instructed Udall to summon the regional governors and mayors back to the White House the next day.

WASHINGTON NEGOTIATIONS AND THE "WATER BANK SOLUTION"

The DRBC principals returned to Washington on Wednesday morning, August 18. Meeting in the Interior Building, the commissioners were informed that New York City had barely enough water to survive for the next 170 days. There were only 186 billion gallons of usable storage left in its entire system on August 17, 1965. The five DRBC principals then negotiated and adopted a "water bank" plan proposed by Stewart Udall. Under this water-sharing plan, which the DRBC would put into effect from September 10 until October 10, New York was permitted to suspend and store ("bank") its 200 mgd releases in its Delaware reservoirs. The banked water was to be placed under DRBC control and earmarked for later diversion to New York or for release to the lower river basin, depending upon the greatest need. This bank strategy made it necessary to

[91] *New York Times,* August 14, 1965. The following material is also taken from this article.

[92] *New York Times,* August 18, 1965.

substitute water from other sources to make up the deficit in the salt front buffer.

In return for the downstream governors' agreement on the bank plan, the Johnson administration agreed to underwrite the cost of accelerating construction of a more efficient fresh water intake for Philadelphia at Torresdale, up to a maximum limit of $250,000.[93] This project was to be completed by the first of December so that Philadelphia could take water at low tide when the salt content was lower. (The actual amount expended was $125,000.) The President also agreed to pay most of the $70,000 per day required to finance the temporary relocation of Philadelphia's Torresdale intake if it should be overrun by the salt front.

The afternoon negotiations in the Interior Building produced several other agreements. Rockefeller agreed to release water from Greenwood Lake for northern New Jersey. He also agreed to hasten the approval of the Chelsea permit for New York City as rapidly as state law allowed, thus clearing the way for construction of that project. For New Jersey, the federal government agreed to install a $1 million emergency pump and pipeline system from Lake Hopatcong to the Boonton reservoir. In addition, the Department of Interior agreed to drill wells in the Passaic glacial basin for a standby supply and to provide the pump and pipeline system if necessary. The cost of this combined undertaking was estimated at $4.5 million. Pennsylvania and Philadelphia agreed to explore the feasibility of utilizing open mine water in the city system.[94]

After Udall's meeting had produced this negotiated package, the four regional governors and their aides hastily drafted a joint request for federal drought assistance to the President. On receipt of the request President Johnson declared the Delaware Basin and service area a federal drought disaster area. OEP disaster funds were thereby freed, and, more important, the impasse between New York State and Pennsylvania (or New York City and Philadelphia) was broken. Each state looked upon the result as a victory. Johnson and Udall had used the inducement of needed federal money to effect a package of intra-regional accommodations.

The federal government did not provide loans or grants, but rather OEP guarantees to pay the estimated costs of the projects involved. In order to qualify for the drought relief funds, the states had to prove that they had made a substantial fiscal commitment themselves—to the extent of $5 million for New York State and $3.5 million for New Jersey. This requirement was waived for Pennsylvania.[95] However, the OEP later refused Pennsylvania's request for financing the acid neutralization plant in Pottsville because the local authorities had not exhausted their financial resources.

Response to federal involvement was unenthusiastic at the regional level. The *New York Times* editorialized:

> President Johnson's program for federal help for the drought-stricken Northeast, prefaced by publicity fanfare and hurried visits by "crisis teams" to several cities confirms the expected: Neither Washington nor anybody else has any magic formula for instant water. By any standard of optimism these steps are of sharply limited productivity.[96]

New York State Water Commissioner Harold Wilm viewed federal aid as an attempt to weaken the DRBC. From his perspective:

> Federal initiatives in the basin tended to overemphasize what federal agencies could and would do to help alleviate the drought crisis; they tended to preempt decisions and agreements which had evolved through the DRBC; and to place special weight on the roles of state and local governments rather than on that of the commission.[97]

All of these factors seemed to him "to deprecate the crucial and decisive role of the DRBC as an interstate-federal administrative and mediating mechanism." Some DRBC staff members also expressed privately their resentment at the

[93] *SIC/Northeast Hearings, 1965*, p. 22. See also Appendix Two.
[94] *Ibid.*
[95] *New York Times*, August 19, 1965.
[96] *Ibid.*
[97] Letter from Harold Wilm to author, August 26, 1968.

"Johnny-come-lately" involvement on the part of the federal government.

The water bank, which minimized flows downstream and maximized storage upstream, was considered by some participants to be primarily a public relations device to placate the parties-at-interest and to prevent panic in the cities.[98] Commissioner Wilm later recounted:

> The so-called "water bank" created by shutting off the prescribed releases kept absolutely essential drinking water in the reservoirs instead of letting it run to sea for the somewhat subordinate purpose of retarding the advance of the "salt front." The retention of this water in the reservoirs reassured the people of New York City against the literal fear of complete loss of their drinking water. At the same time, the Commission's reservation of the power to decide whether the water would be released toward New York City or down river reassured people of Philadelphia and Camden, that if all else failed, water could be made available from these reservoirs to help hold back the salt front.
>
> In the meantime, water was commandeered from other sources and was metered out with such care and skill—and good luck!—as to keep the progressive advance of the salt front retarded sufficiently so that it failed to reach the Philadelphia intake. In the event this metering of releases was unsuccessful, the revised water intake at Torresdale could partly meet the problem; and *in extremis* the Army barges and dredge-pipelines could be put into service.
>
> So the water bank was actually far more than a public relations device, even though it did reassure the people in the major cities. . . .

Wilm also shed light on the origin of the water bank idea put forward by Secretary Udall:

> . . . the "water bank plan" . . . had been under discussion . . . ahead of time by non-federal people. Oddly, the Philadelphia-Pennsylvania-New Jersey people had been talking about this as a possibility, and may have broached the idea to the Secretary. Concurrently, Arthur Ford and I had come up with similar thoughts in the hopes that the downstream parties might accept this means of averting catastrophe for New York City.

[98] Interview with Henry Caulfield.

New York stopped releasing water from storage on September 7, and by October 9 had banked approximately 2.2 billion gallons. In order to offset the cutoff in New York's downstream releases, the DRBC boosted the maximum discharges from the two private hydropower reservoirs from 266 to 662 mgd and secured an additional 66 mgd from the Corps of Engineers' Francis Walter reservoir.

THE ACCELERATION ISSUE

Federal agencies in fact contributed little to the short-range solutions. The Corps of Engineers readied a barge and dredge system to shift Philadelphia's intake, but this proved unnecessary. The U.S. Geological Survey drilling of underground wells in the Passaic glacial basin was unproductive. From a long-range standpoint, however, the federal contribution was more significant.

On August 11 the President directed the Secretary of the Army to accelerate reservoir construction. On August 13, in a rider to the fiscal 1966 public works appropriations bill, the President asked Congress for a $1.25 million appropriation to speed up the Army Corps of Engineers' work on five Delaware reservoirs. These projects had been authorized by Congress in 1962 and were already on the engineers' drafting boards. This special appropriation was intended to reduce by a full year the time required to complete the reservoirs. Despite the best of federal intentions, these reservoirs could not have been used much before the early 1970's— too late to do any good for the immediate crisis.

In early September the Senate Committee on Interior and Insular Affairs conducted hearings on the water crisis in the Northeast. In arranging the hearing, Senator Henry Jackson (Dem., Wash.), a long-time supporter of water resource legislation, sought to impress Congress with the national impact of water supply and pollution problems. Administration witnesses elaborated their views on a wide range of topics from desalination, pollution, metering, leak detection, and water pricing to other economic aspects of water demand. Acting as the administration spokesman, Udall argued for federal water quality standards.

He also told the senators that a better system of incentives and rewards was needed to encourage efficient state and local water management. Udall said the federal government should require all cities to treat sewage effluent and operate unified, self-sustaining water and sewer systems. In response to inquiries from Idaho Senator Len Jordan, Udall defended the administration's request for supplemental funds:

> Because nobody considered that there were serious problems, what we in the West would call a real comprehensive study has not been made. This (Delaware) is an important river basin. They fought over the water from that river for about 25 years. They could not even agree on a common plan for development. We finally got together on this DRBC with the help of Congress four years ago. It has worked very well. I do not know what we would do, if it were not in existence today.[99]

Bureau of the Budget Deputy Director Elmer Staats and the President's science adviser, Donald Hornig, testified that the conventional approach of building more reservoirs and aqueducts would no longer suffice for supplying water to the nation's great urban centers. The big cities would have to rely increasingly on waste water purification and re-use. Hornig stressed that: "Waste water purification is not only a source of usable water but also a positive step in the control of water pollution—it is a dual purpose operation." He noted that while desalination offered the possibility of supply independent of the vagaries of weather, it was still not economically competitive and would likely remain more costly than waste water purification. Hornig concluded:

> Construction of major projects can create almost irrevocable conditions, and we must be sure as we take these steps that they are in fact the best course to follow. In planning water development we are planning for many decades ahead. In virtually no other aspect of government activity do we plan and construct works which will be effective a century from now. It would be well now while we face a relatively local and temporary problem in the Northeast to look toward a nationwide and long-term view.[100]

Udall warned that New York City's failure to adopt water reforms could cost the city federal aid. Deputy Budget Director Staats concurred, asserting that the federal government reserved the right to deny financial assistance to cities that failed to charge for water service or to eliminate inefficient water management practices.[101] Three days after the hearing, the lame-duck Wagner administration finally agreed to the compromise proposals for gradual metering recommended by the Udall-inspired national panel, though it sidestepped universal metering.

One month after the Senate hearings were concluded, Congress passed an amendment to the 1965 omnibus water projects bill directing the Corps of Engineers to undertake a comprehensive study of the long-range water supply needs in the northeastern United States. It was to provide for: (1) a system of major reservoirs; (2) conveyance facilities to exchange water between various river basins; and (3) major water purification facilities. Under Title 1 of Public Law 89–298, the Secretary of the Army was authorized to "construct, operate and maintain those reservoirs, conveyance and purification facilities which are recommended in the plan." Since the study is still in progress, its specific recommendations are as yet unknown. But according to one water expert: "The authority given to the Corps of Engineers in this law, which was a direct result of the drought, contains provisions which may in the future be recognized as a giant step toward centralization of planning construction and operation of water supply projects at the federal level."[102] The first funds for this study ($76,000) were requested in the President's 1966 budget.

[99] *SIC/Northeast Hearings, 1965*, pp. 43–44.

[100] *Ibid.*, pp. 60–61.

[101] *Ibid.*, p. 54.

[102] Letter from Herbert A. Howlett, DRBC Chief Engineer, to author, August 30, 1968.

End of the Emergency

> The Commission [DRBC] passed its first really acid test, when we mutually decided to abandon this idea of courts and recriminations and whose fault it is and who is going to win and so forth and so on, and met this situation like men engaged in a regional effort to meet a natural disaster, which has appeared to me to be something like a slow earthquake.
>
> GOVERNOR RICHARD HUGHES

Salt water encroachment in August 1965 proceeded at a slower rate than in June or July. The 250 ppm line of chlorides advanced five more miles upstream and penetrated the Camden recharge area about August 27.[103] However, no serious contamination was reported by Camden residents. During the first half of September, the salt front remained relatively stable in the vicinity of the Walt Whitman Bridge at river mile 97. In mid-September it resumed its upstream movement and on October 7 reached river mile 100, within 10 miles of Torresdale. For the next two weeks it remained virtually stationary and then gradually began its seasonal downstream recession.

Taking all these factors into consideration, the DRBC met again in emergency session on October 7 and extended the water bank agreement for another 50 days through November 30. At the same time, it eased the drawdowns on the private reservoirs and reduced the flow objective at Trenton from 2,000 to 1,800 cfs.[104] By the end of October the salt front was on its seasonal downriver movement. It had never been necessary to implement the emergency plan to relocate the Torresdale intake upstream. On December 30 the private reservoirs were returned to normal operations. The worst of the water crisis had passed.

Drought persisted in the Delaware Valley throughout most of 1966. Surface water storage improved with increased precipitation, restraint in use, and synchronized reservoir management. But ground water levels continued to decline. In mid-March 1966 the federal WRC warned the basin states to prepare for a fifth year of drought "as a matter of prudent public policy" and urged the DRBC to continue its regulatory action. The WRC cautioned: ". . . until the drought is clearly broken, the emergency water management and conservation measures should be continued."[105]

Actually, improved conditions in early 1966 were of short duration. The pattern of recovery was erratic, with torrential rains interspersed with severe drought. Precipitation falloff in the early spring depressed river flows at Trenton to a third of normal, and the salt front advanced five miles beyond its April 1965 position.[106]

Fearful of abandoning controls under fluctuating conditions, the DRBC repeated its seriatim issuance of emergency proclamations until the spring of 1967. In each case, extended and sometimes tedious negotiations were involved. With the 1966 summer dry season approaching, the DRBC on June 2 requested the Corps of Engineers to release the 11 bg that it had impounded in the Francis Walter reservoir. These releases boosted downstream flows and contributed to retarding the salt intrusion well below the 1965 advance.

In mid-July 1966 the Geological Survey warned that ground water supplies were dangerously

[103] DRBC Staff Report, *Summary of Water Conditions in the Delaware River Basin*, September 20, 1965.

[104] DRBC, Minutes of meeting of October 7, 1965.

[105] WRC, *Drought in the Northeastern United States: A Third Appraisal*, March 1, 1966, pp. 2–3.

[106] DRBC, *Annual Report for 1966*, p. 19.

low.[107] The month of August was even drier. The presidential drought disaster declaration was due to expire, but Johnson decided to extend it until March 15, 1967. In an effort to coordinate matters, the DRBC followed suit a week later.

The first significant break in the weather occurred in the fall of 1966. Modest but continued improvement in precipitation, streamflows, and well levels persisted, and by mid-winter the upswing was sharp.[108] A long, wet fall followed by an equally wet winter in 1966–1967 left the Delaware reservoirs with normal storage volumes. Ground water levels rose in 16 out of 23 test wells in the basin. By mid-January 1967 New York City had ceased operating its Chelsea pumping plant. But once again the Lindsay administration was stymied in its efforts to push a universal metering bill through a reluctant City Council.[109] The worst drought in the history of the Delaware appeared at an end.

One question remained to be settled: How to undeclare the emergency? The decision was not as easy as it might seem. Aside from merely repealing the two conservation orders, the staff of the DRBC had to be sure that there would be minimum risk for the remainder of 1967. Consequently, they continued to monitor the physical conditions in the basin. Furthermore, something had to be decided about the 53.6 billion gallons that remained in the common water bank.[110]

By early March 1967 the DRBC felt that it was safe to terminate the 20-month water supply emergency. The four regional governors and Secretary Udall attended the March 2 meeting to make the termination decision. It was decided that the 53.6 bg remaining in the common water bank would be made available to meet the terms of the 1954 Supreme Court decree.[111] The effective date of the DRBC termination order, March 15, was made to coincide with the expiration of the presidential declaration. At the same meeting the DRBC also adopted far-reaching pollution control standards as prescribed by the Water Quality Act of 1965.

By April 1 the fast-accumulating storage in the Cannonsville reservoir reached the 50 bg mark, automatically making it a functioning part of New York's water system under the 1954 Court ruling. The city's daily diversion allowance jumped to 800 mgd, and its minimum downstream release obligation increased to 1,750 cfs.[112] Moreover, there was a return of the usual spring flooding of smaller streams. On March 7 the Philadelphia and Trenton metropolitan areas were drenched with a steady 24-hour downpour. Assunpink Creek in downtown Trenton overflowed its banks, as did several other small tributaries in the southern part of the basin. By May 1967 the Pepacton and Cannonsville reservoirs were filled to the brim. There was no longer any doubt: The unprecedented six-year drought had clearly broken. The *New York Times* wrote on May 14:

> One compensation for the late wet spring is the water itself, simply the sight of flowing water. After the drought years that plagued the whole Northeast, brooks are alive again, rivers flow in full stream and the reservoirs brim over their spillways. There is a sense of plenty once more in the purling flow of a rivulet, the gush and chatter of a hillside brook and the rumble of a waterfall. How we use that water, or abuse it and rob ourselves, is another matter. The water is there again.

AN AFTERVIEW

The emergency measures, providing for integrated management of the Delaware reservoirs, greatly diminished the impact of the drought. The control of releases and withdrawals demonstrated how impoundments can be successfully integrated in a single, basin-wide operation. Water yield from the reservoirs when operated independently was less than with coordinated system management. State action in taking over the total management of the five independent reservoir systems in northern New Jersey also produced a greater delivery capability.

[107] *New York Times*, July 13, 1966.
[108] DRBC, *Annual Report for 1967*, p. 10.
[109] See Noel Perrin, "New York's Forgotten Drought," *The Nation*, June 5, 1967, pp. 721–723.
[110] Interview with Robert Goodell, DRBC Engineer, November 22, 1967.
[111] DRBC, Minutes of meeting of March 2, 1967.
[112] DRBC, *Annual Report for 1967*, p. 11.

The drought cast serious doubt on the Delaware system's capacity to deliver water at the formerly projected rate. The assumed yield of New York's Delaware reservoirs was particularly questionable. The Montague formula proved unworkable, and the minimum expected yields of New York's reservoirs failed to materialize. After the drought New York City engineers admitted that their pre-drought estimates of minimum yields were 30 per cent too high. At its first meeting following the termination of the emergency, the DRBC initiated a study of the basin's water supply sources and storage facilities in light of the drought.

Burgeoning metropolitan communities with rising standards of living will continue to place heavy strains on the urban water table. On October 16, 1967, the New Jersey Committee of the Regional Plan Association called for the establishment of a single state agency with overall responsibility for allocation and transmission of water, including pollution control. Anticipating a population increase of 2.5 million residents in North Jersey alone within 20 years, the group advocated a program of "total water management" to minimize the effects of future shortages, waste, and mounting demand.[113]

In a 1967 study of the northeast drought, the National Science Foundation stated: "Increasing urbanization, especially in the northeastern United States, may be affecting large-scale weather patterns as well as local temperature regimes."[114] While the report stated that the causes of the prolonged dry spell were exceedingly complex, it cited three man-made factors: the rising levels of carbon dioxide in the atmosphere, the large urban heat output, and the overseeding of clouds from automobile exhaust.

One can only speculate what might have happened had there not been a river basin commission to reconcile the differences and to oversee water allocations. There is no reason to believe that the United States Supreme Court would have been equipped to do the job. Past experience indicated that the judicial process did not usually move with the speed required to resolve a constantly changing water crisis. Even if the Court had enjoined New York to cease and desist from any further violations of the 1954 decree, the overriding problem of supply and demand would have been unsolved. Afterwards, one legal observer wrote:

> Courts find it terribly difficult to deal with a case where the question is how rights are to be resolved between New York and Philadelphia, and where in order to settle that issue it must look not only at the relative needs in the Delaware water as such, but also at the problems of the Hudson River, of metering, of saline water conversion, of wells, of the use of government and private reservoirs, and possibly of weather modification, of tapping the Great Lakes and damming Long Island Sound as well. In short, the pressures on courts are to simplify the facts and to reduce alternatives, whereas in terms of the ultimate public good what may be most needed is an institutional form which operates to generate more and more alternative solutions to a problem. Courts seek stability and certainty, but the New York water supply problem (and it is by no means unique) may most need just the opposite, that is, a kind of creative and dynamic instability in which the pressures are toward innovation and novelty and experimentation, rather than the complacency which may come with having a firm and enforceable legal right—which right has already come to terms with the underlying, conflicting and troublesome public interest.[115]

The DRBC appeared to have provided an appropriate vehicle for a regional effort. It had both the administrative apparatus and territorial jurisdiction for making legally binding interstate decisions. Moreover, the DRBC had a staff capable of monitoring changing conditions periodically and of updating its approach. In retrospect, Maurice Goddard commented:

> While those of us who had helped to bring the Commission into existence had faith in the ability of this new Federal-Interstate arrangement as a means of solving mutual water problems, we were . . . in this, the Commission's first real test, ex-

[113] *Trenton Times*, October 17, 1967.

[114] *New York Times*, July 20, 1967. See also Abel Wolman, "The Metabolism of Cities," *Scientific American* (September 1965), pp. 179–190.

[115] Joseph L. Sax, *Water Law, Planning and Policy* (Indianapolis: Bobbs-Merrill Co., 1968), p. 179.

ploring new territory. Our success in meeting that test was due, in large measure, to the fact that we had already established mutual trust and an excellent working relationship between the Commissioners at the alternate level prior to the advent of the emergency.

However, any political institution that operates by consensus can take vigorous action only as long as its members agree. Although the personal relations among the principal commissioners were at times severely strained by the political forces and news media operating in 1965, they nevertheless fully supported the DRBC. Any one of the five members could have exercised an absolute veto in the decision-making process. The groundwork for reaching the unanimous decisions was laid in the behind-the-scene activities of the alternates, who, as Goddard and Wilm indicated, all enjoyed fine personal relationships and who were not so exposed to political pressures and publicity.

APPENDIX ONE: REPORT OF THE WATER RESOURCES COUNCIL ON THE NORTHEAST DROUGHT

Memorandum for the President
Date: August 7, 1965

As the result of your July 14 directive to the Water Resources Council, the water agencies of the Federal Government have undertaken a series of systematic assignments to evaluate and alleviate the water shortage problem in the Northeast.

This memorandum will constitute a current report on the Federal effort. It recommends a more closely integrated effort to combat this prolonged drought.

The Council held a meeting last Thursday. The following is an up-to-the-minute report by the Council on the current situation in the crucial Delaware Basin area:

1) There has been a further reduction in the available water supply. Since our July 21 report precipitation has been spotty. There has not been significant rainfall on the critical upper Delaware watershed. It is now clear that it will take a hurricane or a series of sod-soaking rains to sharply increase stream runoff in the weeks ahead.

2) The salt water intrusion has continued to advance up the Delaware River toward the Philadelphia intake, and saline water has already reached the recharge area of the underground wells which supply fresh water to Camden, New Jersey.

3) According to the latest reports New York City now has 210 billion gallons in storage. At an emergency meeting of the Delaware River Basin Commission yesterday the New York City spokesman predicted that the city would "run out of water by the middle of February 1966" if adverse conditions continue. This spokesman also states that at the present rate of depletion the City's reservoirs on the Delaware River watershed "would be empty by November 25." He states it would be "disastrous" for the City to make further releases of water into the Delaware after September 10. Such a decision would, of course, precipitate a major new controversy among those cities which look to the Delaware as their principal source of supply. It is now obvious that the Delaware River Basin Commission will face a water impasse in early September.

4) The principal New Jersey reservoir serving Newark and the northern portion of the State is now at 35% of capacity—equivalent to 83 days' average use.

Under your directive, agencies of the Federal Government, supervised by the Water Resources Council, have already taken the following action:

1) The Department of the Interior will shortly complete an inventory of all surface and groundwater supplies.

2) The Federal Power Commission has inventoried all storage in reservoirs licensed to private utilities.

3) The Army Corps of Engineers is identifying critical water shortage areas. It has also located equipment that can be utilized, if necessary, to move the Philadelphia intake system upstream, and twenty-five communities have been loaned emergency pumps and pipe by the Office of Civil Defense.

4) The Department of Agriculture is already making emergency loans in 159 counties in 11 States; permitting grazing and hay-making on conservation reserve lands in 117 counties in 5 States: continuing emergency conservation assistance to reestablish vegetation in 53 counties in five States; and is offering government-owned feed grain at reduced prices to eligible farmers in two counties in Vermont.

5) In addition, last Thursday Chairman Seaborg of the Atomic Energy Commission, Chairman Swidler of the Federal Power Commission, and I met with Governor Hughes and the two New Jersey Senators to discuss water desalinization as a possible long-term "drought-proof" solution. As a result of this meeting—and a similar session with New York City officials Wednesday—a reconnaissance survey has already been initiated to determine the feasibility of a very large desalting facility in the New York-New Jersey metropolitan area.

Confronted by the prospect of a deepening drought, your suggestion of a conference with the Governors and Mayors who have responsibilities for facing the most critical shortage problems is most welcome for the purpose of organizing appropriate action to meet the immediate problem, to lay plans against the possibility of another year of drought, and to consider longer range attacks on the problem of water supply and conservation. (I suggest that you invite the Governors of New York, New Jersey and Pennsylvania—and the Mayors of New York, Philadelphia, Jersey City, Newark and Camden to participate in the initial meeting.)

Common prudence requires all concerned to act on the assumption that this unprecedented drought will persist for at least one more year. We are convinced such a conference would be most useful. Action plans must be developed now to avert serious water outages in these major centers of population. Such plans must, of course, include steps for better conservation of water supplies.

In our judgment present circumstances do not warrant issuance of a national disaster area proclamation. However, it is clear that coordinated planning by the Federal, State and local governments must be initiated immediately if shortages that could cripple an entire region are to be avoided.

STEWART L. UDALL, Chairman

APPENDIX TWO: ELEMENTS OF AGREEMENT IN THE FEDERAL-STATE-MUNICIPAL NORTHEAST WATER CRISIS

(Adopted at DRBC Meeting August 18, 1965)

1. The disputed water in New York City's Delaware Basin reservoirs will be constituted a common "water bank" subject to allocation by the Delaware River Basin Commission.

2. Within the context of a limited threatened disaster area a proclamation by the Federal Government will guarantee the "water bank" and authorize the following steps:

   First Phase (Immediate Action)

   (a) Army Corps of Engineers will install emergency pump-pipeline system at Lake Hopatcong in New Jersey.

   (b) Department of the Interior will drill for emergency well production in underground Passaic Lake to develop a standby supply.

   (c) Provide emergency funds to expedite present construction of a Philadelphia intake. This action is expected to move completion date from February to about December 1.

   Second Phase (If Required)

   (a) If "salt front" swamps existing Philadelphia intake, pay major share of cost of emergency dredge supply system to provide water supplies to Philadelphia from the Dela-water upstream from Torresdale until the spring thaw occurs.

   (b) Provide pump-pipeline system from underground Passaic Lake.

3. *New York*

   (a) The State would act to expedite initiation of construction of the Chelsea intake by New York City as rapidly as the law of the State allows—approximate cost $7 million, with completion in six months from start of construction.

   (b) The State would agree quickly to release the water stored in Greenwood Lake. This would make substantial quantities of water available to northern New Jersey.

4. *Pennsylvania*

   (a) Philadelphia would agree to acceleration of construction of new Torresdale intake to have it in operation no later than December 1, 1965.

   (b) The State and Philadelphia would agree to explore further the feasibility of utilizing in the city system waters now available in substantial quantities in open mine pits.

5. *Water Conservation* (New York, Pennsylvania, New Jersey & Delaware)

A Federal official will join in the Conservation Committee of the Delaware River Basin Commission, which is concerned with water conservation by the cities in the area. Additional water conservation measures will be taken as the situation demands.

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