

WATER RESOURCES  
OF THE CONNECTICUT RIVER BASIN:  
PROBLEMS AND PROPOSALS

by

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1941

SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENT FOR THE DEGREE OF  
MASTER IN CITY PLANNING  
from the  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
1948

Signature of Author

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Signature of Professor  
in Charge of Research

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Signature of Chairman of  
Department Committee of  
Graduate Students

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Cambridge, Mass.  
September 10, 1948

Frederick Johnstone Adams,  
Professor of City Planning  
in Charge of Course,  
School of Architecture and Planning,  
Massachusetts Institute of Technology,  
Cambridge, Massachusetts

Dear Professor Adams:

I herewith respectfully submit this study  
"Water Resources of the Connecticut River Basin: Problems  
and Proposals" as the Thesis in partial fulfillment of  
the requirements for the Degree of Master in City Planning.

Sincerely yours,

Morton B. Braun

### ACKNOWLEDGMENTS

Concentrated scholarly effort is bound to require assistance and cause distress.

I wish to acknowledge gratefully the counsel and support of the Faculty of the Department of City Planning at Massachusetts Institute of Technology and particularly Professors Greeley and Rodwin; and to thank appreciatively Dudley Harmon, Wallace Dickson, and Alan McClennen of the New England Council, and Truman Safford of Charles T. Main, Inc. for their kind assistance; and to thank Anna L. Mulhern for converting the manuscript into its present form.

Especial gratitude is due my wife, who heard every word patiently and offered suggestions, and who with our families, endured the pressures of my authorship.

M.B.B.

Scituate Center  
September 10, 1948

TABLE OF CONTENTS

INTRODUCTION ..... i

CHAPTER I: PROBLEMS

Section 1: A Summary of Broad Administrative  
and Planning Problems ..... 1

Section 2: Power..... 5

Section 3: Flood Control .....29

Section 4: Navigation ..... 58

Section 5: Pollution ..... 77

CHAPTER II: PROPOSALS

Section 1: The Constitutional Background of  
Federal-State Relations in Power  
and Flood Control ..... 87

Section 2: Analyses of Experience in Watershed  
Development, To Be Used as Guidance  
for Proposals ..... 93

(a): Interstate Commissions, other than  
New England ..... 94

(b): Federal Authorities ..... 99

(c): New England .....106

Section 3: Proposals: The Interstate Commission  
on the Connecticut River .....113

APPENDICES

The Connecticut River Valley Flood Control Compact..120

New England Interstate Water Pollution Control  
Compact.....146

BIBLIOGRAPHY.....153

## TABLES

Table a:	Principal Tributaries of the Connecticut River...	ii
Table b:	Cities over 10,000 Population in the Connecticut River Valley.....	v
Table I-1:	Statutory Conditions for Licensing by the Federal Power Commission under Legislation of 1920 and 1935.....	7
Table I-2:	Average Residential Electric Bills in the United States, by Regions, 1947.....	9
Table I-3:	Average Annual Kilowatt-Hour Consumption Per Residential Customer--1945, For Cities of 50,000 Population and More.....	10
Table I-4:	Typical Net Monthly Electric Bills, January 1, 1947, Communities from Low to High....	11
Table I-5:	Typical Net Monthly Electric Bills, January 1, 1947, Industrial Service.....	12
Table I-6:	New Power Generating Capacity Under Way Since August, 1945, To Be in Operation by January 1, 1951.....	14
Table I-7:	Installed Hydroelectric and Steam Generating Capacity in New England.....	15
Table I-8:	Undeveloped Hydroelectric Power in New England..	19
Table I-9:	Undeveloped Hydroelectric Power at Flood Control or Navigation Projects in the Connecticut Basin.....	26
Table I-10:	Summary of Direct and Indirect Flood Losses by States.....	30
Table I-11:	A Comparison of Flood Control Plans for the Connecticut Basin.....	35
Table I-12:	Reservoir Sites under 1947 Comprehensive Plan..	55
Table I-13:	Local Protection Works.....	57
Table I-14:	Total Traffic on the Connecticut River to Hartford, Conn., 1926-1946.....	64
Table I-15:	Tonnages, Connecticut River, By Commodities 1935-1946.....	65
Table I-16:	Percentage of Coal and Petroleum Tonnage to Total.....	66

## TABLES

Table I-17: Results of the Navigation Survey, W. P. A. Project, 1936.....	67
Table I-18: Estimated Potential Water-Borne Commerce and Savings.....	68
Table I-19: Pleasure Craft Using Windsor Locks, Conn., 1925-1944.....	73
Table II-20: A Partial Roster of State Agencies Concerned with the Connecticut River.....	112

## FIGURES

follows

Figure a: The Connecticut River Basin in New England.....	page 1
Figure b: Profile of the Connecticut River and its Tributaries, Sheet No. 1.....	Table a
Figure c: Profile of the Connecticut River and its Tributaries, Sheet No. 2.....	Table b
Figure I-1: Principal Transmission Lines.....	page 8
Figure I-2: Developed Water Power.....	page 13
Figure I-3: Steam and Diesel Power.....	page 16
Figure I-4: Undeveloped Water Power.....	page 18
Figure I-5: Connecticut River Watershed Map.....	page 54

## A PLANNER'S CREED

Dear God, give us the strength to accept with serenity the things that cannot be changed. Give us the courage to change the things that can and should be changed. And give us the wisdom to distinguish the one from the other.

Admiral Hart

## INTRODUCTION

### THE CONNECTICUT RIVER BASIN

The Connecticut River rises in northern New Hampshire and the Province of Quebec, Canada, and flowing southward, is the boundary between the States of New Hampshire and Vermont. It crosses the States of Massachusetts and Connecticut, and empties into Long Island Sound at Saybrook, about 30 miles east of New Haven and 14 miles west of New London. The river is approximately 390 miles long and drains an area of 11,260 square miles, divided as follows: Canada, 115; New Hampshire, 3,096; Vermont, 3,911; Massachusetts, 2,712; and Connecticut, 1,426.

The principal tributaries of the Connecticut, listed in Table a, page ii, are for the most part rapid-flowing mountain streams having steep slopes and narrow valleys. The slope of the river, which falls 1,643 feet, is very steep in the upper reaches. For the first 25 miles below First Connecticut Lake, New Hampshire, the river falls 25 feet per mile, and at the Fifteen Mile Falls area, there is a fall of 400 feet in 30 miles. In the lower river, from points in Massachusetts to tidewater above Hartford, the river falls about 2 feet per mile. See Figures a, b, and c.

The watershed area is long and narrow, the maximum width being 62 miles and its length, 280 miles. The eastern line of the drainage basin is in the White Mountains of New Hampshire, and in the minor hills and ridges extending southward therefrom. The western divide

KEY TO TRIBUTARIES

- |                      |                |
|----------------------|----------------|
| a - Nulhegan         | o - West       |
| b - Upper Ammonoosuc | p - Ashuelot   |
| c - Israel           | q - Millers    |
| d - Passumpsic       | r - Deerfield  |
| e - Ammonoosuc       | s - Chicopee   |
| f - Wells            | t - Westfield  |
| g - Waits            | u - Scantic    |
| h - Ompompanoosuc    | v - Farmington |
| i - White            | w - Salmon     |
| j - Mascoma          |                |
| k - Ottauquechee     |                |
| l - Sugar            |                |
| m - Black            |                |
| n - Williams         |                |

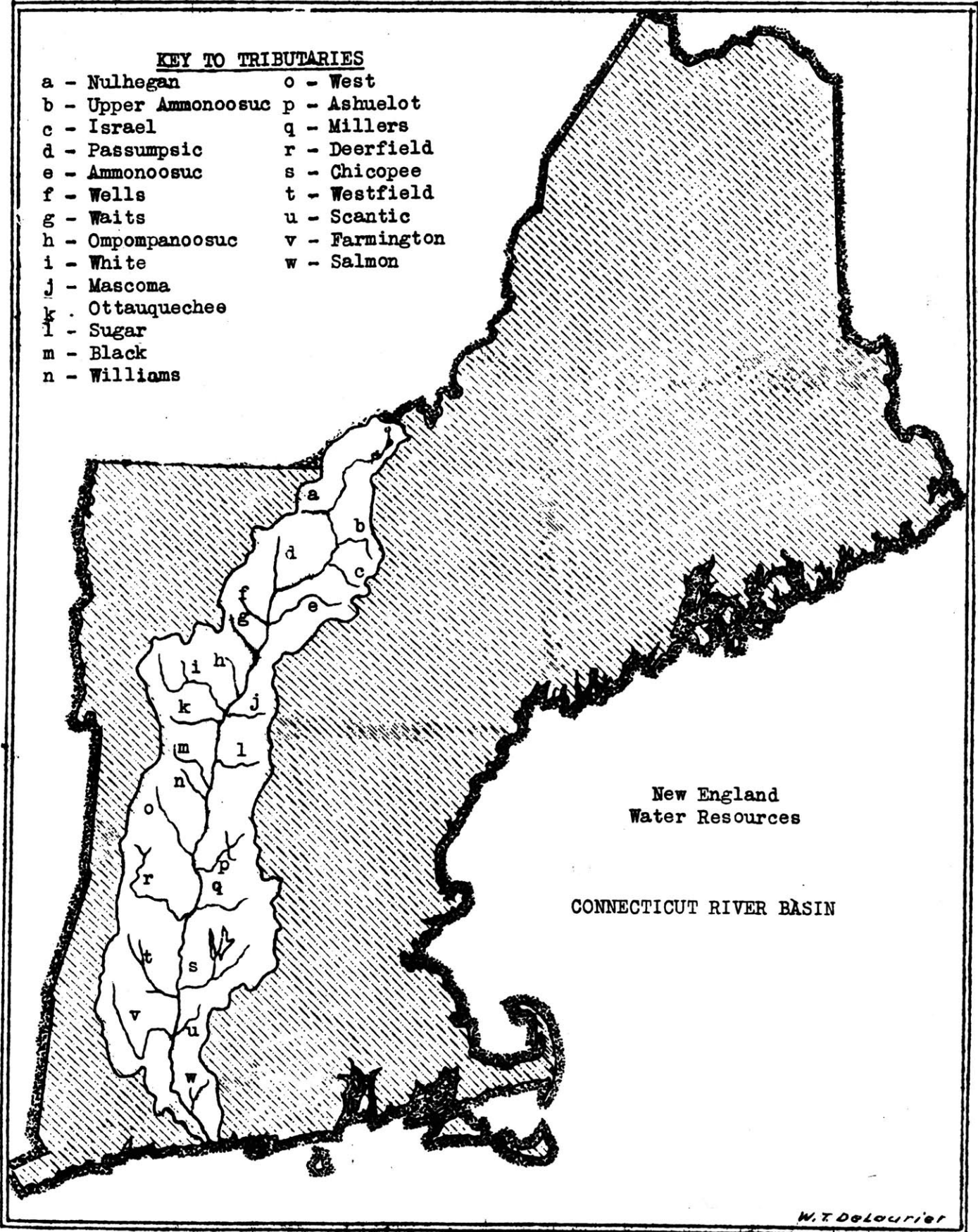


FIGURE a

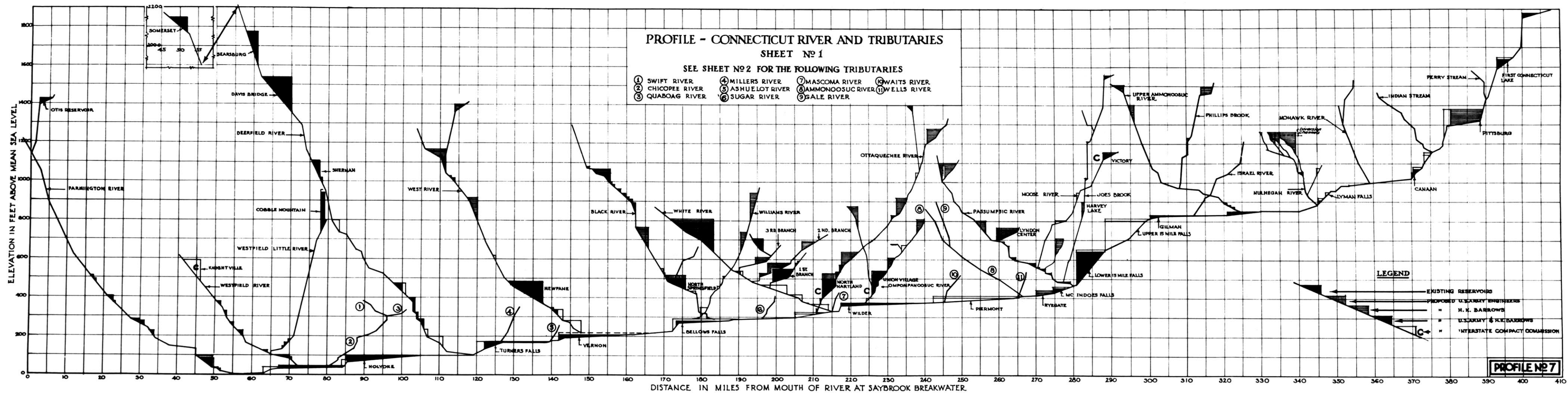


FIGURE b

# PROFILE - CONNECTICUT RIVER AND TRIBUTARIES

SHEET NO 2

SEE SHEET NO 1 FOR OTHER CONNECTICUT TRIBUTARIES

## LEGEND

- EXISTING RESERVOIRS
- PROPOSED U.S. ARMY ENGINEERS
- " H.K. BARROWS
- " U.S. ARMY AND H.K. BARROWS
- " INTERSTATE COMPACT COMMISSION

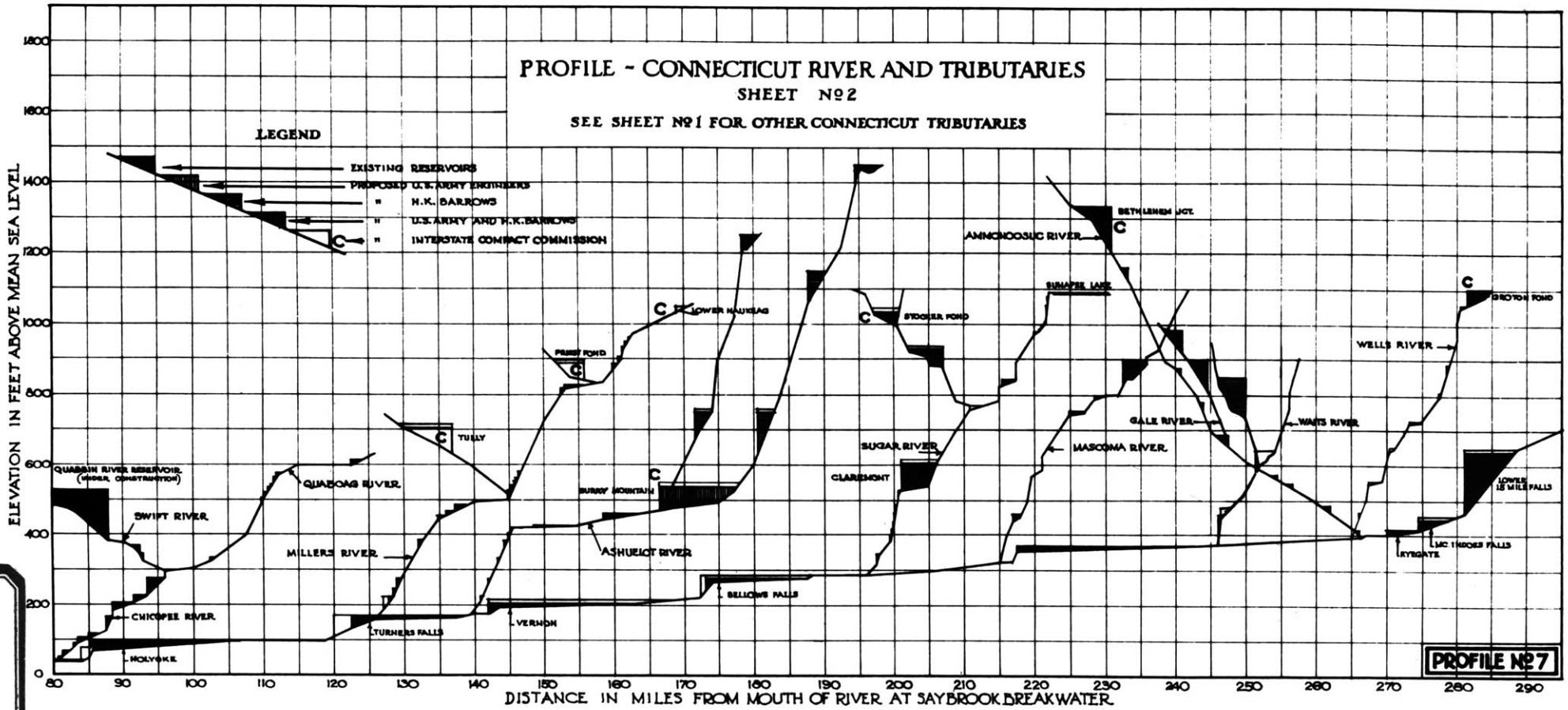


FIGURE 6

TABLE a

PRINCIPAL TRIBUTARIES OF THE CONNECTICUT RIVER

<u>RIVER</u>	<u>STATE</u>	<u>Tributary</u>	<u>DRAINAGE AREA(sq.mi.)</u>		<u>Enters From</u>	<u>Distances above the Mouth of The Main River (mi.)</u>
				<u>Main River Above Confluence</u>		
Nulhegan	Vt	151		651	Right	344.5
Upper Ammonoosuc	NH	260		945	Left	324.7
Israel	NH	130		1,266	Left	312.0
Passumpsic	Vt	507		1,664	Right	279.4
Ammonoosuc	NH	402		2,265	Left	266.2
Wells	Vt	99		2,667	Right	265.9
Waits	Vt	156		2,907	Right	246.8
Ompompanoosuc	Vt	136		3,224	Right	224.3
White	Vt	710		3,426	Right	215.2
Mascoma	NH	195		4,136	Left	214.2
Ottauquechee	Vt	223		4,370	Right	210.2
Sugar	NH	274		4,740	Left	195.3
Black	Vt	202		5,093	Right	183.1
Williams	Vt	117		5,327	Right	176.4
West	Vt	423		5,807	Right	149.2
Ashuelot	NH	420		6,310	Left	139.8
Millers	Mass	393		6,801	Left	126.0
Deerfield	Mass	665		7,237	Right	119.1
Chicopee	Mass	724		8,366	Left	80.4
Westfield	Mass	520		9,138	Right	75.0
Scantic	Conn	113		9,778	Left	59.5
Farmington	Conn	613		9,897	Right	57.1
Salmon	Conn	152		10,989	Left	17.8

SOURCE: House Document #412 Seventy-Fourth Congress, Second Session, page 28.

is in the Green Mountains of Vermont, the Berkshire Hills of Massachusetts, and the Litchfield Hills of Connecticut. The river is tidal in its lower 60 miles.

The climate of the Basin is characterized by frequent weather changes, long and cold winters, and comparatively short summers. It is so located that it is the center of conflict of climatic conditions moving in from other areas, and is therefore a focal point for cyclonic disturbances which affect all of eastern United States. The average winter temperature in the southern region of the Valley is 48 degrees, and that for the northern portions, 41 degrees; extremes of 20 degrees below in the south and 40 degrees below in the north have been recorded.

The average annual rainfall in the Basin varies from about 45 inches in the southern area to about 36 inches in the northern. However, for certain small sections in the vicinity of mountain peaks in New Hampshire and Vermont, as much as 60 inches may fall.

The Valley is adequately served by 8 railroads: the Boston and Maine; Boston and Albany; New York, New Haven and Hartford; Maine Central; Central Vermont; Rutland; Canadian Pacific; and Grand Trunk. Improved federal highways run through the length of the Valley, (Routes 5 and 3), as well as east to west, (Routes 1, 6, 44, 20, 202, 4, 2, and 302).

The principal agricultural products of the Basin are forage crops, vegetables, fruits, tobacco, dairy and poultry products; about four million acres are under cultivation,

yielding a crop value of close to one hundred million dollars. The southern portion of the valley, in Massachusetts and Connecticut is heavily industrialized, the principal manufactures being machinery, machine tools, electrical goods, metal products, textiles and paper products; the value of these manufactures is over one billion dollars annually. In the upper basin, forest and quarry products, as well as some manufacture of machine tools, are of importance.

The population of the Valley is about 1,330,000, representing 20% of the population of the four-state area and 16% of New England. About 350 communities in 22 counties are located there, including 20 with more than 10,000 population, as listed in Table b, page v.

TABLE b  
CITIES OVER 10,000 POPULATION IN THE  
CONNECTICUT RIVER VALLEY

<u>City</u>	<u>1920</u>	<u>1930</u>	<u>1940</u>
<u>NEW HAMPSHIRE</u>			
CLAREMONT	9,524	12,377	12,144
KEENE	11,210	13,794	13,832
<u>MASSACHUSETTS</u>			
GREENFIELD	15,462	15,500	15,672
ATHOL	9,792	10,677	11,180
GARDNER	16,979	19,399	20,206
EASTHAMPTON	11,261	11,323	10,316
NORTHAMPTON	21,951	24,381	24,794
CHICOPEE	36,214	43,930	41,664
HOLYOKE	60,203	56,537	53,750
SPRINGFIELD	129,614	149,900	149,554
WESTFIELD	18,604	19,775	18,793
WEST SPRINGFIELD	13,443	16,684	17,135
<u>CONNECTICUT</u>			
BRISTOL	20,620	28,451	30,167
EAST HARTFORD	11,648	17,125	18,615
ENFIELD	11,719	13,404	13,561
HARTFORD	138,036	164,072	166,267
MANCHESTER	18,370	31,973	23,799
NEW BRITAIN	59,316	68,128	68,685
WEST HARTFORD	8,854	24,941	33,776
MIDDLETOWN	22,129	24,554	26,495

SOURCE: U. S. Census

WATER RESOURCES  
OF THE CONNECTICUT RIVER BASIN:

CHAPTER I

PROBLEMS

## CHAPTER I

### SECTION 1 - A SUMMARY OF BROAD ADMINISTRATIVE AND PLANNING PROBLEMS.

The integrated development of a river basin, once the esoteric teaching of conservationists, is now an accepted doctrine. Its application may not be standardized, however, because no two river basins are alike in the state of their development and their problems. It is likewise difficult to formulate any simple pattern on the administrative and planning levels for the confusions which now exist within the federal structure, in interstate, federal-state and in public-private relationships. The planner's approach to a resolution of these difficulties therefore depends upon a thorough understanding of the problems of the particular river basin with which he is concerned.

It is the purpose of this paper to explore certain problems of the Connecticut River Valley in the light of the administrative and planning confusions enumerated above, and to suggest a means by which these may be resolved, in the interest of a regional, integrated policy for the water resources of the valley. The particular phases of the general problem to be discussed are power, flood control, navigation, and pollution.

Jurisdictional disputes among federal agencies authorized to act on particular phases of the same river basin are quite common in many of the nation's watersheds. This has not been true of the Connecticut River. Up until recently, the only federal agencies importantly interested in the

river have been the Federal Power Commission, the Corps of Army Engineers, and the National Resources Planning Board, and previously, the National Resources Committee.

Of these, the last-named and now no longer in existence, had only a passive interest in the region, with the power to study and recommend, but not to act. Although the Corps of Army Engineers has been primarily engaged in flood control and navigation and the Federal Power Commission in power, their work has necessarily overlapped, but never conflicted. Only once, on the subject of flood control, have these agencies expressed slightly divergent views. This will be discussed more fully in Section 3 on flood control. With the passage of the Barkley Pollution act in 1948, another federal agency, the Public Health Service, is interested in the Connecticut River.

While there are no serious disputes between the federal agencies, which might operate to the detriment of the Connecticut Basin, at the same time there is no integrated policy under which all act, and this cannot be considered a regional benefit. Congress has the power, under present judicial interpretation of the commerce clause of the Constitution, to authorize the effectuation of the drainage basin plans formulated by the National Resources Committee<sup>1</sup>, but it is not likely that such a far-reaching program will be federally undertaken.

In their dealings with the Federal Government the four

---

1. National Resources Committee, Drainage Basin Problems and Programs, Washington, 1936; also, Drainage Basin Problems and Programs, 1937, Revision, Washington, 1937.

states of the Connecticut River Basin have maintained a united front. They have all been resolute in a vigorous support of States' rights. Only when it has become evident that federal funds were to become available in fields previously considered the exclusive function of the states, have the four states joined forces to deal with the Federal Government as a unit. While this may appear to be a paradoxical relinquishment of autonomy, it has operated, rather, to increase the bargaining power of individual states. Thus it has been a characteristic of their relationship with the Federal Government that the four states have supported compromises on issues over which they had previously disagreed, in order to effectuate a united front. These compromises have benefitted the state (or states) which had the most to lose, and have not operated to the benefit of the region as a whole.

Furthermore, the four states, as well as most of the other states, seem to have concentrated so much on resisting the growth of the Federal Government and its ever-widening scope of functions, that the problems over which that resistance developed seem to have been forgotten. In other words, the states have fought the Federal Government's assumption of responsibility for regional problems, but they have failed to adequately demonstrate their own responsibility for them.

As suggested above, interstate relationships have not always been on a high level of cooperation. The Supreme Court has had to arbitrate twice in controversies between states over the Connecticut River. While Massachusetts and

Connecticut have similar problems with respect to flood control, their record in the field of pollution has been poor, and they are diametrically opposed in matters of navigation. New Hampshire and Vermont have together opposed federal plans for flood control and power, but have quarrelled with each other over their boundary, the Connecticut River itself.

There remains to consider briefly the problems of the public interest and private interests, problems which are characterized on the one hand by controversy with local governments, and on the other by a joint stand with the states against the Federal Government. The industries which cry "competitive disadvantage" to state attempts at pollution control, cry "states' rights" along with the states to federal attempts in the same direction. Corporate inter-connections between manufacturing industries, transportation companies, and the utilities account for a continuity and similarity of policy on public issues. The influence of these interests on state policy, like much of lobbying, cannot be proved, only hypothesized.

The remaining four sections of this Chapter will demonstrate the above-summarized administrative and planning problems in the particular fields of power development, flood control, navigation and pollution.

## SECTION 2 - POWER

A brief review of the growth of federal control over power facilities and of the Federal Power Commission is requisite to the understanding of the power aspects of the Connecticut Basin.<sup>1</sup>

For many years after the initial hydroelectric development in the United States, the Federal Government exercised control over such projects only to the extent of preventing direct obstacles to navigation. It was not until 1920 that a Federal Water Power Act<sup>2</sup> was passed and hydroelectric operations placed under governmental control. As amended and clarified by amendments<sup>3</sup> contained in the Public Utility Holding Company Act<sup>4</sup> of 1935, this control attempts to substitute unified regional development of electrical facilities for programs of piece-meal acquisition by individual companies.

Since the Federal Power Commission was not established under a direct grant of constitutional power, but instead was given powers incidental to the commerce clause of the Constitution, it could act only in accordance with the existing judicial interpretation of the extent of that clause. Ramifications of this, as applied to watershed development, will be discussed in Chapter II. Suffice to

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1. See "Authority of the Federal Power Commission to Secure Unified Watershed Development", note in 50 Yale Law Journal 134-143, November, 1940.

2. 41 Stat. 106 (1920).

3. 49 Stat. 838 (1935).

4. 49 Stat. 802 (1935).

note now that the commerce clause in 1920 was subject to a strict construction by the courts, and consequently the Federal Power Act of that year was vague as to the extent of federal authority on tributaries of navigable rivers which are not of themselves navigable.

The Commission itself as originally established was until 1931 composed of the Secretaries of War, Agriculture and Interior and an independent executive secretary. This arrangement did not induce a powerful authoritative agency. In 1931, however, the composition of the Commission was changed to five full-time, independent members,<sup>5</sup> and its emergence as a stronger organization began.

The new Commission soon announced the doctrine that no project affecting the interests of interstate commerce could be constructed until all the conditions of the Power Act had been met. These conditions are set forth in Table I-1, page 7. Some of the larger utilities immediately refused to accede to this administrative ruling. It was not until 1940, after ten years of litigation, during which time hydroelectric construction was curtailed, that a judicial interpretation of the Power Act was obtained.<sup>6</sup>

The cost of both industrial and domestic power in New England is the highest in the United States.<sup>7</sup> Table I-2,

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5. 46 Stat. 797 (1930).

6. A discussion of the decision and its importance will be found in Chapter II.

7. Data for Tables I-2, 3, 4 and 5 was obtained from: Federal Power Commission, Typical Electric Bills, 1947, Washington, 1947.

TABLE I - 1

STATUTORY CONDITIONS FOR LICENSING BY THE  
FEDERAL POWER COMMISSION UNDER LEGISLATION  
OF 1920 AND 1935.

Section 4(a) of the Act allows the Commission to regulate licensee's accounts.

Section 6 limits licenses to 50 years.

Section 8 requires the Commission's approval for voluntary transfers of licenses or rights granted thereunder.

Section 10 (a), as amended in 1935, requires that the project be best adapted to a comprehensive plan for improving or developing the waterway for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, and for other beneficial public uses, including recreational purposes. Section 10(c) requires that the licensee must maintain the project adequately for navigation and for efficient power operation, must maintain depreciation reserves adequate for renewals and replacements, and must conform to the Commission's regulations for the protection of life, health and property; 10 (d)-out of surplus earned after the first 20 years above a specified reasonable rate of return, the licensee must maintain amortization reserves to be applied in reduction of net investment; 10 (e)- the licensee must pay the United States reasonable annual charges for administering the Act, and during the first 20 years the United States is to expropriate excessive profits until the state prevents such profits; 10 (f) the licensee may be ordered to reimburse those by whose construction work it is benefitted.

Section 11, for projects in navigable waters of the United States the Commission may require the licensee to construct locks, etc., and to furnish the United States free of cost (a) lands and rights-of-way to improve navigation facilities, and (b) power for operating such facilities.

Section 15 gives the United States the right, upon expiration of a license, to take over and operate the project by paying the licensee's "net investment" as defined, not to exceed fair value of the property taken. However, the right of the United States or any state or municipality to condemn the project at any time is expressly reserved.

Section 19 allows state regulation of service and rates; if none exists, the Commission may exercise such jurisdiction.

page 9, shows the average residential electric bills in the United States by regions. New England's \$4.26 may be compared with the Pacific Coast's \$2.80 and the United States average of \$3.64. At the same time, kilowatt-hour use of power in New England communities was far below that in other cities of similar size. This can be seen in Table I-3, page 10. Furthermore, as may be expected from the above, the rates were higher in New England than elsewhere. This is demonstrated in Table I-4, page 11. The same analysis may be made for commercial and industrial rates. Those for the latter are shown in Table I-5, page 12. A general reduction in electric bills has been prevalent in the United States from 1937 to 1947, but the least reduction has been in New England.<sup>8</sup>

With the exception of Maine, which does not allow the export of power developed within her borders,<sup>9</sup> New England is a well-integrated power region. This may be seen clearly in Figure I-1. There is a considerable interchange of power among the region's various public utilities, which are to a very great extent corporately interrelated. It is the established policy of these companies to meet industrial demands as they arise, and to maintain a certain amount of reserve capacity. In recent years, however, increased war demands and curtailment of construction have created periodic shortages. It is hoped that by 1951 a reserve capacity will

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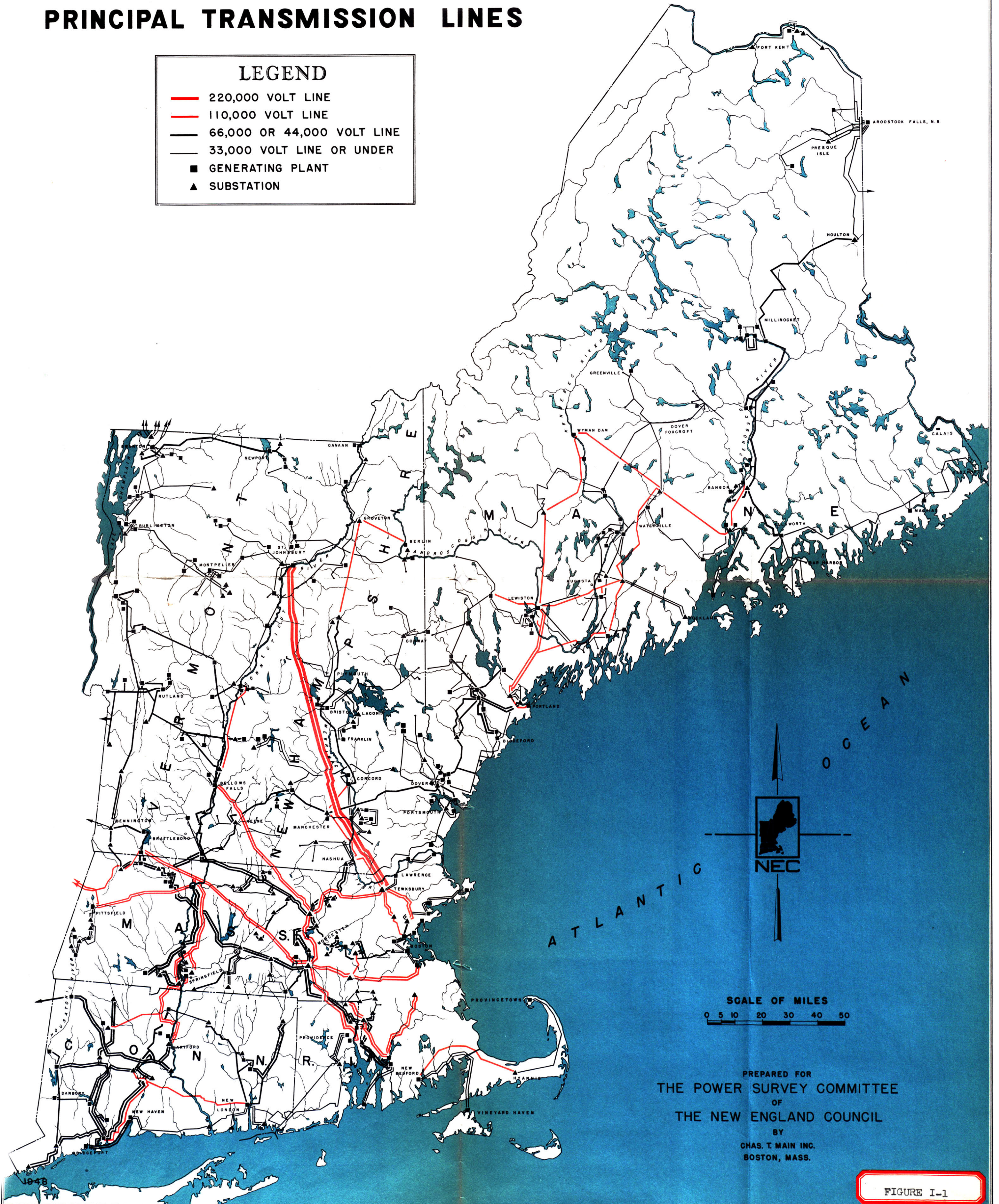
8. Ibid., p. iv.

9. Revised Statutes of Maine, 1930, Ch. 68, p. 1108

# PRINCIPAL TRANSMISSION LINES

## LEGEND

- 220,000 VOLT LINE
- 110,000 VOLT LINE
- 66,000 OR 44,000 VOLT LINE
- 33,000 VOLT LINE OR UNDER
- GENERATING PLANT
- ▲ SUBSTATION



SCALE OF MILES  
0 5 10 20 30 40 50

PREPARED FOR  
THE POWER SURVEY COMMITTEE  
OF  
THE NEW ENGLAND COUNCIL  
BY  
CHAS. T. MAIN INC.  
BOSTON, MASS.

FIGURE I-1

TABLE I - 2

AVERAGE RESIDENTIAL ELECTRIC BILLS IN  
THE UNITED STATES, BY REGIONS, 1947  
(For 100 KW)

New England	\$4.26
Middle Atlantic	4.24
East North Central	3.29
West North Central	3.29
South Atlantic	3.51
East South Central	2.71
West South Central	3.49
Mountain	3.57
Pacific	2.80
United States	3.64

SOURCE

Federal Power Commission,  
Typical Electric Bills, 1947,  
p. IV.

TABLE I - 3

AVERAGE ANNUAL KILOWATT-HOUR CONSUMPTION PER RESIDENTIAL  
CUSTOMER--1945, FOR CITIES OF 50,000 POPULATION AND MORE

<u>Rank</u>	<u>Community</u>	<u>Annual KWH Use</u>	<u>Populations, 1940</u>
1	Tacoma, Wash.	4,178	109,408
2	Seattle, Wash.	3,800	452,639
7	Hartford, Conn.	3,276	166,267
9	Nashville, Tenn.	2,498	167,402
10	Chattanooga, Tenn.	2,435	128,163
34	Newton, Mass.	1,436	69,873
91	Holyoke, Mass.	1,217	53,750
100	Los Angeles, Calif.	1,189	1,504,277
127	Springfield, Mass.	1,096	149,554
160	Worcester, Mass.	1,003	193,694
171	Quincy, Mass.	961	75,810
179	Bridgeport, Conn.	900	147,121
182	New Haven, Conn.	881	160,605
183	Manchester, N. H.	880	77,685
184	Medford, Mass.	878	63,083
191	Cambridge, Mass.	827	110,879
193	Malden, Mass.	809	58,010
203	Somerville, Mass.	760	102,177
205	Boston, Mass.	745	770,816
212	Providence, R. I.	688	253,504
213	Lynn, Mass.	664	98,123
214	Lowell, Mass.	637	101,389
215	New Bedford, Mass.	594	110,341
217	Fall River, Mass.	578	115,428
218	Lawrence, Mass.	535	84,323

SOURCE

Federal Power Commission,  
Typical Electric Bills, 1947,  
p. VII.

TABLE I - 4

TYPICAL NET MONTHLY ELECTRIC BILLS, January 1, 1947  
Cities of 50,000 population and more.

COMMUNITIES FROM LOW TO HIGH--RATES FOR  
25, 100, 250, and 500 KILOWATT HOURS

Community	25 KWH		100 KWH		250 KWH		500 KWH	
	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate
<u>High</u>								
Lansing, Mich.	1	\$ .70						
Tacoma, Wash.			1	\$1.70	1	\$3.20	1	\$5.30
<u>Low</u>								
Hartford, Ct.	215	\$1.75						
Yonkers, N.Y.			212	5.10				
Somerville					213	9.30		
Lynn, Mass.							217	15.53
Holyoke	30	1.00	116	3.75	99	6.75	153	10.50
Springfield	57	1.12	102	3.59	148	7.34	177	10.84
Cambridge	71	1.15	62	3.15	64	6.15	183	11.15
Quincy	90	1.20	103	3.60	162	7.60	135	10.10
Worcester	90	1.20	125	3.82	161	7.57	133	10.07
Bridgeport	101	1.25	103	3.60	119	6.88	93	9.38
New Haven	101	1.25	103	3.60	110	6.88	93	9.38
New Bedford	134	1.28	155	3.89	155	7.46	212	13.39
Malden	139	1.30	183	4.22	205	8.72	184	11.22
Medford	139	1.30	183	4.22	205	8.72	184	11.22
Fall River	156	1.35	197	4.70	209	8.85	187	11.35
Boston	166	1.45	208	4.80	213	9.30	201	12.30
Newton	166	1.45	208	4.80	213	9.30	201	12.30
Providence	166	1.45	193	4.60	209	8.85	187	11.35
Somerville	166	1.45	208	4.80	213	9.30	201	12.30
Lawrence	179	1.48	198	4.73	212	9.23	194	11.73
Lynn	195	1.53	189	4.34	207	8.77	217	15.33
New Britain	196	1.55	170	3.98	141	7.25	145	10.38
Waterbury	196	1.55	170	3.98	141	7.25	145	10.38
Manchester	206	1.65	192	4.54	159	7.54	132	10.04
Lowell	212	1.66	196	4.66	211	9.16	193	11.66
Brockton	214	1.68	188	4.31	201	8.51	179	11.01
Hartford	215	1.75	106	3.62	124	6.95	78	9.20

SOURCE: FEDERAL POWER COMMISSION,  
Typical Electric Bills, 1947,  
pp.7-9

TABLE I-5

TYPICAL NET MONTHLY ELECTRIC BILLS, January 1, 1947  
Cities of 50,000 population and more

<u>City</u>	<u>INDUSTRIAL SERVICE Rates</u>									
	<u>75</u>		<u>150</u>		<u>300</u>		<u>500</u>		<u>1,000</u>	
	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>	<u>KILOWATTS</u>
	<u>KWH-000's</u>		<u>KWH-000's</u>		<u>KWH-000's</u>		<u>KWH-000's</u>		<u>KWH-000's</u>	
	<u>15</u>	<u>30</u>	<u>30</u>	<u>60</u>	<u>60</u>	<u>120</u>	<u>100</u>	<u>200</u>	<u>200</u>	<u>400</u>
Boston	2.57	1.80	2.30	1.63	2.13	1.54	2.06	1.51	2.01	1.48
Bridgeport	2.68	2.11	2.49	1.82	2.13	1.64	1.99	1.57	1.88	1.51
Brockton	2.42	1.70	2.07	1.45	1.78	1.27	1.72	1.21	1.66	1.18
Cambridge	2.21	1.54	1.93	1.38	1.83	1.33	1.77	1.28	1.65	1.22
Fall River	2.59	1.90	2.28	1.74	2.11	1.62	1.95	1.53	1.80	1.45
Hartford	2.31	1.60	2.13	1.51	1.91	1.40	1.82	1.35	1.75	1.32
Holyoke	1.37	1.35	1.35	1.31	1.31	1.24	1.29	1.15	1.15	1.08
Lawrence	2.10	1.55	2.01	1.50	1.92	1.46	1.87	1.43	1.83	1.42
Lowell	2.19	1.57	2.09	1.52	1.89	1.42	1.81	1.38	1.75	1.35
Lynn	2.15	1.59	2.11	1.57	2.06	1.55	2.03	1.53	2.01	1.52
Malden	2.45	1.70	2.22	1.59	2.02	1.49	1.89	1.42	1.79	1.37
Manchester	1.97	1.43	1.82	1.36	1.73	1.31	1.69	1.29	1.54	1.12
Medford	2.45	1.70	2.22	1.59	2.02	1.49	1.89	1.42	1.79	1.37
New Bedford	2.21	1.83	2.13	1.80	1.82	1.64	1.67	1.57	1.57	1.51
New Britain	2.53	1.81	2.21	1.63	2.05	1.50	1.90	1.41	1.77	1.32
New Haven	2.68	2.11	2.49	1.82	2.13	1.64	1.99	1.57	1.88	1.51
Newton	2.57	1.80	2.30	1.63	2.13	1.54	2.06	1.51	2.01	1.48
Providence	2.24	1.57	2.05	1.48	1.92	1.41	1.83	1.37	1.71	1.31
Quincy	1.88	1.47	1.77	1.36	1.70	1.32	1.68	1.31	1.65	1.30
Somerville	2.57	1.80	2.30	1.63	2.13	1.54	2.06	1.51	2.01	1.48
Springfield	2.27	1.58	2.00	1.40	1.87	1.33	1.80	1.30	1.76	1.28
Waterbury	2.53	1.81	2.21	1.63	2.05	1.50	1.90	1.41	1.77	1.32
Worcester	1.88	1.42	1.79	1.37	1.74	1.35	1.72	1.34	1.71	1.33

COMPARE:

Chattanooga	1.37	.98	1.23	.83	1.08	.72	1.01	.65	.91	.60
Tacoma	1.01	.72	.84	.57	.70	.50	.64	.47	.59	.45

SOURCE

Federal Power Commission  
Typical Electric Bills, 1947,  
 pp. 24-33.

again be available. See Table I-6, page 14.

New England depends heavily on steam, for which coal is most extensively used, and fuel oil somewhat less.<sup>10</sup> The cost of operation and maintenance of a steam-electric plant is relatively high. In the case of New England, while only the highest grade ores are used, the cost of shipping the coal is a very large item. Since the high-speed turbines of a steam station cannot be thrown into full service quickly, in contrast to a hydroelectric station, a hot reserve must be kept in operation, and this too keeps costs up. Finally, the cost of labor must be considered - labor both to maintain a plant and produce the coal.

For these reasons, the cost of power in New England is high, and it is not likely to decrease within the foreseeable future. For these reasons, also, the wide differences in rates and bills shown in Tables I-2, I-4, and I-5 are not completely comparable. It is natural to expect that rates in the Pacific Northwest, which has a very great proportion of hydroelectric power, will be lower than those in New England.

The developed generating capacity of New England is shown in Table I-7, page 15; the developed water power is shown in Figure I-2, and the developed steam and diesel

10. In 1939 the cost per million BTU of fuel consumed in manufacturing industries was 15.8 cents for the United States, and 20.8 cents for New England. Fuel oil accounted for 15.7% and natural gas for 17.1% of the country's fuel consumption, while the corresponding figures for New England were 34.3% and 0%, respectively. Harris, Seymour E., "New England's Decline in the American Economy", 25 Harvard Business Review 358, Spring, 1947.

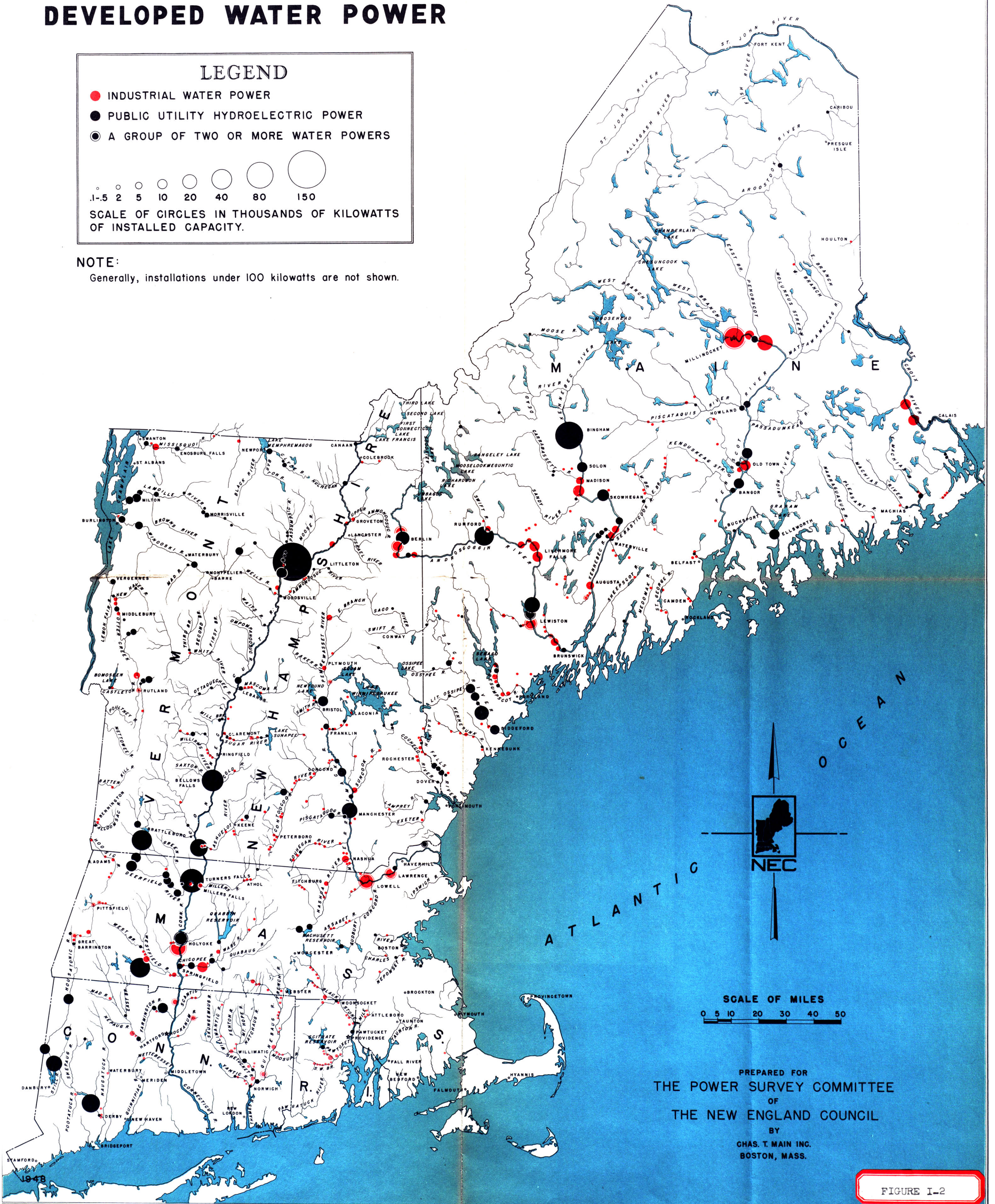
# DEVELOPED WATER POWER

**LEGEND**

- INDUSTRIAL WATER POWER
- PUBLIC UTILITY HYDROELECTRIC POWER
- A GROUP OF TWO OR MORE WATER POWERS

SCALE OF CIRCLES IN THOUSANDS OF KILOWATTS OF INSTALLED CAPACITY.

**NOTE:**  
Generally, installations under 100 kilowatts are not shown.



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OF  
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BY  
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BOSTON, MASS.

FIGURE I-2

TABLE I-6

NEW POWER GENERATING CAPACITY UNDER WAY SINCE AUGUST, 1945,  
TO BE IN OPERATION BY JANUARY 1, 1951

	<u>STEAM PLANTS</u>		<u>HYDRO PLANTS</u>		<u>ALL PLANTS*</u>		<u>PER CENT OF TOTAL</u>
	<u>NO.</u>	<u>CAPACITY (KW)</u>	<u>NO.</u>	<u>CAPACITY (KW)</u>	<u>NO.</u>	<u>CAPACITY (KW)</u>	
New Hampshire	6	73,500	2.5	29,400	11.5	106,300	9.3
Vermont	2	1,500	3.5	20,400	8.5	30,200	2.6
Massachusetts	26	464,000	2	4,700	32.	477,700	41.8
Connecticut	12	361,000	0		12	361,000	31.5
Total	46	900,000	8	54,500	64	975,200	85.2
New England	63	1,039,000	9	71,300	88	1,144,300	

\*\*\*\*\*

SOURCE

Unpublished data compiled by Truman  
Safford of Charles T. Main, Inc., Engineers.

\*  
Includes generating plants of all types: steam, hydroelectric,  
and internal combustion

TABLE I-7

INSTALLED HYDROELECTRIC GENERATING CAPACITY IN NEW ENGLAND

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>PUBLIC</u>	<u>INDUSTRY</u>	<u>(1) &amp;</u>	<u>% of (3)</u>	<u>Non-Elec.</u>	<u>Total</u>
	<u>UTILITY</u>		<u>(2)</u>	<u>to Total</u>	<u>Hydro</u>	<u>Hydro</u>
			<u>TOTAL</u>	<u>Capacity</u>	<u>Capacity</u>	<u>Capacity</u>
New Hampshire	255,000	57,000	312,000	67.5	16,700	328,700
Vermont	146,000	16,000	162,000	82.5	6,800	168,800
Massachusetts	167,000	66,000	233,000	11.1	12,700	245,700
Connecticut	87,000	19,000	106,000	8.9	5,500	111,500
Total	655,000	158,000	813,000	20.6	41,700	854,700
Conn. Basin	441,000	46,000	487,000		18,900	505,900
New England	921,000	315,000	1,236,000	24.8	125,000	1,361,900

INSTALLED STEAM GENERATING CAPACITY IN NEW ENGLAND

	(7)	(8)	(9)	(10)
	<u>PUBLIC</u>	<u>INDUSTRY</u>	<u>TOTAL</u>	<u>GRAND</u>
	<u>UTILITY</u>			<u>TOTAL</u>
New Hampshire	98,000	47,000	145,000	462,000
Vermont	15,000	10,000	25,000	196,400
Massachusetts	1,254,000	592,000	1,846,000	2,101,400
Connecticut	828,000	246,000	1,074,000	1,189,000
Total	2,195,000	895,000	3,090,000	3,948,800
New England	2,617,000	1,079,000	3,696,000	4,997,000

\*\*\*\*\*

SOURCE

Unpublished data compiled by Truman  
Safford of Charles T. Main, Inc., Engineers.

power in Figure I-3.

It is now pertinent to examine New England's undeveloped hydroelectric potential. Preliminary to such an investigation, however, is required a discussion of what is an economically feasible power site. The answer to this question depends on who is going to develop the site, a private company or the Federal Government.

If a potential power site is to be developed by private interests, it must stand the test of competition with power generation by coal or fuel oil, and the needs of the utility's complete power system. Most of the nation's rivers have a very wide seasonal variation in flow, and this is certainly true of the Connecticut River. Thus, dependence on the flow of the river without storage for a steady output of power, called base power, is likely to result in a high cost per kilowatt of capacity. Secondly, the flow of a river is also dependent on the total effect of all reservoirs and dams on the river and its tributaries. The Connecticut, like most of the nation's rivers, was developed haphazardly by the power companies, with an eye to developing only the available head at a particular place and with no regard for the flow along the entire river. The only exception to this is the Deerfield river, a tributary of the Connecticut, which has been extensively developed by one company.

A private company must consider the integration of a potential hydroelectric site with its existing system. The erection of a reservoir at the site would enable the genera-

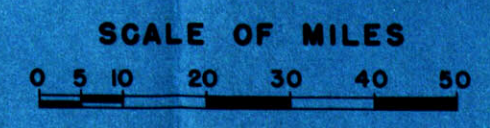
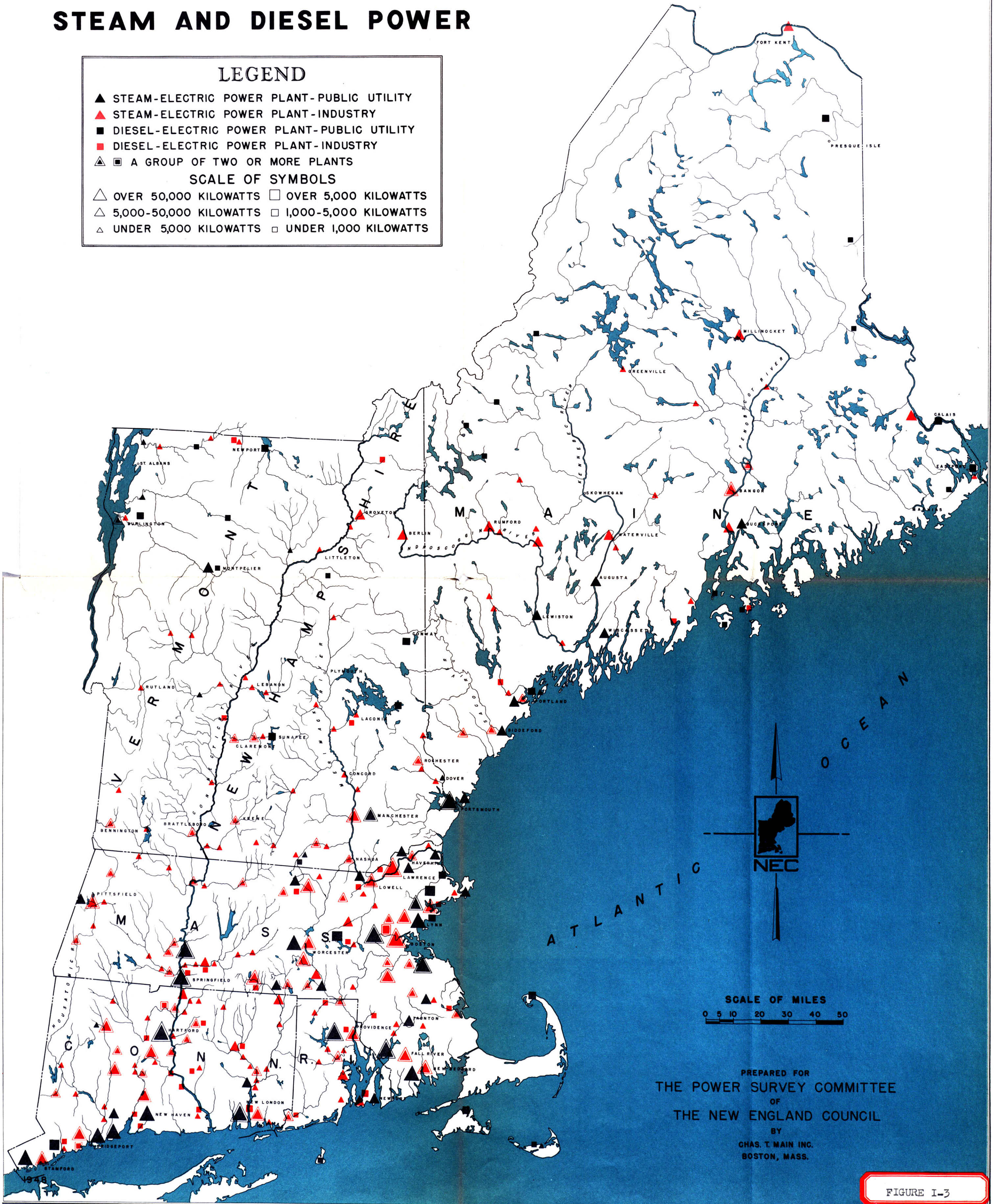
# STEAM AND DIESEL POWER

## LEGEND

- ▲ STEAM-ELECTRIC POWER PLANT-PUBLIC UTILITY
- ▲ STEAM-ELECTRIC POWER PLANT-INDUSTRY
- DIESEL-ELECTRIC POWER PLANT-PUBLIC UTILITY
- DIESEL-ELECTRIC POWER PLANT-INDUSTRY
- △ □ A GROUP OF TWO OR MORE PLANTS

### SCALE OF SYMBOLS

- |                          |                         |
|--------------------------|-------------------------|
| △ OVER 50,000 KILOWATTS  | □ OVER 5,000 KILOWATTS  |
| △ 5,000-50,000 KILOWATTS | □ 1,000-5,000 KILOWATTS |
| △ UNDER 5,000 KILOWATTS  | □ UNDER 1,000 KILOWATTS |



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FIGURE I-3

tion of peak power, power which is generated for several hours a day at a greater capacity than it could carry continuously. But such power must be accompanied by base power -- a steam generating plant -- in order to create a well-balanced system. Thus it is one thing if such a hydroelectric station is needed to round out a system, and another thing if no extra steam generating facilities are available. It is conceivable, of course, that there might be a need for peak power alone. However, it is a characteristic of New England industry that base and not peak power is generally required.

The Federal Government, on the other hand, is not required to make a comparison between the costs of steam and hydro plants, nor is it required to pay taxes. Furthermore, unlike private development, a federal project is designed for multiple purposes, wherever such is possible. Thus some of the costs of the project may be ascribed to flood control or navigation, and the cost of the generated power is thereby greatly reduced. It was estimated by the Army Engineers in 1939 that the cost of power at the proposed federal project of Enfield Dam on the Connecticut River would be 3.5 mills, while at the same time the Army was paying private interests 13.5 mills at nearby Bradley Field.<sup>11</sup> The Federal Government must consider the integration and balance of its system just as private interests do as indicated by the recent proposal -- which failed of

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11. Report of the Special Commission to Investigate Connecticut River Navigation, House Document #1730, Boston, Mass., December, 1946.

passage-- to build a steam plant at New Johnsonville in the Tennessee Valley Authority.

This difference in approach to the economic feasibility of hydroelectric sites, as briefly described in the preceding paragraphs accounts for the great difference in the estimates of Table I-8, page 19. The figures in Column 1 are based on costs to a private company, but since they are estimated on the basis of stream flow available 20% of the time, and do not take into consideration the effect on downstream flow of flood control reservoirs now under construction, they are probably conservative. Although the estimates in Column 2, those of the National Resources Committee, would be somewhat less if recomputed on the basis of present day costs, the difference between the two columns would still be significant.

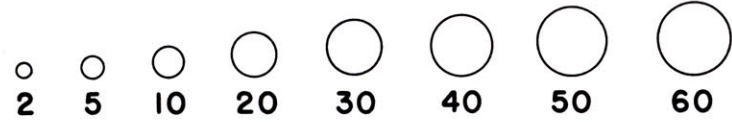
The principal sites with undeveloped hydroelectric potential on the Connecticut River are located at Enfield Rapids in Connecticut and Upper Fifteen Mile Falls in New Hampshire; both sites are privately owned. The Enfield project is dependent on the navigation proposals between Hartford and Holyoke, while the other is scheduled for private development as soon as industrial demand warrants it. See Figure I-4.

It is necessary to inquire as to the need for additional power in New England and as to whether more and cheaper power would attract new industry to the region. While it is difficult to ascertain the relative weight of purchased power in the total cost of a manufactured good, reasonable indications

# UNDEVELOPED WATER POWER

## LEGEND

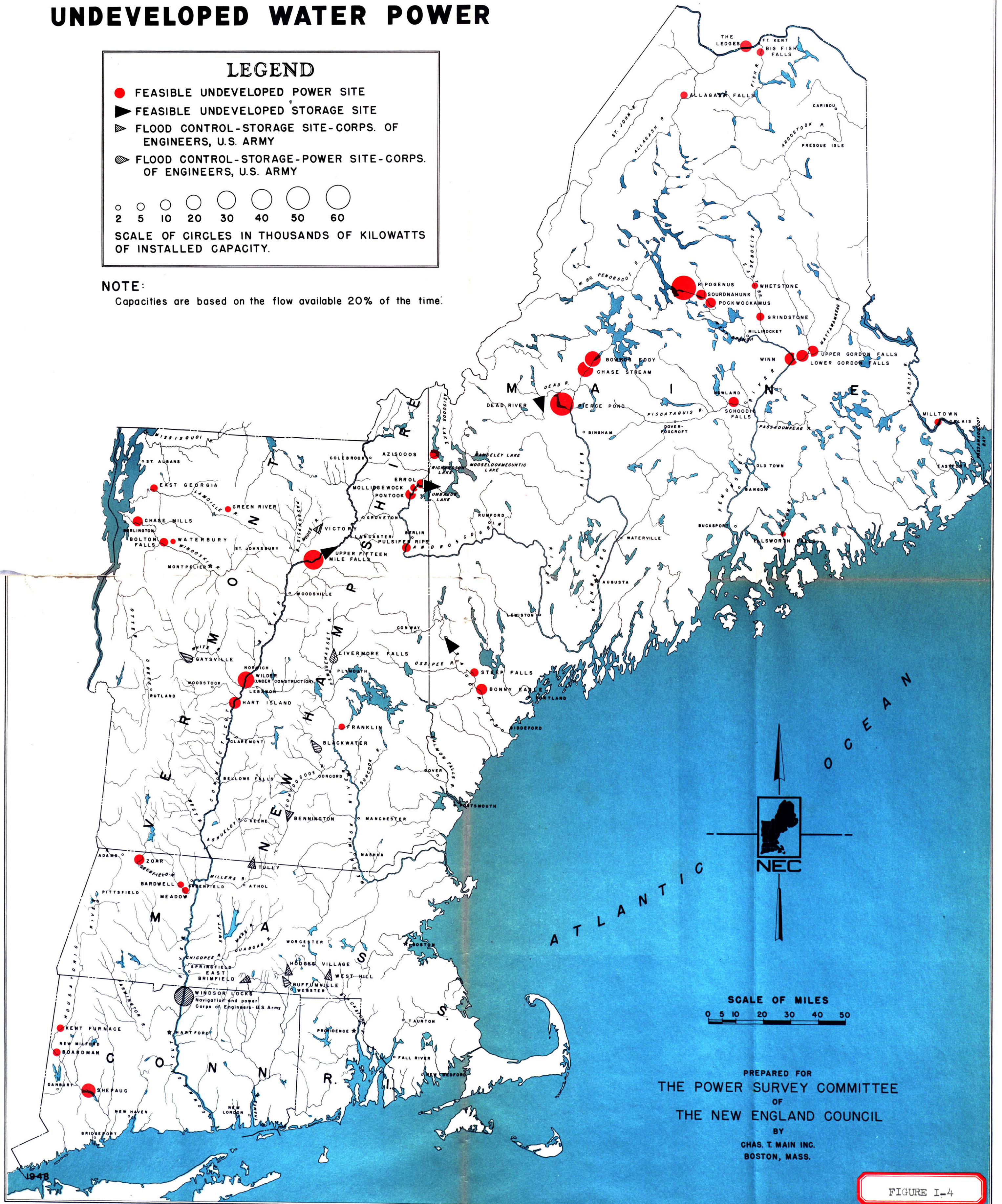
- FEASIBLE UNDEVELOPED POWER SITE
- ▶ FEASIBLE UNDEVELOPED STORAGE SITE
- ▴ FLOOD CONTROL-STORAGE SITE-CORPS. OF ENGINEERS, U.S. ARMY
- ▾ FLOOD CONTROL-STORAGE-POWER SITE-CORPS. OF ENGINEERS, U.S. ARMY



SCALE OF CIRCLES IN THOUSANDS OF KILOWATTS OF INSTALLED CAPACITY.

### NOTE:

Capacities are based on the flow available 20% of the time.



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FIGURE I-4

TABLE I-8

UNDEVELOPED HYDROELECTRIC POWER IN NEW ENGLAND

<u>AREA</u>	(1)	(2)
Maine	263,000	364,000
New Hampshire	83,000	234,400
Vermont	25,000	418,100
Massachusetts	18,000	48,800
Rhode Island		
Connecticut	31,000	116,200
Connecticut River Basin	69,000	373,600
Total: Four Conn. Basin States	157,000	817,500
Total: New England	420,000	1,182,400

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SOURCES

- (1)--Unpublished data compiled by Truman Safford of Charles T. Main, Inc., Engineers.
- (2)--National Resources Committee, Energy Resources and National Policy, January, 1939, pp. 300-301.

are that in some industries it is a comparatively unimportant factor.<sup>12</sup> A more authoritative analysis has been made by Lincoln Gordon, who has written<sup>13</sup> that with the single exception of the aluminum industry, in which the cost of power is significant, there is little movement of industry merely for the purpose of obtaining cheaper power.

Nevertheless the question of power costs cannot be completely dismissed. While it may not be a deciding factor in the decision of an industry to locate here or there, or to change its present location, it is one of many factors all of which must be taken into consideration. It is misleading, therefore, to disregard this factor so completely as did the Special Unpaid Commission Relative to the Development of Inland Waterways of the Commonwealth.<sup>14</sup>

Since this Commission was an unpaid one, original research was impossible. It relied instead on a report made in 1918, and concluded that since the density of population and the value of property are comparatively high in Massachusetts, and the factor of power is negligible in manufacturing costs, there was no need to develop whatever economically feasible potential remained in this state.<sup>15</sup> The majority of this Commission included in its report an

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12. The Report of the Special Unpaid Commission Relative to the Development of Inland Waterways of the Commonwealth, House Document #1765, Boston, Mass., 1948, quotes Harvard Business School sources as stating that in all manufacturing industries combined the cost of power reaches less than one per cent of the total operating expense. (p.24.)

13. Gordon, Lincoln, "Power and Fuels" in National Resources Committee, Industrial Location and National Resources, 1943.

14. Report, op. cit. pp. 23-24

15. Ibid., p. 24.

editorial from the Los Angeles Examiner, entitled "Tennessee Valley Authority--A Horrible Example".<sup>16</sup>

The minority report of this Commission presented a more convincing brief for the need to develop the remaining hydroelectric potential in Massachusetts, basing that conclusion on testimony given before the Commission by operators of factories in the western part of the state. A compelling argument advanced by these operators was that although the Governor has the authority to request the War Department to provide a regulated flow of water from Knightville Reservoir on the Westfield River, and although such a regulated flow was in fact provided by the Army during the war, that Reservoir is not being used now for that purpose.<sup>17</sup>

The minority's position was stated as follows:

"While in general the potential amount of electricity which may be made from water flow in Massachusetts may be limited because streams of this State do not drop so precipitously as do those of its sister States to the north, that still is no justification for Massachusetts not employing to the fullest extent the advantages that do exist."<sup>18</sup>

Another very important aspect of hydroelectric power in the Connecticut River Basin has been the controversy over the proposed development at Enfield Rapids in Connecticut, a project which is part of the plan to extend the navigation

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16. Ibid., pp. 44-45.

17. If a regulated flow was provided during the war with beneficial results, as claimed by the minority of the Commission, it is difficult to understand the basis of the following quotation from the Corps of Engineer's Comprehensive Plan for Flood Control, Connecticut River Basin, Boston, March 1947: "Modification of the Knightville Reservoir to provide low flow regulation is under study." (p. 26).

18. Ibid., p. 54.

of the Connecticut River from Hartford to Holyoke. The navigation elements of the dispute will be discussed in the section dealing with that subject.

The most economical plan of many suggested by the Army for the Enfield development calls for the installation of a hydroelectric plant at Enfield, the capacity of which would be an initial 29,500 kilowatts and an ultimate 37,200 kilowatts.<sup>19</sup> Since this is but the latest of a long series of similar proposals, it is necessary to recount briefly the history of the Hartford-Holyoke navigation project insofar as it relates to the power plant at Enfield Rapids.

The Northern Connecticut Power Company, which owned the water rights at Enfield Rapids, was issued a license in 1928 by the Federal Power Commission for the construction of a power dam at that site. It will be recalled that this was during what might be termed the weak period of the Federal Power Commission. The Rivers and Harbors Act of July 3, 1930 authorized the dredging of a canal from Hartford to Holyoke, provisional upon the prior commencement of construction of a power dam and locks at Enfield by State, municipal or private interests, under license by the Federal Power Commission. Since the Northern Connecticut Power Company already held such a license, the entire project in fact hinged upon the decision of that utility.

It will be recalled also that in 1931 the Federal Power Commission became an independent agency and immedi-

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19. House Document 165, 76th Congress, 1st Session, p. 6

ately asserted its new authority by declaring that no project affecting the interests of interstate commerce could be constructed until all the conditions (Table I-1, page 7) of the Federal Power Act of 1920 had been met. The Northern Connecticut Power Company failed to commence construction of the dam and locks within the prescribed period of time, and its license was accordingly terminated by the Federal Power Commission in 1931. The reasons for the Company's failure to begin the work may be only conjectured. One possibility is the general feeling shared by most utilities at that time, and now, against the recapture and rate-reviewing provisions of the Power Act; another, perhaps, is the unwillingness of the Company to be the instrument by which the Federal Government obtained an entering wedge into the Connecticut Valley; finally, since the Enfield Dam and the Hartford-Holyoke canal were packaged together, the private interests opposing the canal probably found a corporately connected and willing ear in the power interests opposing the Enfield project. From the Company's point of view, another reason might be stated as follows: whereas the plant at Enfield was economically feasible in 1928, changes in the New England power demand nullified the necessity for peak power, rendering construction in 1931 impractical. The remaining aspects of the navigation controversy will be discussed in another section devoted to that subject.

"Water power is wasted if not used," the National

Resources Committee has written,<sup>20</sup> while setting forth the elements of a sound public policy toward energy resources. This policy should include active multiple-purpose development of water resources in order to best approach a solution to problems of flood control, pollution, irrigation, water supply, and navigation, and in order to promote public development of water power.

"The Federal Government should have primary authority and responsibility for the design and execution of these multiple-purpose drainage basin plans for development and conservation of water resources. Private business firms cannot be expected to undertake the several important nonpower functions which cannot yield salable products. Moreover, private business firms cannot be expected to bring about the most economic development of water power, because the necessary storage does not seem to be generally justifiable for power alone."<sup>21</sup>

It is not within the scope of this paper to discuss the pros and cons of federal development of the country's hydroelectric potential. However, a position is taken that the United States should have authority over river basins in the interests of their best development. As far as the Connecticut River Basin is concerned, it seems certain that the most economically feasible sites yet remaining will be developed by private interests. These should harmonize with federal plans for the river basin.

But undoubtedly there is a considerable amount of potential in the Connecticut Basin which could be economi-

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20. Ibid., p. 27.

21. House Document 412, 74th Congress, 2nd Session.

cally developed only by the Federal Government. The Army's comprehensive plan of 1936<sup>22</sup> for the development of the Connecticut River Basin's hydroelectric potential included 41 sites, of which 22 were for the development of power and 19 for storage to benefit downstream power plants. In the Army's Comprehensive Plan of 1947, of the 22 proposed projects, only one--Gaysville, Vermont-- is being planned on a multiple-purpose basis with provision for a future penstock, and 3 others are being considered for conservation storage. It is pertinent to inquire into possible reasons for the difference between these two programs. The undeveloped potential at federal projects in the Connecticut Basin is shown in Table I-9, page 26.

The Flood Control Act of 1938<sup>23</sup> provided that:

"penstocks or other similar facilities adapted to possible future use in the development of hydroelectric power shall be installed in any dam herein authorized when approved by the Secretary of War upon the recommendation of the Chief of Engineers and of the Federal Power Commission."

The Flood Control Act of 1944,<sup>24</sup> which will be discussed more fully in the section on Flood Control, directed that the Corps of Engineers cooperate with the States in planning flood control projects and that if a difference of opinion arose, both sides of the controversy were to be presented to Congress for its final decision. Certain already authorized projects were exempt under this 1944 legislation from this procedure, and others, known

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22. House Document 412, 74th Congress, 2nd Session.

23. 52 Stat. 1215 (1938).

24. Public Law 534, 78th Congress, 1st Session.

TABLE I-9

UNDEVELOPED HYDROELECTRIC POWER AT FLOOD CONTROL OR NAVIGATION  
PROJECTS IN THE CONNECTICUT BASIN

<u>AREA</u>	<u>PROPOSED INSTALLED CAPACITY (KW)</u>	<u>AVERAGE ANNUAL ENERGY (KWH)</u>	<u>CONSERVATION STORAGE FOR DOWNSTREAM POWER (acre-feet)</u>
New Hampshire	38,000	80,000,000	329,000
Vermont	10,000	37,000,000	93,000
Massachusetts	none	none	61,000
Connecticut	32,000	185,000,000	none
Conn. Basin	42,000	222,000,000	147,000
Total: Four Basin States	80,000	302,000,000	483,000
Total: New England	80,000	302,000,000	483,000

\*\*\*\*\*

SOURCE

Unpublished data compiled from Army material by Truman Safford of Charles T. Main, Inc., Engineers.

to be controversial, were directed to be submitted to it. The Army, however, has followed the spirit instead of the letter of the law and has referred even the exempt objects to the States.<sup>25</sup>

It may be reasonably maintained that the Army Engineers are more responsive to local officials and the States than the Federal Power Commission would be if it were placed in a similar position with regard to the problems of the nation's rivers. The Army is more interested in combatting floods and in getting preventive measures constructed than in comprehensive planning for an entire watershed, which would include water supply, irrigation, reforestation, and pollution. If it is assumed further that the States are quite responsive to the private interests within their borders, and that this results in an official State position, it is likely that the Army would not object greatly in accepting a State proposal for one dam without power, in place of another dam with power.

The position of the four Connecticut Basin states with respect to power development by the Federal Government will be discussed more fully in succeeding sections, but it may be noted now that they have been firm in resisting such development and that a change in their position is unlikely. The resultant of all these factors--the state's point of view, the Army's apparent willingness to accede to it, the

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25. Vermont State Water Conservation Board, Effects in Vermont of the Comprehensive Plan for Flood Control of the Connecticut River, Montpelier, 1947, p. 15.

lack of a federal or regional plan for the comprehensive development of the Basin's water resources and the lack of an agency to effectuate it, and the resistance of private interests-- all these indicate that much of the hydroelectric potential in the Connecticut River Basin will remain undeveloped.

### SECTION 3 -- FLOOD CONTROL

Floods are relatively frequent in the Basin of the Connecticut River. Topography and geographical position combine to make floods possible at any time of the year except winter. Flood stages in the lower river occur nearly every spring, due to melting snow or spring rains or a combination of the two. The most serious problem exists on the lower reaches of the river, where there are large concentrations of industry and urban population. A complete program of flood control for the Basin must include dikes and levees at the cities of the lower river, and reservoirs and dams at the headwaters. It is because of a decade-long controversy over the latter that an interstate planning problem in flood control exists in the Connecticut River Basin. The following paragraphs recount briefly the three major floods in this area in modern times; Table I-10, page 30, shows the damages in these disasters.

The flood of November 2-4, 1927, was caused by an Atlantic coastal storm, which, moving further inland than usual, precipitated in northern Vermont on ground already heavily saturated by October rains.<sup>1</sup> Most of the damage occurred in the valley of the Winooski River, which is not a tributary of the Connecticut, but a considerable loss of life and property did occur on tributaries of that river, and damage was sustained in all four states of the Basin. Several retarding basins were later constructed in the

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1. State of Vermont, Water Resources and Electrical Energy, Montpelier, Vt., 1941, p. 6.

TABLE -- I-10

SUMMARY OF DIRECT AND INDIRECT LOSSES BY STATES

	Flood of November, 1927		<u>Total Loss</u>
	<u>Direct Loss</u>	<u>Indirect Loss</u>	
Vermont	\$10,981,000	\$ 9,882,000	\$20,863,000
New Hampshire	1,767,000	1,558,000	3,325,000
Massachusetts	2,157,000	1,848,000	4,005,000
Connecticut	621,000	526,000	1,147,000
Total	<u>\$15,526,000</u>	<u>\$13,814,000</u>	<u>\$29,340,000</u>

	Flood of March, 1936		<u>Total Loss</u>
	<u>Direct Loss</u>	<u>Indirect Loss</u>	
Vermont	\$ 1,765,000	\$ 1,169,000	\$ 2,934,000
New Hampshire	2,342,000	1,528,000	3,870,000
Massachusetts	19,000,000	17,226,000	36,226,000
Connecticut	11,393,000	11,988,000	23,381,000
Total	<u>\$34,500,000</u>	<u>\$31,911,000</u>	<u>\$66,411,000</u>

	Flood of September, 1938		<u>Total Loss</u>
	<u>Direct Loss</u>	<u>Indirect Loss</u>	
Vermont	\$ 3,809,000	\$ 3,489,000	\$ 7,298,000
New Hampshire	1,125,000	962,000	2,087,000
Massachusetts	15,553,000	14,422,000	29,975,000
Connecticut	5,109,000	4,114,000	9,223,000
	<u>\$25,596,000</u>	<u>\$22,987,000</u>	<u>\$48,583,000</u>

Source: Comprehensive Plan for Flood Control--Connecticut River Basin, Corps of Engineers, Boston, Mass., March 1947, pp. 11-12

Winooski Valley.

January and February of 1936 were marked by a series of heavy snow storms and almost continual freezing temperatures in New England and elsewhere in the Northeast.<sup>2</sup> This was followed in early March by a sudden period of thawing temperatures and heavy rainstorms. The ice cover on the Connecticut River alternately broke and jammed: as it broke, it caused serious destruction of property, and as it jammed, it backed up the rising floodwaters to higher and higher levels. A final period of rain and warm weather in the latter part of March climaxed the unprecedented disaster. At the height of the floods, the Hartford gauge rose nearly 8 feet beyond the highest point recorded in 300 years.

Although the flood of September, 1938, fell short of the 1936 floodcrest by two feet, it established a precedent of its own in that no other major New England flood had ever occurred in September.<sup>3</sup> There had been unusually heavy rains in July of that year, which had raised the ground water table and had filled streams and reservoirs. A five-day period of precipitation, beginning September 17, was climaxed on the 21st by the freak course of a tropical hurricane. Another unusual feature of this flood was that most of the tributaries of the Connecticut reached stages far

2. U.S. Department of the Interior, The Floods of March, 1936; Part I: New England Rivers, Geological Survey Water-Supply Paper 798, Washington, 1937.

3. State Water Commission, Seventh Biennial Report, 1936-38, Hartford, Conn., 1938, p. 24.

in excess of the 1936 flood.

New England's efforts to control floods in the valley of the Connecticut River must be analyzed in the light of contemporaneous national political developments, as well as a long-range perspective of cyclical changes in the answers to fundamental governmental problems. An historical approach will reveal that these efforts occurred at the same time that the pendulum oscillating between States' rights and a stronger Federal Government was swinging rapidly toward the latter.

At a time when federal planning necessarily encompassed the national economy and national resources, because of the huge sums involved in the solution of economic problems and the control of nature, New England maintained its traditional States' rights stand.

It may be argued that such an independent spirit has operated to the detriment of the people of the Connecticut Valley and New England as a whole. But it must be remembered that this position is a reflection of local sentiment, which cannot be dismissed lightly, even if one premises the more fundamental importance of regional considerations.

The Connecticut State Water Commission in 1935 secured the passage of an act which had for its primary purpose the control of pollution of waters common to two or more of the New England States. The wording of this legislation was sufficiently broad to permit negotiations between states not only on the basis of pollution control, but also for

flood control:

"....such treaty....to cover comprehensively all matters relating to the development, and improvement, including elimination of pollution, and the carrying out of public works projects on the banks and areas adjacent thereto, of the natural waterways flowing through or situated between any of the said states and the State of Connecticut, and of the natural waterways of said states and the State of Connecticut flowing respectively thereto."<sup>4</sup>

Spurred into action by the floods of March, 1936 the other states of the Basin followed the lead of Connecticut. New Hampshire created a Water Resources Board with broad authority over the waters of the state; Vermont appointed a similar commission, and Massachusetts concurred on May 20, 1936.<sup>5</sup>

The floods of March, 1936 were not geographically confined, but were widespread in the northeastern states and served to attract enough national attention to the problem of flood control that Congressional action was stimulated. These were record floods which impressed upon the people of the flooded areas the magnitude of the problem of carrying flood waters down thousands of miles of tributaries and river channels through heavily populated and industrialized cities to the ocean. The floods stimulated the search for a solution and for protection.

The Corps of Army Engineers had been investigating flood control in the Connecticut River Basin for five years before these floods, and in February, 1936, after three hundred sites

4. Quoted in State Water Commission, Sixth Biennial Report, 1934-36, Hartford, Conn., 1936, p. 13.

5. Ibid., p. 14.

had been studied, 33 projects were proposed as an ultimate plan of flood control, ten of which were chosen as best suited for the initial phase of the program.<sup>6</sup> These 33 projects are listed in column (1) of Table I-11, page 35.

During the Spring of 1936 Congress debated the Copeland or Omnibus Flood Control Act, and in June passed it.<sup>7</sup> This Act established for the first time a federal flood control policy. This policy recognized that destructive floods constituted a menace to the national welfare; that flood control on navigable waters or their tributaries was a proper activity of the Federal Government in co-operation with states; that improvement of waterways for flood control is in the interest of the general welfare, and that the Federal Government should improve or participate in the improvement of waterways for flood control purposes, if the benefits to whomsoever they may accrue were in excess of the estimated costs. The bill provided that the Federal Government would pay the entire cost of constructing impounding reservoirs as its share of the expense of a flood control project. And as their share the benefitted states or communities would have to furnish the land and damage costs.

The bill also gave the advance consent of Congress for two or more states to enter into compacts or agreements in connection with any project or operation authorized by the act for flood control, or any stream or streams or their tributaries which lie in those states, for the purpose of

6. Connecticut River, Conn., Mass., N.H., and Vt., House Document 412, 74th Congress, 2nd Session.

7. 49 Stat. 1570.

TABLE I-11

A COMPARISON OF FLOOD CONTROL PLANS FOR THE CONNECTICUT BASIN

	(1) ARMY <u>1935</u>	(2) COMPACT <u>1936</u>	(3) ARMY <u>1937</u>	(4) ARMY <u>1940</u>	(5) ARMY <u>1947</u>
<u>NEW HAMPSHIRE</u>					
HAPPY CORNER	X				
PITTSBURG	X				
PERRY BROOK	X				
KIM DAY	X				
INDIAN STREAM	X				
KIDDERVILLE	X				
BOG DAM	X				
PHILLIPS BOG	X				
JEFFERSON	X				
UPPER 15 MILE FALLS	X				
BETHLEHEM JUNCTION	X	X	X		
ALDER BROOK	X				
GALE RIVER	X				
STOCKER POND		X			
SURRY MOUNTAIN		X	X	X	X
CLAREMONT			X	X	X
HONEY HILL				X	X
WEST CANAAN				X	
SUGAR HILL				X	X
COLD RIVER					X
OTTER BROOK					X
<u>VERMONT</u>					
EAST HAVEN	X		X		
EAST BURKE	X				X
LYNDONVILLE	X				
LYNDON CENTER	X		X		
VICTORY	X	X	X	X	
KEISER POND	X				
GROTON POND	X	X	X		
SOUTH BRANCH	X		X		
UNION VILLAGE	X	X	X	X	X
GAYSVILLE	X		X	X	X
AYERS BROOK	X		X		
NORTH RANDOLPH	X				
SOUTH TUNBRIDGE	X		X	X	
BRIDGEWATER CORNERS	X				
LUDLOW	X			X	
AMSDEN	X				
THE ISLAND	X				X
NORTH LANDGROVE	X				
NEWFANE	X		X		
NORTH HARTLAND		X	X	X	X
NORTH SPRINGFIELD			X	X	X
HARVEY LAKE			X		
WILLIAMSVILLE				X	
CAMBRIDGEPORT				X	X
BROCKWAY				X	X
RANDOLPH					X
SOUTH RANDOLPH					X
TOWNSHEND					X
BALL MOUNTAIN					X
<u>MASSACHUSETTS</u>					
KNIGHTVILLE	X	X	X	X	X
TULLY		X	X	X	X
PRIEST POND		X			
LOWER NAUKEAG		X	X		
BIRCH HILL			X	X	X
WEST BROCKFIELD				X	
BARRE FALLS				X	X

allocating funds for construction and maintenance, payment of damages, purchase of lands, easements, and rights of way, such allocations to be agreed on by the states and approved by the Secretary of War. Section 3 of the Act read as follows:

"That hereafter no money appropriated under authority of this Act shall be expended on the construction of any project until States, political subdivisions thereof, or other responsible local agencies have given assurances satisfactory to the Secretary of War that they will (a) provide without cost to the United States all lands, easements and rights-of-way necessary for the construction of the project, except as otherwise provided herein; (b) hold and save the United States free from damages due to the construction works; (c) maintain and operate all the works after completion in accordance with regulations prescribed by the Secretary of War.

The debate in Congress over the Copeland Act had centered principally over costs: should the whole cost of flood control works be borne by the Federal Government, or should the benefitted states assume a portion thereof? It was the opinion of the bill's sponsors that if the Federal Government assumed the entire cost of a flood control program, the result would be powerful, pork-barrelling pressure on Congress to authorize large appropriations for projects of doubtful merit. It was argued that if the benefitted states were required to pay part of the costs, only projects of demonstrable value would be submitted to the Congress for approval. Section 3, quoted above, represented this reasoning.

Section 3 represented, also, the States' rights viewpoint. It is a reasonable assumption that it was intended as a negative clause; to prevent the possible consequences

of full payment by the Federal Government. It is also reasonable to assume that it was not intended as a positive tool, a means by which to avoid flood control altogether.

Massachusetts and Connecticut were anxious to see a program of flood control initiated. The Army proposals had made it clear that such a program would necessitate the inundation of many acres of dairyland in Vermont and New Hampshire and the inevitable opposition to this made it evident that no State would accomplish anything by itself. The stage was thus set for regional cooperation.

Two weeks before the passage of the Copeland Act, Congress approved a measure authorizing all the states which had suffered damage in the March floods to enter into compacts in order to secure protection from floods, and for other reasons.<sup>8</sup> Thus two acts of Congress, the special one of June 3 and the Copeland Act, and the voluntary action of the states during the Spring of 1936, were all promising milestones on the path to regional cooperation.

The first meeting of the four state commissions to discuss mutual problems in the Connecticut Basin was held June 3, 1936 in Boston.<sup>9</sup> Exhaustive study was given to the problem of the respective benefits to be derived by each state, in order to allocate as exactly as possible the costs among them.<sup>10</sup> During the latter half of 1936 the representa-

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8. Passed June 8, 1936, 74th Congress, 2nd Session.

9. Wadhams, S. H., "Historical Account of Flood Control Compacts for the Connecticut River", The Connecticut Society of Civil Engineers, Annual Report, 1938, New Haven, Conn., 1938, p. 54.

10. *Ibid.*, p. 55.

tives of the four states met infrequently and by December of that year an interstate compact had been tentatively outlined. But many points of major disagreement yet remained.

The realization of the difficulty of either Vermont or New Hampshire agreeing to flood control projects in their states, either independently or under an interstate compact, led the Connecticut State Water Commission to advise a reluctantly independent course:

"In view of the possible difficulty in formulating an agreement or compact acceptable to the four states concerned with the Connecticut River, it has seemed the part of wisdom to investigate the possibility of securing flood protection by steps which can be taken wholly within the State of Connecticut."<sup>11</sup>

An indication of the principal disagreement between the states may be seen in the following, which appears in the Report shortly after the above:

"....Connecticut must either resign herself to periodic flood visitations with the recurring bill for damages, or she must enter into some joint agreement with her neighbors to the north for the construction of impounding reservoirs and the allocation of costs on the basis of benefits received."<sup>12</sup>

It is reasonable to assume on the basis of the above that the allocation of costs among the four states demanded by Vermont and New Hampshire as the price of the inundation of their lands for the benefit of the downstream states, seemed a little high to Connecticut, and probably to Massachusetts. This point will be referred to again after the following resumé of the Compact to which the four states finally agreed.

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11. Sixth Biennial Report, op. cit., p. 15.

12. Ibid.

The Flood Control Act of 1936 had authorized the expenditure of \$10,028,900 for the 10 reservoirs selected for immediate construction, but no money had been appropriated by the retiring Seventy-Fourth Congress. In February, 1937, the Secretary of War warned the Governors of the four States that unless the differences between them were resolved and a compact approved, no part of the forthcoming Congressional appropriation could be set aside for the Connecticut River projects.<sup>13</sup> On March 21, 1937, the representatives agreed on the final form of the compact to be submitted to the Governors and the Legislatures.

The compact, which was formally signed by representatives of the four states on July 6, 1937, created The Connecticut Valley Flood Control Commission, composed of twelve members -- three from each of the signatories. The commission was empowered to secure the lands necessary for flood control projects, to protect the Federal Government from damages due to construction work, to maintain and operate the projects after completion -- in short, to provide the Federal Government with the assurances required under Section 3 of the Flood Control Act of 1936.

The compact, which is given in full in Appendix I, specifically enumerated eleven possible sites for the construction of reservoirs, of which eight should be selected as the initial phase of a comprehensive flood control program. These are listed in column 2 of Table I-11, page 35. This initial phase would achieve control over 8.1% of the drainage

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13. Wadhams, op. cit., p. 56.

area, and the ultimate control would be 21%. In contrast, the Army program outlined in 1935 would achieve control of 8.5% in the initial phase and 41% ultimately. Although six of the eleven compact sites were not included in the Army report, they were later approved by the War Department.

The Compact further provided that after each state had acquired from the owners the necessary lands at each of the reservoir sites selected, those lands would then be leased to the Flood Control Commission for 999 years, title remaining with the states. The funds for land acquisition were to be provided by the states in the following ratio: Massachusetts, 50%; Connecticut, 40%; Vermont, 5%; New Hampshire, 5%. The lands were to be exempt from taxation, and the Flood Control Commission would reimburse annually the towns in which the lands were located, in the amount of the taxes which would have been collected had the lands remained on the tax lists.

The following quotation from Article VIII of the Compact, over which most of the subsequent dispute arose, is significant:

"The terms and conditions under which any such signatory state shall make available the rights of water conservation, power storage or power development herein reserved shall be determined by separate agreement or arrangement between such state and the United States; and the type and general plans for the construction of such of the reservoirs as are herein contemplated to provide for such further development shall be approved by some agency of such state for that purpose duly authorized before any construction thereon is begun or prosecuted." 14

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14. A Compact between Massachusetts and New Hampshire for the Merrimack River was agreed upon at the same time as that for the Connecticut, and the two contained identical provisions. The controversy over Article VIII involved both these Compacts.

On July 6, 1937, joint resolutions were introduced into both branches of Congress seeking approval of the Compact. Although hearings on these resolutions were not held by the Committee on Flood Control until August 16, 17, and 18, 1937, a major controversy over the Compact had developed before that time.

The focal points of this controversy were the above-quoted Article VIII of the Compact, and the latter's failure to provide for the transfer of title to the necessary lands to the United States. Accordingly, the Committee on Flood Control also considered a joint resolution, introduced by Representative Casey, of Massachusetts, giving Congressional consent to the Compact, provided it contained no reference to power development and provided further that it did not reserve to the states title to the reservoir lands.

Opposition to the measure developed principally from the Federal Power Commission, but the Attorney General, the Bureau of the Budget, and three Connecticut members of the House of Representatives were also among the leading opposition forces.

The official position of the Federal Power Commission may be summarized as follows: a reasonable interpretation of Section 3 of the Flood Control Act of 1936 is that the United States shall own the sites at which dams and reservoirs are to be constructed. Furthermore, even if this interpretation is not correct the Federal Government, according to the Federal Power Act of 1920, has the right to develop power at any government dam, and according to that

Act a government dam is one constructed or owned by the United States whether built with or without contributions from others. The New England Compacts reserve to the states the right of power development, and do not provide for the transfer of title to the United States. The 1936 Act is a flood control measure, and was enacted for that purpose alone. The Act gave advance consent of Congress to interstate compacts drawn in strict compliance with Section 3 of that Act. The mere fact that the New England Compacts must be considered separately by Congress indicates that they are not drawn in compliance with Section 3. In brief, the Compacts violate the Power Act of 1920 and the Flood Control Act of 1936.

It was the opinion of the Attorney General that "it was the clear intent of the Act that all of the projects are to be owned by the Federal Government."<sup>15</sup>

The official argument of the States may be summarized as follows: There is nothing in the 1936 act which specifically requires transfer of title to United States, and therefore we have stated that title to the sites shall remain in the States. The jurisdiction of the Federal Power Commission according to the 1920 Act extends over the navigable waters of the United States and their tributaries. Since the Connecticut River is navigable only as far as Hartford, and since all flood control measures are to be built on non-navigable streams above Holyoke, the Federal Power Commission does not have jurisdiction. It is a fact

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15. Wadhams, op. cit., p. 62

that in a number of instances, some involving the Connecticut River, the Federal Power Commission had ruled that where a dam did not affect foreign or interstate commerce it might be built for power purposes unlicensed.

Thus, the primary issue was the control and disposition of power. It was not a question of whether the States got the developed power, but rather, whether the States got that power under license from the Federal Government, as required by the 1920 act, or whether the States reserved that development to themselves.

The Federal Government's position, that interstate compacts under the Flood Control Act of 1936 were required only to comply with Section 3, is a valid one. But since the New England states inserted the clauses relating to power in their Compacts, it is necessary to inquire into possible reasons for this action.

It will be recalled from the previous section on hydroelectric power, that the constitutionality of the Federal Power Act of 1920 had never been tested in the Supreme Court, and therefore questions as to the extent of federal authority over non-navigable tributaries of navigable rivers were still undecided. An important case, which was finally to place these issues before the Supreme Court was at that time being argued in the lower federal courts,<sup>16</sup> and it is likely that certain members of the drafting commission were aware of this. The basic issue in that case, as in the Com-

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16. The famous New River case, to be discussed in detail in Chapter II.

compact controversy, was the strengthening of the Federal Government through a liberal construction of the Constitution, as opposed to States' rights. If the power clauses in the Compacts had been allowed by Congress, it would have been a major victory for States' rights and a difficult precedent for the Supreme Court to disregard in its future decision. It may therefore be reasonably hypothesized that the opposition to the Compacts by the Federal Power Commission developed as part of a much broader dispute, and that the New England position was maintained as a defence in that same controversy.

At the hearings before the Committee on Flood Control, Representative Jerry Voorhis of California continually questioned witnesses as to the affiliations of certain members of the drafting commission with private power companies. Three members of that commission were so affiliated:<sup>17</sup> Mr. Robert W. Upton of New Hampshire was counsel for the Associated Gas and Electric Company and the New Hampshire Gas and Electric Company, as well as a registered lobbyist in New Hampshire for utility companies; Mr. Walter S. Fenton of Vermont was counsel for the Central Vermont Public Service Corporation, the Green Mountain Power Company, and the Twin States Gas and Electric Company; Mr. Henry I. Harriman of Massachusetts was a former president of the United States Chamber of Commerce and of the New England Power Association, and was at the time of the Compacts, a director and member of

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17. This data was cited by Representative William Citron of Connecticut in 83 Congressional Record 3234-35, 75th Congress, 3rd Session, 1938.

the executive committee of the New England Power Association.

There is no way of knowing whether these men were guilty of any malice aforethought in the insertion of Article VIII into the Compacts. It is possible, as hypothesized above, that they knew of the New River case then pending and suggested that the states take a position which would strengthen the general cause of States' rights. But it must be admitted the wording of the Flood Control Act and the application of the Power Act were sufficiently broad that a sincere attempt to assert the authority of the states can be justified on those terms. In another, less progressive period of politics, such an attempt might have succeeded.

Other reasons have been advanced for the inclusion of Article VIII in the Compacts.<sup>18</sup> During this period, a number of indignation meetings were held in Vermont. Testimony was offered at the hearings on the Compacts, apropos of the Gaysville, Vermont, site that "The people of that valley, up and down, on every side of it would come out with shot guns before they would let anybody flood that valley."<sup>19</sup>

Aside from this fundamental problem of dislocating farmers from their lands, Vermont had a number of governmental reasons for its position. Vermont had an energy tax on the generation of electricity in that state, applying both to municipal as well as private utilities. With federal ownership of power development at the proposed dams, Vermont

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18. Mills, Charles M., "New England's Stand on Flood Control Compacts", 21 Public Utilities Fortnightly 455.

19. Committee on Flood Control, Hearings, 75th Congress, 1st Session, p. 115.

would have lost the taxes on the generated power.

Another reason was stated by Governor Aiken of Vermont in his inaugural address, January 7, 1937.<sup>20</sup> Through the regulation of the flow of water at Vermont dams in the summer months, Massachusetts and Connecticut could lower their cost of generating power by almost half, and thus, at Vermont's expense those two states would gain an industrial advantage.

A final reason was stated in an editorial in the Hartford Times, June 7, 1937. Vermont was originally part of New Hampshire, and when the latter consented to a new state being formed in her western area, New Hampshire insisted that the boundary between the two states be the western bank of the Connecticut River. Thus, all developments on the Connecticut are in New Hampshire, all power companies on that river are New Hampshire corporations and Vermont derives no benefits from taxation of developments permitted by New Hampshire, except to the limited extent that dam foundations and power house rest on Vermont soil. Vermont has no power resources to develop except those on her smaller rivers, and so, if her valleys were to be destroyed for the benefit of downstream states, the least Vermont hoped to retain was the development of the reservoir sites for power or other uses.

It may be reasonably maintained in retrospect and in the light of regional considerations that New England's stand

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20. Ibid., p. 168.

in the dispute over the Compacts was the maintenance of an indefensible position. This is demonstrated by the following evidence:

(1)--Testimony of Attorney General Paul Dever before the Committee on Flood Control that, "Clause VIII is a clause we had to adopt in order that Vermont and New Hampshire would be satisfied."<sup>21</sup> He added that Massachusetts would be satisfied if the compact were reported out of Committee with a reservation that nothing therein could interfere with the powers and rights of the Federal Government.

(2)--Published statements<sup>22</sup> by a Connecticut member of the drafting commission that the original draft of the Compact on the Connecticut River was drawn up by Judge Daly of Connecticut who did not include in it any reference to power or conservation potentialities at the proposed sites, since the state of Connecticut was only interested in flood control; and that the two northern states had insisted that the other values inherent in the sites should be reserved to the states. It is difficult to reconcile (1) and (2) above with the following:

"I think the Congress and the executive departments of the Federal Government may rest assured that New England will sacrifice the prospective benefits of the flood control program if it is obliged to choose between such benefits and the surrender of any rights over its streams enjoyed by its States under existing law."<sup>23</sup>

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21. Ibid., p. 101.

22. Newlands, James A., "Water Power Proposals which have Entered into the Writing of the Compact", The Connecticut Society of Civil Engineers, Annual Report, 1938, New Haven, Conn., 1938, p. 69.

23. Letter from James W. Hock, then president of the New England Council, to President Roosevelt, quoted in 81 Congressional Record 2060-61, 75th Congress, 1st Session, 1937.

It is apparent, therefore, that Massachusetts and Connecticut agreed to the power reservation clauses demanded by Vermont and New Hampshire for the sole purpose of achieving flood control for themselves. They were thus placed in the position of having to defend the Compact as a whole, which defense evoked the above-quoted threat to refuse all flood control for the sake of an Article neither state had supported initially.

The result was that the Compacts were not approved by Congress, and much of the flood control program for the Connecticut River Basin has yet to be realized. Although an interstate compact was signed by four states, this episode cannot be considered a good example of cooperation in regional planning.

The Flood Control Act of 1936 authorized the Corps of Engineers to review its comprehensive plan of 1935 for the Connecticut River Basin in the light of the floods of March, 1936. Those floods had caused greater damage in the lower valley than any previous record flood, and the Army investigation showed the desirability of changing the list of reservoir sites somewhat, to include more sites in the lower portion of the Basin. A new program for the valley was therefore recommended by the Army in December, 1937.<sup>24</sup>

Selected as the initial phase of this program were 8 reservoirs, all of which were among the 11 listed in the New England Compact. This coincidence is due, in part, to

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24. House Document 455, 75th Congress, 2nd Session, 1937.

the fact that the Corps of Engineers had been consulted on these sites by the drafting commission. The complete 1937 program called for a system of 20 flood control reservoirs, shown in column (3) of Table I-11, page 35, and a series of dikes and levees for ten industrial cities of the two southern states, shown in Table I-13, page 57. The report recommended that in view of the difficulties involved in executing the comprehensive plan, the dike program be completed first. This new plan for the Basin was authorized by Congress in the Flood Control Acts of 1938 and 1941.

In November, 1937, the New England Governors requested a conference with the President on flood control. At a White House meeting on January 19, 1938, the administration announced a new policy, that the Federal Government would offer to pay the whole cost of the projects, and the states nothing — if the states would relinquish all titles to the land. The Brown-McCormack Bill, introduced into Congress, embodied the principle announced by the President, and that bill later became the Flood Control Act of 1938.<sup>25</sup>

The Flood Control Bill of 1938 settled the issue of the ownership of the sites. The entire cost of construction and of acquisition of lands, easements, and rights-of-way was to be borne by the United States; the Army Engineers and the Federal Power Commission would carry out the work. If potential power existed at a site, penstocks would be built, but if power was to be actually produced, then further Congressional action would be necessary.

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25. 52 Stat. 1215.

The swing of the pendulum away from States' rights had thus gone almost as far as it could in the direction of Washington. It had not gone as far as the President desired, however. The President had won an overwhelming victory in the elections of November 1936, and a reasonable interpretation thereof was a mandate from the people to continue the sweeping changes which had marked Roosevelt's first term.

There had been indications as far back as February 1937 that President Roosevelt was dissatisfied with the progress of the New England Compact, and in fact with the interstate compact method itself for dealing with problems such as flood control and drainage basins. The President was quoted in the press, in the spring of 1937, as believing that regional authorities similar to the Tennessee Valley Authority, were the answer to flood control.<sup>26</sup> In December, 1936, the National Resources Committee had published its "Drainage Basin Problems and Programs", which stated:

"Without discussion of the merits or demerits of existing policy, it may be affirmed with confidence that a coordinated Federal water policy is now needed, not a collection of unrelated policies applicable respectively to individual types of water problems. Without such a new policy, the Federal Government cannot contribute effectively or equitably to the integrated development and control of water resources."<sup>27</sup>

Such a new policy was announced in a Presidential

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26. Wadhams, op. cit., p. 60.

27. National Resources Committee, Drainage Basin Problems and Programs, Washington, 1936, p. 3.

message to Congress June 3, 1937,<sup>28</sup> which urged the creation of seven regional authorities for the country. The requested legislation contemplated that regional planning would start with local communities and, pyramiding up through the chain of county and state groups, would be coordinated for a region. The project programs would be reported annually to Congress through the President, the National Planning Board having previously checked the programs for budgetary purposes and conformance with national planning policies.<sup>29</sup>

The message urged the treatment of flood control works under a comprehensive plan involving entire drainage areas, through retarding dams and reservoirs on the major tributaries, smaller dams and reservoirs on the minor tributaries, downstream levees and floodways, and measures of applied conservation, such as restoration of forests and grasses on inferior lands, and encouragement of farm practices which diminish runoff and prevent erosion on arable lands. The proposals finally asked for the effective administration of hydroelectric projects as part of the multiple purpose development of a watershed.

The idea of seven regional authorities for the nation has been revived in almost every Congress since 1937, but no action has ever been taken on it. Its value as a planning procedure for the Connecticut River Basin will be

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28. 81 Congressional Record 5280-81, 75th Congress, 1st Session, 1937.

29. These ideas were incorporated into the Norris Bill, S. 2555, and the Mansfield Bill, H. R. 7365, both 75th Congress, 1st Session, 1937. There was no action taken on either of these measures.

discussed in Chapter II.

After the floods of September, 1938, Congress authorized a review of existing flood control plans for the Connecticut Basin. Two interim reports were submitted by the Corps of Engineers to the Congress pursuant to this authorization;<sup>30</sup> the program suggested in the later of these two reports, which may be found in column (4), Table I-11, page 35, was adopted by Congress in the Flood Control Act of 1941, which also authorized the continued construction of local protection works at the cities of the lower valley.

In 1944 a number of states, including those in New England, attempted to recover for the States' rights cause some of the ground which had been lost to the Federal Government in the Flood Control Act of 1938, and in the two Supreme Court decisions of 1940 and 1941 which had given Congress broad powers over watershed development. These efforts resulted in the O'Mahoney amendment to the Flood Control Act of 1944, which in its original form<sup>31</sup> would have required that any project concerning flood control, rivers and harbors be submitted by the federal agency concerned to the Governor of the state involved; and that if after three months of study, the Governor desired a modification of the project those recommendations be submitted to the Congress for its decision.

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30. House Document 653, 76th Congress, 3rd Session, dated March 11, 1940; House Document 724, 76th Congress, 3rd Session, dated May 9, 1940.

31. State Water Commission, Tenth Biennial Report, 1942-44, Hartford, Conn., 1944, p. 13.

The Flood Control Act of 1944<sup>32</sup> did not repeal any of the power which Congress had asserted over the nation's rivers in the 1938 Act, but it did state:

"In connection with the exercise of jurisdiction over the rivers of the Nation through the construction of works of improvement, for navigation or flood control, it is hereby declared to be the policy of Congress to recognize the interests and rights of the States in determining the development of the watersheds within their borders and likewise their interests and rights in water utilization and control, as herein authorized to preserve and protect to the fullest possible extent established and potential uses, for all purposes, of the waters of the Nation's rivers....."

The Act further provided that during the course of its investigations of projects, the Corps of Engineers shall keep the state concerned informed of data and findings, and "to the extent deemed practicable by the Chief of Engineers, opportunity to cooperate in the investigations....;" and if after the planning stage, there should be disagreement between the state and the Engineers, a report presenting both views should be prepared for Congress, with whom rested the final decision.

In October, 1945, the Governors of Massachusetts, Connecticut, Vermont and New Hampshire met in Hartford to discuss the possibility of a new attempt at interstate cooperation in the Connecticut River Basin.<sup>33</sup> Each state named four men to a New England Interstate Flood Control Commission, which held several meetings in 1945 and 1946,

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32. Public Law 534, 78th Congress, 2nd Session, approved December 22, 1944.

33. Engineering News-Record 18, which stated, "The avowed purpose was for the states to retain some control over flood control operations in the region and to head off federally regulated regional valley authorities of the TVA type."

and was inactive in the early part of 1947.

In March, 1947, the Corps of Engineers published its Comprehensive Plan for Flood Control--Connecticut River Basin,<sup>34</sup> as a preliminary report in order that the four states might have advance information as to the Army's latest proposals for the Basin. A program of 22 dams and reservoirs was listed, with maps showing the areas to be inundated and relocations necessary. This program may be seen in column (5) of Table I-11, page 35, and Table I-12, page 55.

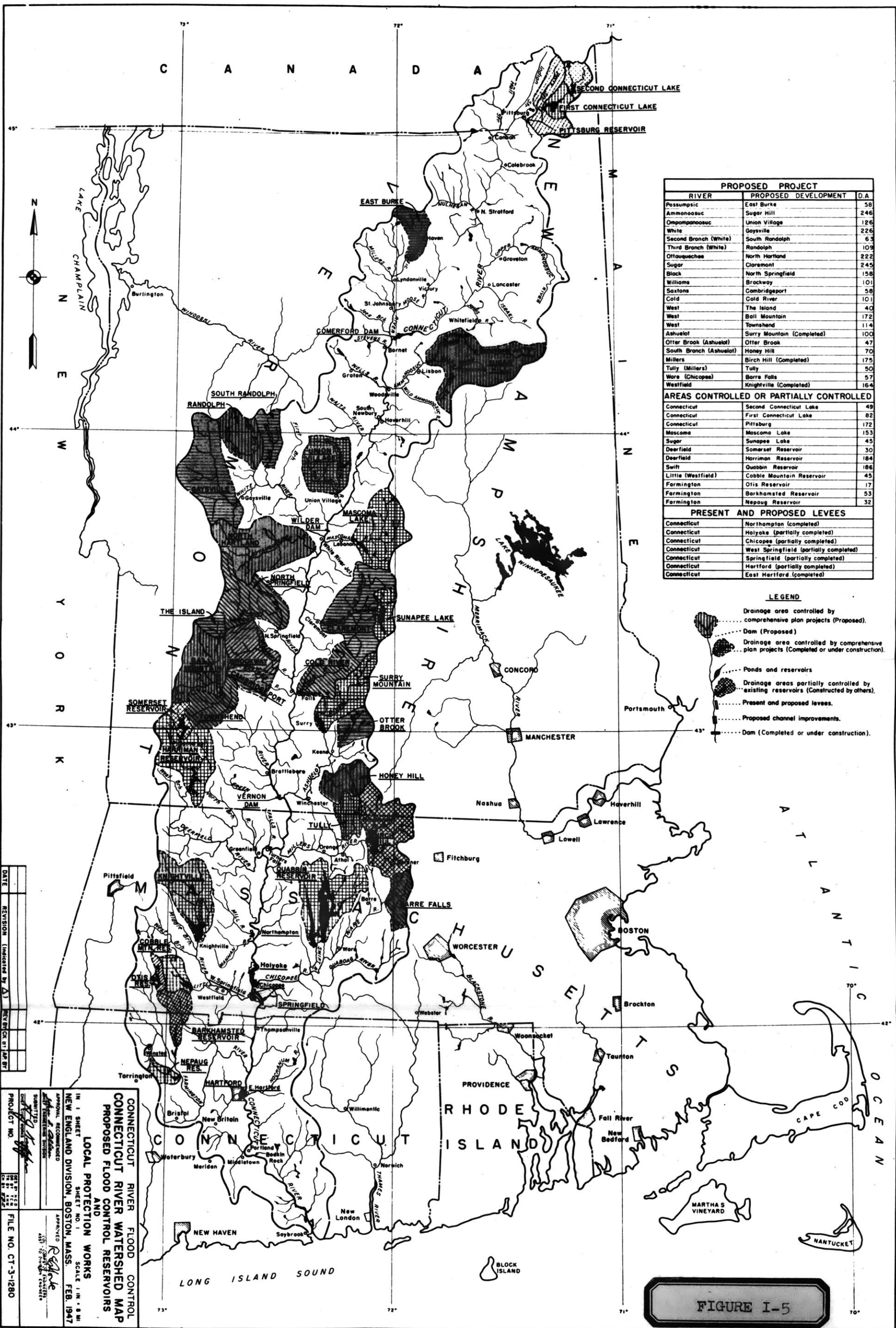
The Interstate Commission was revived shortly after the Comprehensive Plan was made public, and it has held several meetings since then to date. An interim report dated July 23, 1948, from the Commission's chairman, General S. H. Wadhams of Connecticut, to the Governors of the four states listed the extent of flood control measures completed and scheduled in the Basin. Dams completed are Knightville, Birch Hill, and Surry Mountain; under construction are Tully and Union Village; next scheduled is Barre Falls. See Figure I-5.

The interim report concluded that a successful flood control program in New England depends on a revision of federal laws pertaining to the Federal Power Commission, and on an interstate compact by which Massachusetts and Connecticut would reimburse Vermont and New Hampshire for the loss of lands in those states caused by federal projects.<sup>35</sup>

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34. War Department, Corps of Engineers, New England Division, Boston, Mass., March, 1947.

35. In May, 1948, the Commission traveled through Vermont inspecting the proposed reservoir sites and lands which would be inundated by their construction. New England News Letter, June, 1948, p. 9.



PROPOSED PROJECT		
RIVER	PROPOSED DEVELOPMENT	D.A.
Passumpsic	East Burke	58
Ammonoosuc	Sugar Hill	246
Ompomponosuc	Union Village	126
White	Goysville	226
Second Branch (White)	South Randolph	63
Third Branch (White)	Randolph	109
Offauguechee	North Hartland	222
Sugar	Claremont	245
Black	North Springfield	158
Williams	Brookway	101
Saxtons	Cambridgeport	58
Cold	Cold River	101
West	The Island	40
West	Ball Mountain	172
West	Townshend	114
Ashuelot	Surry Mountain (Completed)	100
Offer Brook (Ashuelot)	Offer Brook	47
South Branch (Ashuelot)	Honey Hill	70
Millers	Birch Hill (Completed)	175
Tully (Millers)	Tully	50
Ware (Chicopee)	Barre Falls	57
Westfield	Knightsville (Completed)	164

AREAS CONTROLLED OR PARTIALLY CONTROLLED		
Connecticut	Second Connecticut Lake	49
Connecticut	First Connecticut Lake	82
Connecticut	Pittsburg	172
Mascoma	Mascoma Lake	153
Sugar	Sunapee Lake	45
Deerfield	Somerset Reservoir	30
Deerfield	Harrison Reservoir	184
Swift	Quabbin Reservoir	186
Little (Westfield)	Cobble Mountain Reservoir	45
Farmington	Otis Reservoir	17
Farmington	Barkhamsted Reservoir	53
Farmington	Nepaug Reservoir	32

PRESENT AND PROPOSED LEVEES	
Connecticut	Northampton (Completed)
Connecticut	Holyoke (partially completed)
Connecticut	Chicopee (partially completed)
Connecticut	West Springfield (partially completed)
Connecticut	Springfield (partially completed)
Connecticut	Hartford (partially completed)
Connecticut	East Hartford (Completed)

**LEGEND**

- ..... Drainage area controlled by comprehensive plan projects (Proposed).
- ..... Dam (Proposed)
- ..... Drainage area controlled by comprehensive plan projects (Completed or under construction).
- ..... Ponds and reservoirs
- ..... Drainage areas partially controlled by existing reservoirs (Constructed by others).
- ..... Present and proposed levees.
- ..... Proposed channel improvements.
- ..... Dam (Completed or under construction).

DATE	REVISIONS	INITIALED BY

**CONNECTICUT RIVER FLOOD CONTROL MAP**  
**CONNECTICUT RIVER WATERSHED MAP**  
**PROPOSED FLOOD CONTROL RESERVOIRS**  
**LOCAL PROTECTION WORKS**

IN 1 SHEET  
 NEW ENGLAND DIVISION, BOSTON, MASS. FEB. 1947  
 SCALE 1 IN. = 8 MI.

APPROVED: [Signature]  
 ASSISTANT CHIEF OF ENGINEER

PROJECT NO. CT-3-1280  
 SHEET NO. 1

**FIGURE I-5**

TABLE I-12

RESERVOIR SITES UNDER 1947 COMPREHENSIVE PLAN

<u>Site</u>	<u>Assessed Valuation in Reservoir Limits</u>	<u>Tax Loss</u>	<u>Estimated Project Cost</u>
EAST BURKE	25,000	875	2,989,000
SUGAR HILL	116,970	2,769	11,222,000
UNION VILLAGE			3,749,000
GAYSVILLE	85,130	2,938	8,464,000
RANDOLPH	116,350	5,570	3,506,000
SOUTH RANDOLPH	69,050	280	2,739,000
NORTH HARTLAND	174,122	7,183	6,573,000
CLAREMONT	176,700	5,857	8,165,000
NORTH SPRINGFIELD	112,250	3,368	5,315,000
BROCKWAY	42,800	1,250	5,957,000
CAMBRIDGEPORT	35,750	1,210	3,136,000
COLD RIVER	25,735	730	5,873,000
TOWNSHEND			5,240,000
BALL MOUNTAIN	22,755	892	10,147,000
THE ISLAND			2,083,000
SURRY MOUNTAIN			1,721,000
OTTER BROOK	18,915	640	2,827,000
HONEY HILL	87,695	3,157	2,369,000
BIRCH HILL			4,347,000
TULLY	18,170	805	1,615,000
BARRE FALLS	none*		1,709,000
KNIGHTVILLE			3,170,000

SOURCE: COMPREHENSIVE PLAN FOR FLOOD CONTROL,  
CONNECTICUT RIVER BASIN, Corps of Army  
Engineers, Boston, March 1947

The ten million dollars which Congress would have appropriated in 1937, had it not been for the issues raised by the New England Compacts, would have given the Connecticut River Basin a measure of flood control which has not been realized as yet. Although local protection works at the cities of the lower valley have been almost completed (see Table I-13, page 57), and some reservoirs have been constructed, an occurrence of unusual weather conditions, or even the annual coincidence of melting snow and vernal rains, could cause severe damage in the valley.

But in spite of these dire possibilities, and in spite of the fact that New England in 1936-37 preferred to joust with the Federal Government instead of combatting Nature, it is apparent that the same struggle is still continuing. A successful flood control program in the Connecticut River Basin and in New England depends on the assumption by the states of their responsibilities under existing conditions, and not on continued exertions to change those conditions. This point will be amplified, and a method suggested for its effectuation in Chapter II.

TABLE I-13

LOCAL PROTECTION WORKS

1. Hartford, Conn.	Complete except for 2 pumping stations, one of which is under construction
2. E. Hartford, Conn.	Complete
3. Winsted, Conn.	Construction funds appropriated. Requirements for local cooperation yet to be met
4. Springfield, Mass.	Complete except flood wall at Mill River
5. West Springfield, Mass.	Complete except some foundation treatment
6. Chicopee, Mass.	Complete except portion in Willimansett Section
7. Springdale, Mass.	Construction of dike improvement initiated in Spring of 1947
8. Riverdale, Mass.	Construction deferred
9. Holyoke, Mass.	Upstream section completed. Construction of downstream section initiated in Spring of 1947
10. Northampton, Mass.	Complete

SOURCE

Comprehensive Plan for Flood Control--  
Connecticut River Basin, Corps of  
Engineers, Boston, Mass., March  
1947, p. 23

#### SECTION 4. NAVIGATION

Until the advent of the railroads, the Connecticut River was the great natural commercial highway for interior New England.<sup>1</sup> By the end of the colonial period of New England history, the settlements in the Connecticut Valley had a well organized transportation system on the river, from Wells River Junction in Vermont to Long Island Sound, a distance of about 235 miles. This system employed flat-boats plying between the various falls, at which were established transshipment points, for unloading cargoes and carting them around the falls. Hartford was the principal transfer point for loading ocean-bound sloops and barks.

The Connecticut River shared in the national craze and boom in canals. Elaborate plans were formulated for a system of canals around the principal falls in order to increase the navigability of the river. Locks and canals were built at South Hadley and Turners Falls in Massachusetts, at Bellows Falls, Sumner Falls and White River Junction in Vermont, and at Enfield Rapids in Connecticut. While all these locks and canals, with the exception of the last-named, have long since been abandoned and are today but historical curiosities, Windsor Locks at Enfield Rapids remains the focal point of a three-party controversy between Massachusetts, Connecticut and the United States.

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1. The historical background of Connecticut River navigation may be found in: Connecticut Valley Waterway Board, Report on an Investigation of the Connecticut River, Boston, Mass., 1913, pp. 5-7.

In the canal era, freight was carried on the openly navigable Connecticut River in specially constructed flat-boats which were 70 feet long, 15 feet wide, and capable of carrying from 30 to 40 tons. Commercial activity reached new heights throughout interior New England. But with the coming of the steamboat and steam engine, this prosperity ceased. The steamboats were too large for the canals and of too deep draft for the upper portions of the river. The old system of relay steamers and transfer points was reverted to, but the consequent increased costs could not compete with those of railroads. Within ten years after the first railroad charter in the Connecticut Valley was granted, almost all locks and canals were abandoned.

Navigation on the Connecticut River is now limited to the 52 miles between Long Island Sound and Hartford, Connecticut, along which a channel 150 feet wide and 15 feet deep is maintained by the Corps of Army Engineers. The Federal Government has been interested in extending navigation to Holyoke, Massachusetts, since 1871, and numerous surveys of the  $32\frac{1}{2}$  mile Hartford-Holyoke stretch of the river and project studies have been made since that time. Although the river from the Sound to Hartford is usually considered icebound from December to March of each year, this has not been continually true in recent years.

The history of the navigation project, as it related to the development of hydroelectric power at Enfield Dam, has been recounted in Section 2. It will be recalled that the dredging of the canal by the Corps of Engineers depended

on the prior construction of a power dam at Enfield by private interests licensed by the Federal Power Commission; that construction was not begun and the license was terminated in 1931; and that another attempt in 1935 to carry out the project under the above terms also failed.

In 1938 the Corps of Army Engineers re-examined the problem and made a series of comprehensive proposals to Congress:<sup>2</sup> (1) the United States would build and operate a navigation lock and power dam at Windsor Locks and Enfield Rapids, respectively; (2) the United States would provide a 12-foot channel from Hartford to Holyoke, and another dam and lock just above Hartford; (3) five bridges to be raised by their owners; two by the New Haven Railroad, one by the state of Connecticut, and two by counties, one in Massachusetts and the other in Connecticut; (4) construction of terminal facilities at Springfield, Holyoke and Chicopee, to be paid for by those communities.

The major difference between this plan and the one authorized by Congress in 1930 and 1935 was the recommendation that the United States now construct both the power dam and locks. Hearings on the proposal were held March 14, April 4, 5, 6, and May 10 and 15, 1939 by the House Committee on Rivers and Harbors.<sup>3</sup>

Opponents of the measure were all from the state of Connecticut, and included General Wadhams of the State Water Commission representing the Governor, various property owners, delegates from Chambers of Commerce, farmers' organ-

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2. House Document 165, 76th Congress, 1st Session, 1939.

3. Hearings, 76th Congress, 1st Session.

izations, and many high-ranking legislative officials. Their arguments may be summarized as follows: there is no need for additional power in that area, the proposed dams would raise the floodcrest of the Connecticut by 3/10 to 8/10 of a foot, the navigation project is uneconomical, and it is generally unsound and undesirable.

The proponents of the measure were all municipal officials and businessmen from western Massachusetts, but the state itself was not represented. It was necessary for these advocates of the proposal only to defend the Army plan, but had the Governor or other officials of the state government been present or represented, the position of the western Massachusetts cities would have been strengthened greatly.

The Committee on Rivers and Harbors at first rejected the proposed navigation and power project by a vote of 9 to 8, but after a rehearing, it voted, 14-4, to recommend the measure as a committee amendment to the Rivers and Harbors Bill of 1939.<sup>4</sup> The amendment was defeated in the House of Representatives by a vote of 98 to 36.<sup>5</sup> An attempt to have the Senate consider the proposal was defeated by a negative vote in the Senate Committee on Rivers and Harbors.<sup>6</sup>

In 1941, the House Committee on Rivers and Harbors considered the Hartford-Holyoke project again,<sup>7</sup> but it does not appear that anything came of it. This same Committee heard

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4. 84 Congressional Record 5674.

5. Ibid., p. 5678.

6. Hearings, 78th Congress, 1st Session, p. 26.

7. Hearings, 77th Congress, 1st Session.

testimony on the project for a third time in 1943,<sup>8</sup> at which time it was voted down.

It is necessary to inquire as to the reasons for Connecticut's opposition to the navigation project. These may be discussed from the point of view of flood control, power, navigation, and recreation.

The flood control issue was raised by statements in the Army's proposals that the maximum flood heights at certain cities would be increased by 3/10 to 8/10 of a foot.<sup>9</sup> However, these cities were all in Massachusetts and they were in favor of the plan. No damage was to be caused to lands or communities in Connecticut.

The power issue has been discussed in Section 2. At the hearings and before Congress, that issue took the form of a debate as to the relative merits of public and private power. Since the power project was to be in Connecticut, that state's larger power companies were all represented at the hearings in opposition.<sup>10</sup>

The focal point of the navigation canal controversy is the potential tonnage to be carried by barge to Springfield, Holyoke and Chicopee, and the consequent savings to be realized by western Massachusetts consumers and manufacturers.

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8. Hearings, 78th Congress, 1st Session.

9. House Document 165, op. cit., p. 72.

10. Much of the tonnage which arrives at Hartford via the Connecticut River is destined for the power generating plants of the Hartford Electric Light Co. One of the officials of that Company, C. W. Mayott, has prepared a brief against the project, which was distributed by the Connecticut Chamber of Commerce: Analysis of Navigation Project, Hartford, 1946.

Table I-14, page 64, shows the total tonnage carried on the Connecticut River below Hartford from 1926 to 1946. Table I-15, page 65, shows a breakdown of the total tonnage into several major categories, and Table I-16, page 66, shows the percentage of coal and petroleum tonnages to the total.

In 1936, W. P. A. researchers investigated the potential benefits to consumers in western Massachusetts from a navigation canal to Holyoke.<sup>11</sup> This work was conducted as an Emergency Relief Administration State Planning Project, and was advocated and directed by the United Municipal Connecticut River Navigation Committee, a group of representative citizens appointed by the mayors of Springfield, Chicopee and Holyoke. Over 2,000 business firms in that area were visited. It was estimated that the potential tonnage in those cities amounted to 1,147,000 tons, with consequent savings of \$1,467,000. This is shown in Table I-17, page 67.

The Corps of Engineers considered the results of the W. P. A. survey too optimistic, and in its 1939 report, having re-examined the problem, estimated that the potential tonnage was 607,600 tons, with savings of \$406,000.<sup>12</sup> This is shown in Table I-18, page 68. A comparison of Tables I-17 and I-18 will reveal differences not only in antici-

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11. This report was included in Appendix III of House Document 165, but the appendices to that Document were never printed. However, they are on file with the New England Division of the Corps of Engineers, U. S. Army, Boston, Mass., and may be seen there.

12. House Document 165, op. cit., pp. 17-18.

TABLE I-14

TOTAL TRAFFIC ON THE CONNECTICUT RIVER TO HARTFORD, CONN.,  
1926-1946

<u>Year</u>	<u>Tonnage</u>
1926	536,950
1927	592,922
1928	531,395
1929	682,229
1930	648,226
1931	703,330
1932	660,962
1933	811,154
1934	983,295
1935	950,750
1936	1,074,388
1937	1,232,636
1938	1,069,023
1939	1,237,628
1940	1,426,709
1941	1,538,655
1942	1,094,188
1943	873,942
1944	1,054,490
1945	1,116,192
1946	1,400,215

Source: Reports of the Chief  
of Engineers, U. S.  
Army, 1926-1946

TABLE I-15

TONNAGES, CONNECTICUT RIVER, BY COMMODITIES, 1935-1946

<u>Year</u>	<u>Anthracite Coal</u>	<u>Bituminous Coal</u>	<u>Fertilizers</u>	<u>Miscellaneous</u>
1935	25,690	102,012	9,141	9,212
1936	31,674	137,940	16,012	2,359
1937	30,415	170,333	11,998	8,106
1938	22,556	58,800	13,431	4,220
1939	24,697	78,618	12,350	1,278
1940	11,943	142,028	13,635	13,009
1941	10,253	145,609	16,717	19,742
1942	11,569	287,796	13,151	22,317
1943	10,260	224,213	30,293	651
1944	11,546	169,953	6,034	0
1945	12,185	214,865	6,511	495
1946	9,684	144,261	13,106	0

	<u>Gasoline</u>	<u>Kerosene</u>	<u>Other Fuel and Petroleum Products</u>
1935	219,264	116,657	442,170
1936	314,656	122,817	420,571
1937	396,450	146,796	432,180
1938	396,423	152,697	395,226
1939	435,593	174,916	477,598
1940	478,638	162,712	392,997
1941	490,162	170,486	676,735
1942	287,153	112,954	359,072
1943	248,408	88,756	269,784
1944	398,638	81,345	386,985
1945	392,115	107,104	382,917
1946	366,755	149,463	716,946

Source: Reports of the Chief  
of Engineers, U. S.  
Army, 1935-1946

TABLE I-16

PERCENTAGE OF COAL AND PETROLEUM TONNAGE TO TOTAL

<u>Year</u>	<u>Coal</u>	<u>Petroleum</u>	<u>Combined</u>
1933	16.73	80.49	97.22
1934	18.17	80.18	98.33
1935	13.43	81.88	95.31
1936	15.80	80.10	95.90
1937	16.29	79.14	95.43
1938	7.60	88.21	95.81
1939	8.35	87.88	96.23
1940	10.79	86.03	96.82
1941	10.13	86.99	97.02
1942	27.32	69.42	96.74
1943	26.82	69.42	96.24
1944	17.21	82.25	99.46
1945	20.36	79.18	99.54
1946	10.98	88.24	99.22

Sources: Committee on Rivers and Harbors, House of Representatives, Hearings, 78th Congress, 1st Session, 1943, and Reports of the Chief of Engineers, U.S. Army, 1935-1946

TABLE I-17

RESULTS OF THE NAVIGATION SURVEY, W. P. A. PROJECT, 1936

A. 1936 TONNAGES INTO AND OUT OF WESTERN MASSACHUSETTS CITIES

<u>Community</u>	<u>Incoming</u>	<u>Outgoing</u>	<u>Total</u>
Springfield and West Springfield	1,555,000	224,000	1,779,000
Holyoke	517,000	122,000	639,000
Chicopee	<u>112,000</u>	<u>30,000</u>	<u>142,000</u>
Totals	2,184,000	376,000	2,560,000

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B. ESTIMATES OF POTENTIAL TONNAGES AND SAVINGS

<u>Commodity</u>	<u>Tons</u>	<u>Savings Per Ton</u>	<u>Annual Savings</u>
Incoming			
Pa. Coal	287,000	\$0.47	\$ 135,000
Va. Coal	39,000	.47	18,000
Gas Coal	80,000	.70	56,000
Petroleum	393,000	1.25	493,000
Misc.	287,000	2.26	649,000
Outgoing			
Misc.	<u>61,000</u>	1.90	<u>116,000</u>
Totals	1,147,000		\$ 1,467,000

SOURCE: Appendix III (unprinted) of House Document 165, 76th Congress, 1st Session, 1939; on file with New England Division, Corps of Engineers, U. S. Army, Boston, Mass.

TABLE I-18

ESTIMATED POTENTIAL WATER-BORNE COMMERCE AND SAVINGS

<u>Commodity</u>	<u>Present Tonnage into Area (tons)</u>	<u>Potential Water-Borne Tonnage (tons)</u>	<u>Present Trans- portation Cost per ton</u>	<u>Potential Water-Borne Cost per ton</u>	<u>Savings per ton</u>	<u>Total Savings</u>
Petroleum Products	345,000	388,600	\$0.97	\$0.15	\$0.82	\$318,700
Bituminous Coal	436,000	70,000	3.73	3.63	.10	7,000
Gas Coal	90,000	( 30,000	4.09	3.78	.31	25,500
		( 60,000	3.95	3.68	.27	
Wood pulp	73,000	42,000	2.90	2.00	.90	37,800
Newsprint	15,000	10,000	4.80	3.80	1.00	10,000
Fertilizers:						
Cottonseed	7,000	( 3,000	2.80	2.15	.65	7,000
		( 2,000	4.25	3.05	1.20	
Phosphates	18,000	( 2,000	3.40	2.15	1.25	
Total		607,000				\$406,000

Source: House Document 165,  
76th Congress, 1st  
Session, 1939, page  
18

pated tonnages--which might be expected--, but also in the expected savings per ton. Since it might be expected that railroad freight rates and water-borne freight rates can be fairly accurately ascertained, it is difficult to account for the above differences in savings.

There are, however, two reasons for the differences in estimated tonnages. First, the W.P.A. survey was based on a canvass of business firms in the area, while the Army's results were based on its records of previous tonnages on the river below Hartford. Secondly, the W.P.A. survey included tonnages expected to be shipped from the area via the river, which the Army report did not.

In 1946 a Special Commission to Investigate Connecticut River Navigation was created by the Massachusetts Legislature; it was the first time since 1913<sup>13</sup> that the state as a whole had taken an interest in the project. The Commission hired a consultant to make an investigation of potential tonnages and savings, and it was his estimate, based on the results of a questionnaire, that such savings on both incoming and outgoing freight would amount to nearly \$4,000,000 annually.<sup>14</sup>

In 1940, a Socony Oil Company pipeline from Providence to Springfield, via Worcester, was extended to Hartford.<sup>15</sup>

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13. In 1913 the Massachusetts Legislature created the Connecticut Valley Waterway Board, which investigated all Corps of Engineers proposals on the navigation canal up to that time.

14. Special Commission to Investigate Connecticut River Navigation, Report, Boston, December, 1946, p. 18.

15. 84 Congressional Record 5674.

Table I-15, page 65, shows a decrease in the shipments of all petroleum products during the war years. Since this was a period of ship losses, when public utilities were requested to convert from oil to coal in order to conserve that fluid, the effect on the economics of the navigation canal cannot be determined. It will be observed, however, that the post-war years have shown great increases in the shipment of petroleum products.

From a planning point of view, there are several other factors which ought to be considered. First is the possibility that the existence of water-borne commerce will attract to this area new industries which might find the combination of cheap transportation and skilled labor attractive. Secondly, some weight should be given to manufactures and agricultural products moving out of this area, which would increase the potential savings in transportation greatly. Finally, in computing the tonnages moving into the western Massachusetts area, consideration seems to have been given only to the tonnages recorded for the Connecticut River. If an analysis might be made of waterborne tonnages received at New London and New Haven which are transshipped via truck and rail to western Massachusetts, a considerable additional potential might be found.

The New York, New Haven and Hartford Railroad is particularly concerned with the navigation proposals. Not only is it asked to spend \$322,000 to modify two railroad bridges across the Connecticut River, but also to consider the prospects of losing freight business to water carriers. As might

be expected, the New Haven Railroad was represented at all the various hearings, opposed to the measure. It is interesting, however, that its spokesmen admitted that there would be savings to western Massachusetts, but it considered such savings to be about \$100,000 a year.<sup>16</sup> Representatives of the Brotherhood of Locomotive Engineers, the Brotherhood of Railroad Trainmen, the Order of Railway Conductors, and the Brotherhood of Railway Clerks, appeared before the Committee on Rivers and Harbors at various times to testify against the proposed canal on the grounds that the New Haven Railroad was already in receivership, and that it was not sound policy for the Federal Government to seek to create enterprise which would compete with the railroads, thereby causing a loss in revenue and the firing of employees.<sup>17</sup>

A final aspect of the Hartford to Holyoke navigation project concerns recreation. At the present time, controlling depths in the Connecticut River above Hartford are about 2.5 feet in the open river for 11 miles to Enfield Rapids, about 6 feet in the existing canal, and about 4.5 feet from there to Holyoke.<sup>18</sup> The proponents of the measure call attention to the recreational benefits to be derived from a deeper channel, as well as the additional recreation dollars that

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16. Hearings, 76th Congress, 1st Session, pp, 111-118.

17. It is interesting to note in this connection that in August, 1948, a ton of oil can be shipped from Baton Rouge to Pittsburgh, via water, for \$6.02, compared with \$12.62 by rail; and a ton of steel from Chicago to Houston for \$6.04 via water, \$15.80 by rail:  
52 Time 70, August 30, 1948.

18. House Document 165, op. cit., p. 3.

would be spent in the area for berthing boats, fishing, swimming, and other sports. The opponents point to the scant number of pleasure craft now plying the Hartford to Holyoke stretch, (see Table I-19, page 73), and are pessimistic about other recreational benefits.

The Corps of Engineers is now preparing a new report on Connecticut River navigation, its seventh since 1900. On November 26, 1946 hearings were held at Hartford,<sup>19</sup> which were concerned primarily with the stretch of the river from Saybrook to Hartford. Testimony for the Hartford Electric Light Company was given to the effect that since that Company has \$450,000 invested in terminal facilities at South Meadow, just below Hartford, the channel to Hartford should continue to be maintained by the Army. A representative of the Inland Water Petroleum Carriers Association urged that the channel to Hartford be increased from 15 feet to 17 feet, since the larger towboats and barges thus permitted would result in savings of \$.50 per barrel of oil.

A second hearing, April 30, 1947, at Bradley Field, Connecticut, was devoted entirely to the navigation proposal between Hartford and Holyoke.<sup>20</sup> Four major oil companies, Standard Oil, Gulf, Texaco and Sunco, testified on behalf of the project. A coal company with deep-water terminal

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19. Held pursuant to authority in Public Law 525, 79th Congress, 2nd Session, approved July 24, 1946. The unpublished minutes and exhibits of this hearing, as well as those of the second hearing, referred to below, are on file at the New England Division of the Corps of Engineers, U. S. Army, Boston, Mass.

20. Held pursuant to previous authority (see Footnote 19) and a resolution of the House Rivers and Harbors Committee, adopted January 3, 1947.

TABLE I-19

PLEASURE CRAFT USING WINDSOR LOCKS, CONN., 1925-1944

<u>Year</u>	<u>Southbound</u>	<u>Northbound</u>
1925	31	20
1926		
1927	24	28
1928		
1929	16	19
1930	25	22
1931	28	19
1932	34	29
1933	33	26
1934	25	23
1935	28	24
1936	5	7
1937	30	31
1938	44	34
1939	21	22
1940	21	24
1941	17	19
1942	3	14
1943	2	5
1944	6	5

Source: Reports of the Chief of  
Engineers, U. S. Army,  
1925-1944.

facilities at New Haven, the Hartford Electric Light Company the New Haven Railroad,<sup>21</sup> and the Connecticut Chamber of Commerce were recorded as opposed. Arrayed on expected sides were legislative representatives and other officials from local and state agencies in Massachusetts and Connecticut.

Although railroad and water-borne freight rates, as well as construction costs, have increased since the Engineer's report of 1939, it is expected that the new report will nevertheless recommend the navigation project from Hartford to Holyoke along the same lines as the 1939 plan.<sup>22</sup> Whatever its merits, it faces severe opposition from vested interests. The navigation canal cannot be justified economically as a project by itself, and must necessarily be coupled with the power dam at Enfield: the navigation element will continue to be opposed by the New Haven Railroad and the power project by the utilities.

The forthcoming Army estimates of tonnages and savings will again be based on its records of previous shipments in the lower Connecticut River. It is suggested that a fresh survey, similar to the 1936 W.P.A. canvass, be undertaken, by the Massachusetts State Planning Board, or by an outside, impartial consultant, of business firms in the western Massachusetts area, in order to more accurately evaluate the eco-

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21. The New Haven Railroad claimed that the navigation project would be so harmful to it, that if the \$4,000,000 potential savings claimed by the Massachusetts Commission were true, the New Haven Railroad would be put out of business.

22. Interview, September 2, 1948, at Corps of Engineers, New England Division, Boston, Mass.

nomics of the canal.

When viewed in the light of her position on other aspects of the development of the Connecticut River, that taken by the state of Connecticut on the navigation issue is contradictory. While on the one hand, Connecticut endorses the flood control program which would inundate Vermont and New Hampshire lands for her benefit, and further endorses the deepening of the Connecticut up to Hartford, she is opposed to extension of navigation to Holyoke. An official representative of the state testified at the Army's hearing in April, 1947, that Connecticut is not opposed to material transportation benefits to the cities of western Massachusetts, but she is convinced that this proposed canal to Holyoke is unsound, uneconomical, and not justified by the facts.

While it is not within the scope of this paper to take a position on the relative merits of the project under consideration, it is suggested that Connecticut's opposition might lie in another, more basic reason. That is a general opposition to the development of power in New England by the Federal Government, which might also account for the lack of state support in Massachusetts for the canal.

The navigation project cannot be economically separated from the Enfield power dam, and the latter, according to the utilities, cannot now be developed economically by private interests. It is therefore unlikely that the forthcoming Army report will result in favorable action by Congress. The controversy over this project demonstrates well the lack

of regional thinking and planning within New England and its  
opposition to Federal attempts to change the status quo.

## SECTION 5. POLLUTION

The problem of water pollution is now receiving more attention from a pollution-minded public than ever before. An increase in the use of inland and tidal waters for recreational purposes and a realization that the growth of population and industry along rivers has brought with it an increase in pollution, have resulted in a movement to replace shortsightedness with responsibility.

Recent Congresses have considered many proposals for federal control of pollution. The forces which have been arrayed against this solution--the states and industry--are the very forces which in the past have foiled efforts to secure pollution control through other means. The states have contended that water pollution is a state matter. Industrial polluters have objected to any type of pollution control, on the one hand complaining to the states that it would create unfair competitive disadvantages, and on the other siding with the states in their assertion of States' rights.

Stream pollution is seldom a serious matter on intrastate waters. It is of major concern on interstate waters. Controversies between the states over flood control, navigation benefits, and hydroelectric development, it might be claimed, are the almost inevitable results of efforts to secure a unified and regional treatment of water resources problems. But in a matter which vitally concerns the health and daily lives of people, a different and positive approach

might be expected: yet cooperation between communities and between states has not in the past been a characteristic of this phase of river development. The history of pollution control in the Connecticut River Basin reflects the indictments above no less than the remainder of the nation's watersheds.

The State of Connecticut is the principal sufferer in the pollution problems of the Connecticut River. Not only is that state situated to receive the accumulated wastes of all the communities and industries above, but the fall and depth of the river there are such as to diminish its self-cleansing velocity. Analyses of Connecticut River water in 1937 showed that the water entering Massachusetts was unobjectionable, but that it became increasingly polluted as the river flowed southward, principally because of heavy industrial pollution at the cities of Holyoke, Springfield, West Springfield and Chicopee.<sup>1</sup> Other reports of the same period indicated that the river below Springfield was neither desirable for public bathing nor well suited for fish life.

Connecticut had pioneered in the field of state pollution control with the passage in 1925 of an act which created a State Water Commission, with powers to effectuate a policy calling for the protection of its public waters. Whereas most state departments of health are limited in their powers by the necessity of showing that pollution of a waterway is

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1. Massachusetts State Planning Board, Connecticut River, Drainage Basin Study No. 2, 1938, p. 99.

a menace to health, the Connecticut State Water Commission is empowered to order correction wherever necessary on the ground that pollution of a public waterway is contrary to the policy of the State. The only limitation imposed on the Commission compels it to specify the type of relief required, the cost of which must be reasonable.

This legislation was enacted to combat the increasing pollution on all Connecticut waters, and therefore served to counteract that portion of the pollution on the Connecticut River which could be attributed to communities and industries within that state. But no steps were taken at this time to secure the cooperation of Massachusetts in removing the pollution caused by that upstream neighbor. As a result of the Connecticut legislation all of the larger communities which had formerly discharged their raw sewage into the Connecticut River built sewage treatment plants.

In 1936 the New England Regional Planning Commission listed 97 organized sewerage systems in the Connecticut River Valley, serving about 68% of the Valley's population.<sup>2</sup> Of these, only 2 had complete treatment facilities and 13 had partial treatment; the remaining 82 discharged their raw sewage into the river and its tributaries. The completion of treatment works at Springfield and Hartford within a few years after this report, added significantly to the percentage of the Basin's population served by complete treatment.

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2. New England Regional Planning Commission, Connecticut River Valley Water Resources Data, Boston, 1936, p. 28.

The same study listed 54 additional municipalities without any existing sewerage facilities, which were considered possible sources of pollution.<sup>3</sup> Of these, 50 were in New Hampshire and Vermont, but since the population in those states is for the most part scattered through numerous rural communities, the problems of stream pollution there are generally of local significance only. Since many of these waters are extensively used for recreational purposes, whatever local problems do exist merit immediate attention.

In 1936 the Massachusetts Department of Public Health secured an authorization to cooperate with a W. P. A. pollution study of the Connecticut River in Massachusetts.<sup>4</sup> Similar studies were undertaken for other sections of the main river and its tributaries, and these constitute the last complete, authoritative study of pollution in the Connecticut River Basin.

Mention should be made of the suit which Connecticut brought against Massachusetts to enjoin the latter from diverting waters of the Connecticut River watershed for a water supply for the Metropolitan District Commission. Massachusetts had proposed to increase the capacity of the Wachusett Reservoir by a diversion of the Ware and Swift Rivers, tributaries of the Chicopee, which in turn is a

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3. Ibid., p. 34.

4. W. P. A. Pollution Study No. 18120, Report on Sources of Pollution Connecticut River Valley Massachusetts, 1940; a summary of the results in this study was included in House Document 1735, Sanitary Condition of Certain Rivers of the Commonwealth, 1938, a report of the Massachusetts Department of Public Health.

tributary of the Connecticut. One of the claims made by the State of Connecticut was that the projected diversion would reduce the self-cleansing velocity of the main river and thereby increase pollution. The Supreme Court<sup>5</sup> found that this claim could not be established and supported the Massachusetts project with certain conditions which regulated the flow of water into the Connecticut.

Until 1941 the Massachusetts Department of Public Health could not compel communities to construct sewage treatment works unless the degree of pollution was such as to result in a nuisance or definite menace to the public health. In that year an act was passed which authorized the Department of Public Health to regulate the pollution of inland and tidal waters, but it could not interfere with industries or sewerage systems existing on January 1, 1941.<sup>6</sup> Although the Department was empowered to act for future industrial or municipal installations, a considerable area of control was thus denied it. In 1945, however, the Department was authorized<sup>7</sup> to provide rules and regulations for all inland and tidal waters, with no exceptions. This law placed the Department in a similar position with respect to pollution control as the Connecticut State Water Commission.

Undoubtedly one of the purposes behind Connecticut's comprehensive program of pollution abatement was, that when as much was completed as could be done within the state, Con-

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5. 282 U.S. 660 (1931).

6. Chapter 388, Acts of 1941.

7. Chapter 615, Acts of 1945.

necticut would then have more than reasonable grounds for requesting similar programs by the upstream states. It will be recalled from the discussion on flood control that in 1935 the Connecticut State Water Commission secured the passage of an act which had for its primary purpose the control of pollution of waters common to two or more of the New England States. (See pages 32-33). Although this measure was used as one of the bases for the Interstate Compact on Flood Control of 1936, it was not used for pollution control.

The National Resources Planning Board provided much of the initial stimulus for such interstate cooperation in pollution control as exists today. Through its Water Resources Committee, and under it the New England Drainage Basin Committees, a Special Subcommittee on Classification of New England Waters was created.<sup>8</sup> This group, composed of sanitary engineers of New England state departments of health and water conservation, as well as other state and federal officials, formulated a plan for classifying streams according to their present and potential highest use. Almost all of the states also appointed state committees on classifications of state streams, and in this work the Massachusetts and Connecticut committees made considerable progress through joint action.<sup>9</sup>

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8. New England Regional Planning Commission, The Rivers Speak, Boston, 1942, p. 15.

9. New England Interstate Water Pollution Control Commission, First Draft of First Annual Report, Providence, 1948, p. 3

The postwar years have seen considerable progress in pollution abatement. As already noted, broader powers were given the Massachusetts Department of Public Health; a water pollution board was created in New Hampshire to work with the state department of health; Vermont committed herself to an educational and promotional campaign; and Connecticut furthered its work of promoting sewage treatment installations.

Not the least of these postwar achievements has been the creation of the New England Interstate Water Pollution Control Commission under a Compact, to which Massachusetts, Connecticut and Rhode Island are signatories, and which has been approved by Congress.<sup>10</sup> The other New England states and New York have been represented at the Commission's meetings, and it is anticipated that these will join in the near future. The text of the Compact may be found in Appendix II.

Although the immediate occasion for the Interstate Pollution Compact was a recommendation in October, 1946, of the New England Conference of State Sanitary Engineers, so much of the preparatory work had been done by the state and regional classification committees that most of the credit for this achievement properly belongs to the Drainage Basin Committees and the National Resources Planning Board. Furthermore, Massachusetts and Connecticut had already overcome the objections of industry<sup>11</sup> through the strengthening of the

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10. Public Law 292, 80th Congress, 1st Session.

11. Pollution control is a benefit to many industries which require a considerable volume of clean processing water.

powers of the state in dealing with both private and municipal pollution. There being no further internal or interstate reasons why pollution abatement should not be elevated from the state to the interstate level, the Compact was the next logical step. In this respect, the history of the Compact points a moral, the value of which will be emphasized in Chapter II.

The Compact provides for an Interstate Commission which will establish reasonable physical, chemical and bacteriological standards of water quality satisfactory for various classifications of use, based on studies of their interstate waters by the individual states. Each state is pledged to provide for the abatement of present pollution and for the control of future pollution, in accordance with the use classification adopted by the Commission.

Fulfillment of these pledges remains a state function, and no time limit is imposed. Since the facilities of the states, including both those of water departments and state universities, will be used for technical matters, the Commission has been appropriated \$11,000 for salaries, office and other expenses, to which will be added another \$3,000 if the three northern New England states become signatories to the Compact.

Before evaluating the Interstate Pollution Control Compact and Commission, it is necessary to discuss briefly federal legislation pertaining to this subject. Prior to 1948 federal participation in pollution control was limited

to the regulation of oil pollution in coastal waters and of substances impeding navigation on navigable waters. Although many proposals for federal control have been considered by Congress in the last 50 years none has been able to overcome either Congressional or Presidential disapproval. The Barkley Pollution Act of 1948, however, succeeded in steering a middle course between the advocates of complete federal action and the defenders of States' rights, and became the Water Pollution Control Act of 1948.<sup>12</sup>

This law declares it to be the policy of Congress to recognize and protect the primary rights and responsibilities of the states in controlling water pollution. It provides that the Surgeon General shall prepare comprehensive programs for pollution abatement, in cooperation with state agencies, interstate groups, municipalities and industries; that the pollution of interstate waters which endangers the health or welfare of persons in a state other than that in which the discharge originates is a public nuisance and subject to abatement according to regulations and machinery established by the law; that loans to states, interstate agencies and municipalities may be made for anti-pollution projects which are included in the comprehensive plan; and finally, for grants and funds for studies, research, and plans.

In preparing a classification of New England's interstate streams, to which the signatory states are pledged to adhere, the New England Pollution Control Commission has

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12. Public Law 845, 80th Congress, 2nd Session.

in effect adopted a comprehensive plan for pollution abatement. In this respect the Compact anticipated the Congressional legislation and thereby created a buffer agency to deal with the Federal Government. It will be observed, however, that the effectuation of the anti-pollution programs remains with the states and municipalities under the Compact, although under the federal Act, interstate agencies may receive loans for the construction of treatment works on interstate waters. It may be concluded, therefore, that although the Compact's signatories have advanced the cause of regional cooperation, they have been careful to retain as many independent powers as possible. The states might have created an interstate agency with powers of effectuation as well as investigation, but they have not chosen to do so.

WATER RESOURCES  
OF THE CONNECTICUT RIVER BASIN:

CHAPTER II

PROPOSALS

## CHAPTER II

### SECTION 1. THE CONSTITUTIONAL BACKGROUND OF FEDERAL-STATE RELATIONS IN POWER AND FLOOD CONTROL

One of the major issues which has been the concern of the Supreme Court throughout its history has been the problem of what belongs to the nation and what belongs to the states. The following paragraphs recount the more significant episodes in this controversy as it has related to navigation under the commerce clause of the Constitution.

The Constitution expressly delegates to Congress the power to "regulate commerce with foreign nations, and among the several states, and with the Indian tribes."<sup>1</sup> John Marshall's decision in Gibbons v. Ogden<sup>2</sup> established the principle that the power to regulate commerce includes the regulation of navigation and comprehends navigation within the limits of every state in the country so far as that navigation may be in any manner connected with the commerce over which Congress has jurisdiction. The only exception to this limitation to navigable waters has been federal aid for irrigation projects in the arid lands of western states.

The criteria for navigability were established by the Supreme Court in United States v. The Daniel Ball,<sup>3</sup> which held that navigable waters of the United States are those which are in fact navigable, and which either alone or by uniting with other waters, form a continuous highway over which commerce

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1. Article 1, Section 8, Clause 3.

2. 9 Wheat. 1 (1824).

3. 10 Wall. 557 (1871).

is or may be conducted among the States or with foreign countries in the customary modes in which commerce is conducted by water.

This rule was not importantly challenged for nearly 70 years. To it was added the principle that since navigability is a question of fact, which varies from river to river, its determination must be by the courts in each individual case. Although the Court had upheld the Tennessee Valley Authority, in two important decisions,<sup>4</sup> these had been concerned with the issue of power, and navigation was but incidentally mentioned.

The first careful examination of the navigation question since 1871 was made in the important case of United States v. Appalachian Electric Power Co.,<sup>5</sup> popularly known as the New River case. It is interesting to note that the events in this case began in 1925, that its history in the federal courts began in 1935, and that it was not decided until 1940. The facts follow:

The New River, which rises in North Carolina and flows through Virginia into West Virginia, is a tributary of the Kanawha River, which in turn is a tributary of the Ohio River. About June 1, 1934, the Appalachian Electric Power Company began construction of a dam across the New River;

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4. The Supreme Court upheld the constitutionality of the TVA's Wilson Dam in Ashwander v. TVA, 297 U.S. 288 (1936). The constitutionality of TVA itself has never actually been determined by federal courts, but the issue is said to have been settled by default in Tennessee Electric Power Co. v. TVA, 21 F. Supp. 947 (1938).
  5. 311 U.S. 377 (1940).

on May 6, 1935, the United States filed a bill for an injunction against the construction of the dam unless licensed by the Federal Power Commission, on the grounds that since the New River was navigable and its construction would impair the navigability of the New, Kanawha and Ohio Rivers, the construction violated the Federal Power Act of 1920.

There were two main issues involved: (1)-the navigability of the river; and (2)-assuming the river to be navigable, whether certain conditions under which Federal Power Commission licenses are granted are unconstitutional since they are unrelated to navigation. See Table I-1, page 7. These questions were considered so vital to the exact determination of federal-state relationships in river development that 41 states filed briefs as amici curiae, among them the 6 New England States.

The Court held<sup>6</sup> first that the New River was a navigable river. It declared that the test of the Daniel Ball was too narrow, that navigation comprehended more than the operation of boats and improvement of the waterway itself:

"Navigability in the sense just stated, is but a part of this whole. Flood protection, watershed development, recovery of the cost of improvements through utilization of power are likewise parts of commerce control."<sup>7</sup>

And secondly, on the matter of licensing conditions, the Court held that water power development from dams in navigable

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6. This was a 6-2 decision in which Chief Justice Hughes took no part, and Justices Roberts and McReynolds dissented.

7. at p. 426.

streams is from the viewpoint of the public welfare a by-product of the general use of rivers for commerce; that the dam may have proposed or intended uses for purposes other than power, and as such is only part of a larger development:

"The point is that navigable waters are subject to national planning and control in the broad regulation of commerce granted the Federal Government. The license conditions to which objection is made have an obvious relationship to the exercise of the commerce power."<sup>8</sup>

This victory for the Federal Government was made possible by the changed political complexion of the Supreme Court, which in 1940 had six Roosevelt appointees and which, since the Court-packing proposals of 1937, had increasingly supported a more liberal interpretation of the Constitution<sup>9</sup>. The declaration by the Court in this case that the federal power over commerce must be able to develop with the needs of commerce, would not have been the majority opinion four years before.

In the following year, 1941, the Supreme Court extended the federal power over commerce even further. The important case of Oklahoma ex rel. Phillips, Governor, v. Guy F. Atkinson Co. et al.,<sup>10</sup> popularly known as the Red River case, tested the constitutionality of the Flood Control Act of 1938. The facts of this case are worth noting

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8. Ibid.

9. It is interesting to note that Justice Roberts, who is credited with having "changed his mind" after 1937, thereby reversing the previously customary 5-4 decisions against New Deal measures, dissented in the New River case but voted with the majority in the Red River case.

10. 313 U.S. 508 (1941).

since they bear a striking resemblance to conditions in the Connecticut River Basin, and well might have arisen in Vermont.

The Flood Control Act of 1938 authorized the construction of Denison Reservoir on the Red River, a tributary of the Mississippi, in Oklahoma and Texas. Oklahoma sought to enjoin the construction of this dam on the grounds that the Red River is a non-navigable stream, that 100,000 acres of rich farmland would be inundated and 8,000 people seriously affected with no compensation for the loss; that the dam and generators would be located in Texas and its power would be sold principally in that state; that the Flood Control Act of 1938 was not within the powers of Congress under the commerce clause.

The Supreme Court unanimously declared that the Denison project was a valid exercise of the commerce power by Congress; that Congress has control over the non-navigable stretches of a river in order to preserve or promote commerce on the navigable portions; that the inclusion of watershed development and flood protection in the federal power over commerce, as decided in the New River case, is now extended:

"And we now add that the power of flood control extends to the tributaries of navigable streams. For, just as control over the non-navigable parts of a river may be essential or desirable in the interests of the navigable portions, so may the key to flood control on a navigable stream be found in whole or in part in flood control on its tributaries." 11

The extent to which the Supreme Court went in granting the Federal Government broad powers over flood control may

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11. at p. 525.

be seen in the following quotations from the decision:

"It is for Congress alone to decide whether a particular project, by itself or as part of a more comprehensive scheme, will have such a beneficial effect on the arteries of interstate commerce as to warrant it."12

"The fact that Congress has introduced power development into this project as a paying partner does not derogate from the authority of Congress to construct the dam for flood control, including river flow. The power project is not unrelated to those purposes.....the fact that ends other than flood control will also be served, or that flood control may be relatively of lesser importance, does not invalidate the exercise of the authority conferred on Congress."13

"...the suggestion that this project interferes with the state's own program for water development and conservation is likewise of no avail. That program must bow before the 'superior power' of Congress."14

The decisions in the New River and Red River cases vindicated the Government's position in the New England Compact controversy of 1936-37, and destroyed all the legal arguments made by the Connecticut River states at that time. Comprehensive planning for waterway systems on national, regional, and watershed levels had been given full judicial sanction, and had been placed entirely within the province of Congress. The pendulum had swung as far away from States' rights as it could. For all practical purposes it is still there.

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12. at p. 527

13. at pp. 530, 531, 533.

14. at p. 534.

SECTION 2. ANALYSES OF EXPERIENCE IN WATERSHED  
DEVELOPMENT, TO BE USED AS GUIDANCE FOR  
PROPOSALS.

There has now been enough experience in the control and development of watersheds to teach the futility and waste incurred by continued interstate controversy, federal-state disputes, and the lack of state efforts to coordinate regional considerations with those of a river basin, to treat the problems of a watershed as a whole instead of individually, and to subordinate private interests to those of the public welfare.

In planning for the resources of a river basin, certain principles may be postulated. Water cannot be considered apart from other, related problems: recreation, reforestation, improvement of agricultural methods, experimentation in new uses for resources, and the creation of new opportunities for industry, agriculture, and the people generally. The equation to be formulated contains land and human factors as well as water.

It follows therefore that a plan for a watershed must be comprehensive, and characterized by unity of purpose. Regional resource development has meaning and is effective only if it is directly related to the social and economic problems of the area. The incentive for this type of planning exists with the people. The impulsion and momentum must be supplied by them.

When analyzed in the light of these premises, the efforts of the New England states to deal with the problems

of the Connecticut River have been comparatively fruitless. Time has been lost, but the experience gained will greatly benefit the policymakers who will guide these states in further cooperative attempts to deal with the Basin as a unit. The last decade has seen federal and interstate efforts in other parts of the country to solve the problems of watershed development, and a study of their achievements and failures will also assist in planning a new course of action. A brief account of some of these experiments and experiences, as well as a summary analysis of the New England states' experience, follows.

(a) Interstate Commissions, other than New England

The Interstate Commission on the Delaware River Basin, popularly known as Incodel, is a joint government agency of the states of Delaware, New Jersey, New York, and Pennsylvania.<sup>1</sup> It is financed entirely through appropriations from these states, and holding no administrative powers, works through existing state agencies. As originally constituted, the Commission was composed of four members from each state: a senator, a representative, an administrative official, and a member of the planning board; another representative has since been added to each state's membership.

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1. Reference Material on Incodel included: (1)-Robinson, David W. "Voluntary Regionalism in the Control of Water Resources", 207 The Annals 116-123, January, 1940; (2)-Incodel, Annual Report, 1947, Philadelphia, 1947; (3)-The Council of State Governments, The Book of the States, 1943-44, Chicago, 1943.

IncodeI serves as a fact-finding and fact-coordinating agency, making surveys of basic data and related subjects, and formulating regional plans and policies. It sponsors the development of its programs, but their effectuation remains with the individual states or for the Federal Government, whose cooperation is actively sought. The Commission drafted and secured the passage in each state of a uniform pollution control law, and an agreement on diversion of the Delaware River for public water supply purposes. It represents the four states before Congress on matters affecting the Delaware River, and was instrumental in amending the Flood Control Act of 1944 to give the states an opportunity to share in the planning stage of flood control programs. Its position in this respect has been summarized by its chairman, as follows:<sup>2</sup>

IncodeI "strongly feels that there should be no effort on the part of the federal administration to clothe itself with all-encompassing powers in the over-all control of watershed development until the states directly involved have been afforded a fair opportunity to accept and meet their obligations in this field and have failed to meet that challenge. It recognizes that it may not be possible to bring the states amicably together in certain regions because of wide differences in social policies, political philosophies, and other factors. Where that is the case a federal authority is probably desirable."

The Interstate Commission on the Potomac River Basin was established through the cooperation of the National Resources Committee and the Public Health Service for the

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2. Turner, Ellwood J. "The Place of the States in the Field of Watershed Development", 18 State Government 21, February, 1945.

primary purpose of controlling pollution in the Potomac River.<sup>3</sup> The Commission consists of three representatives from each of the following: Virginia, West Virginia, Maryland, Pennsylvania, the District of Columbia, and the United States. It serves as a coordinating agency for the state agencies concerned, and has thereby obtained basic data for the formulation of a pollution abatement program as well as a general plan for the development of the watershed. It has sponsored and seen enacted changes in the laws of Virginia governing pollution control and water conservation, in order to more effectively carry out the Commission's plans for the Potomac River.

The Commission has recommended that commissions be established in all river basins through interstate compacts, for the economic development of water resources; that the Federal Government, upon request, assist the various river basin commissions in studies and surveys; and that the Federal Government finance construction of projects that cannot be reasonably carried out by the states through the interstate commissions.

Reference should be made to two other interstate commissions engaged in pollution abatement, about which, however, additional analytical information is unknown; the Interstate Sanitation Commission, composed of the states of New York, New Jersey and Connecticut; and the

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3. Reference material for this section included: (1) The Book of the States, op. cit.; (2) The Interstate Commission on the Potomac River Basin, Its Policy and Program, Washington, 1946.

Ohio River Valley Water Sanitation Compact Commission, whose membership includes all states concerned except Virginia: Illinois, Indiana, New York, Ohio, Pennsylvania, Tennessee, Kentucky and West Virginia.

A final example is the Northwest States Development Association, an organization representing the states of Washington, Oregon, Montana, Idaho and Wyoming for the development of the Columbia River Basin.<sup>4</sup> In formulating a plan for that watershed area, state agencies and the federal planning agencies concerned participated cooperatively. That program calls for a basin-wide, region-wide development of the Columbia River Basin; it emphasizes the need for cooperative endeavor on all governmental levels, and stresses the importance of regional initiative and leadership in the interests of national decentralization of authority. Regional development is the function of the Pacific Northwest Development Association, heir to the Pacific Northwest Regional Planning Commission; this body, and its New England counterpart, were the only regional planning boards in the country created during the period of the National Resources Planning Board.

If the interstate commissions described above are to serve as a guide for a similar organization in New England, a discussion of their advantages and disadvantages is necessary.

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4. Reference material for this section included: (1)-Aiken, George K. and Strickland, Charles E. "The Columbia", 19 State Government 237-238, September, 1946; (2)-Pritchett, C. Herman, "Organization for Regional Planning", 23 Social Forces 387-394, March, 1945.

Each of these regional organizations represents a pooling of the governmental and administrative resources of the individual states, supplemented by the advice and assistance, when requested, of the Federal Government. However, since interstate compacts must be approved by Congress, since federal agencies are well equipped to afford complete technical assistance, and since by virtue of Congressional power and financial interest, the Federal Government must be a participant in watershed development, it is obvious that there must be some point of contact between Washington and the interstate commissions.

So long as the National Resources Planning Board was in existence, that agency provided the necessary focal point and could aid and activate regional planning groups. In the absence of the stimulus coming from such a source, the present interstate bodies must provide that energy themselves. Care must be taken that they do not become prey to the pressures of groups within the region who have an interest in the planning recommendations made.

It will be observed that none of the above regional planning organizations was given the power to carry out its programs. If such had been done, there would have been created an interstate authority endowed with powers of administration and control and a legal corporate entity which would, in effect, exist between the Federal Government and the states. The powers which might be entrusted to such a superstate agency would probably place it beyond the reach

of either federal or state domination. This has been done in some measure in the case of The Port of New York Authority, but that agency is concerned with matters which are subject to federal regulations, but which have not been the subject of direct Congressional interest and active participation. It might be questioned on these grounds whether this type of interstate organization can be applied to watershed development. The problems involved in working out such a superstate agency for the Connecticut River Basin, place their discussion beyond the scope of this paper, which must necessarily be limited to a planning body.

(b) Federal Authorities

Many types of federal organizations have been suggested for the administration of a river basin: the independent autonomous agency; an authority under a single federal department; an authority using the services of existing agencies; an independent agency advisory to the President, Congress, or the Cabinet, which would serve to coordinate and review programs and policies; voluntary coordination among the federal agencies; and independent action by the various, interested governmental bodies.

It will be observed that most of these differ only in their relative position in the administrative scale, and will therefore not be discussed here. It is important, however, to analyze the independent autonomous agency, as exemplified by the Tennessee Valley Authority, and to

appraise its possible application to the Connecticut River Basin.

The essentials of the TVA concept have been well summarized by David Lilienthal, its former chairman:<sup>5</sup>

- "--a federal autonomous agency, with authority to make its decisions in the region.
- responsibility to deal with resources, as a unified whole, clearly fixed in the regional agency, not divided among several centralized federal agencies.
- a policy, fixed by law, that the federal regional agency work co-operatively with and through local and state agencies."

In view of the success of the TVA, it may be questioned why that type of federal agency should not have been employed in other river basins. Valley authority proposals have been made for almost every watershed in the country, and as discussed in Chapter I, under flood control, President Roosevelt in 1937 proposed the creation of "conservation authorities" which would have developed integrated plans for the natural resources of seven regions, but which would not have the powers of effectuation possessed by TVA.

Two explanations for the failure of efforts to establish the TVA form of agency in other sections of the country have been offered by Professor Pritchett:<sup>6</sup> (1)-the opposition of regular federal departments and agencies, founded on jealous fear of losing some of their functions to the new agencies. This type of conflict has been observed in the Columbia River development and particularly in the proposed Missouri Valley Authority. (2)-doubts about the wisdom of dis-

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5. Lilienthal, David E. TVA-Democracy on the March, Harper & Bros., New York, 1944, p. 153.

6. "Organization for Regional Planning", op. cit., pp. 150-151.

mantling existing departmental programs for distribution among decentralized regional authorities. This argument maintains that the existing departments and their bureaus are better able to deal with specialized problems than a new agency.

Apart from the advantages and disadvantages of the TVA type of agency per se, it may be questioned whether it constitutes a solution to the problems of every river basin. Since no two river basins are alike in the state of their development and in the extent of their needs, no standard solution may be universally applied.

If the Connecticut River Valley today be compared with the Tennessee River Valley before 1933, a great difference will be observed. Whereas the former contains highly industrialized and cultivated areas, with large concentrations of urban population, the Tennessee Valley was a vast region of comparatively undeveloped resources. The combined metropolitan populations of Knoxville, Nashville and Chattanooga in 1930 were roughly equivalent to the metropolitan population of Hartford alone. Although there is still undeveloped hydroelectric potential in the Connecticut River Basin, it is insignificant compared to that which existed on the Tennessee and its tributaries. There was no record of regional cooperation among the states of the Tennessee River Basin prior to TVA, but there have been several efforts at self-help among the states of the Connecticut Valley. In short, the development, needs, and problems of the two watersheds differ to such an extent that

the same formula cannot be applied to each.

The unified approach used by the Tennessee Valley Authority in the integrated development of the river, is one which can be simulated by all interstate organizations concerned with water resources. To conceive of power development, conservation, reforestation, pollution control, navigation, flood control, recreation, irrigation, promotion of new industries and new uses for the land, all as single phases of one problem is the only way to obtain the most from water resources.

The TVA solution has been proposed for the Connecticut Basin. On January 29, 1935, Representative William M. Citron of Connecticut introduced a bill<sup>7</sup> into Congress to create a federal corporation for the development of the Connecticut River Valley:

"A Bill to insure domestic tranquility, to provide for the common defense, and to promote the general welfare of the United States by improving the navigability, controlling the flood waters, and eliminating the pollution of the Connecticut River and its tributaries; by providing for the development and improvement of forest reserves, recreational parks, and highways, and the preservation of wild life; by promoting agriculture and industry, and by producing electrical energy for interstate transmission, and also by providing healthy water supplies; and for the relief of unemployment among the people of the Connecticut River Valley and neighborhood; and further, for the creation of a corporation to carry out the aforesaid."

The bill was referred to the House Committee on Flood Control and later to the Committee on Rivers and Harbors, but it does not appear that it was actually considered by either of these committees.

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7. H. R. 4979, 74th Congress, 1st Session, 1935.

Representative Citron introduced a similar bill<sup>8</sup> into the next Congress, and that suffered the same fate as its predecessor.

The Water Resources Committee of the New England Regional Planning Commission studied this proposal for a federal valley authority in the Connecticut River Basin, as well as the relative merits of the federal authority on the one hand and voluntary regionalism through interstate compacts on the other. The Committee recommended the latter as the solution better adaptable to local conditions, for the comprehensive development of New England river basins.<sup>9</sup>

The Water Resources Committee further recommended a modified form of the Citron Bill<sup>10</sup> which would have given Congressional consent to an interstate compact, under which the Federal Government would promote a cooperative program to be executed by the four states of the Connecticut River Basin, rather than the development of the Basin by a federal corporation, as originally proposed. This interstate agency would be composed of one representative from each state, and "appropriate federal representation"; it would have wide powers to initiate plans for flood control, pollution control, reforestation, industrial and recreational development; execution of the plans would be within the terms of consent of each state, financed by joint local and federal funds.

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8. H. R. 4811, 75th Congress, 1st Session, 1937.

9. National Resources Committee, Regional Planning: Part III-New England, Washington, 1936, pp. 4, 5, 61.

10. Ibid. Also: Bradley, Phillips. "A TVA for New England", 50 American City 39-41, June, 1935.

It has been suggested in the previous section that in the absence of a federal agency like the National Resources Planning Board to stimulate local and regional planning groups, those groups must provide that energy and momentum themselves. The absence of a national water policy has also been decried. Interdepartmental controversies over conflicting activity in the same watershed, while not characteristic of the Connecticut Basin, have been common in other areas. The return of a national planning agency may not be legislated within the foreseeable future, but it is to be hoped that a national water policy may be formulated and the implementation of its principles entrusted to a new federal agency.

It is important that this agency be created at that place in the federal administrative scale which will maintain and improve the balance which has been struck between the Federal Government and the states in the development of water resources. Although each new Congressional Act pertaining to flood control, rivers and harbors, and pollution declares it to be the national policy for the Federal Government and the states to cooperate in these programs, at least in the planning stages, this cooperation is comparatively meaningless unless there is a clear-cut exposition of national policy on the one hand, and unless the states have made the most of their planning opportunities on the other.

If, then, a federal agency is to be created to deal with water resources problems comprehensively, it must be an independent organization, advisory to the President and

to Congress, with the power to review and recommend. It must coordinate the programs of conflicting federal agencies and integrate them with those of the states, but it should not itself engage in the execution of the programs. This reviewing agency would provide a forum for the executive agencies, Congressional committees, state and local governmental organizations, and private interests, and as such, would greatly assist in resolving federal-state and inter-agency disputes.

It is realized, of course, that there will be forces opposed to such an agency. The departments and agencies themselves may prefer to deal with Congressional committees directly, in the hopes of impressing their point of view, rather than losing or compromising through a reviewing group.

But such an agency would be of great benefit to the states and particularly to interstate cooperation. It would provide the means by which state participation in planning and in making decisions would be placed on a more direct basis. It would provide the focal point and assistance for regional water resources planning groups, formerly supplied by the National Resources Planning Board. It would stimulate the formation of new interstate agencies to deal with water problems, since it would assure the states an adequate hearing. And finally, it would encourage the assumption of more responsibility by the states for the cure of their interstate water problems by permitting them more direct participation.

(c) New England.

The experiences of the four Connecticut River states in dealing with the problems of that Basin's water resources have been described in Chapter I. The lessons to be learned from an analysis of those experiences will provide considerable guidance for prescriptions and recommendations.

The efforts of Massachusetts and Connecticut to achieve pollution abatement demonstrate that interstate cooperation is made more possible when the individual states have solved similar problems within their own borders. Thus, the creation of strong state agencies with the power to enforce pollution control in those two states enabled a combined approach to matters of mutual concern. A corollary to this proposition is shown in the present reluctance of New Hampshire and Vermont to join the Interstate Pollution Control Commission, because of the absence of state legislation to enable the effectuation of the necessary pledges.

Does it follow from this that the solution to interstate problems depends on previous internal resolution of similar situations? While it is clear from the record that this is desirable, it is also evident that in many instances there can be no internal solution, only an interstate one. Flood control is a good example of this, since the dams to be constructed in Vermont and New Hampshire benefit those states but little in comparison with the gain to be derived by their downstream neighbors. A regional compact is clearly indicated, with costs allocated in proportion to benefits.

The controversy between Massachusetts and Connecticut

over the navigation project from Hartford to Holyoke demonstrates the extent to which the success or failure of interstate cooperation depends on the benevolence or hostility of private interests. The success of the interstate pollution control program is due in great measure to the fact that state legislation had previously settled the objections of industry. The prospects for the proposed canal are gloomy because the public utilities object to the Enfield project, and the New Haven Railroad is opposed to its navigation aspects. It must be concluded, also, that the official opposition of the state of Connecticut is based on fears that the proposal does have merit, which would harm the private interests concerned, and consequently affect the state's tax base. Federal hydroelectric developments in the Basin may be analyzed similarly.

While Connecticut is thus opposed to the navigation canal, she completely endorses the Army's flood control program which would inundate many acres of valuable lands in Vermont and New Hampshire. It might be concluded from this that one of the bases for collective action must be the presence of benefits without cost. However, the New England Compact of 1936 provided for the allocation of costs on a benefit basis, and discussions are now in progress to restore that provision.

The failure of the 1936 Compact to become a step forward in the progress of New England regional cooperation may be attributed, in part, to the attempt by the states to establish a position in the no-man's land created by the lack of judicial

interpretation of a federal statute. The purpose of the compact was to secure flood control and not to reinforce the states' position at the expense of the Federal Government. Experience has made it apparent, therefore, that accomplishment through interstate cooperation depends to a very great extent upon the balance which is struck between the states and the Federal Government. This problem is so important that it should be discussed in some detail.

An essential requirement of a program of interstate cooperation is that the states work with the Federal Government under existing law. The attitude expressed in the letter quoted on page 47 of this report, indicating a "you-play-my-way-or-I-won't-play" position, is not conducive of accomplishment. Nor is the opinion that a successful flood control program in New England is dependent on the prior amendment of laws pertaining to the Federal Power Commission. If prevailing opinion in New England indicates that certain changes are necessary in federal laws, efforts to bring them about should be kept apart from programs to conserve and control natural resources.

If the states are to work with the Federal Government it is obvious that they must assume a great deal more responsibility than they have assumed before. Although the states have compacted on particular problems of the Connecticut River, there has been no voluntarily organized approach to the development of the watershed as a whole.

It has been seen that the Flood Control Act of 1936 declared proper the expenditure of federal funds for flood

control in a cooperative program with the states; that the Flood Control Act of 1938 abandoned this principle of combined federal-state action in favor of complete federal assumption of all costs; that, although in the Flood Control Act of 1944 Congress did not relinquish any of the power over watershed development it had assumed through legislative extension of the commerce clause and later judicial sanction, the rights and interests of the states in such development were recognized to a limited extent.

It is doubtful that Congress will legislate to restrict its broad power over the nation's rivers and their tributaries. The New River and Red River decisions have not been overruled and may be used as authority for a return to the principle of the 1938 Act, or as a precedent for another extension of federal jurisdiction.

In 1936, the New England regional report of the National Resources Committee noted that "although there has been agitation for coordination and cooperation in solving interstate problems in the past few years, inability to carry out projects as distinctly cooperative ventures has been a strong deterrent to the comprehensive development of New England water resources.<sup>11</sup> The Committee was referring to the lack of legal machinery at that time for interstate cooperation. The same observation might have been made, however, about the inability to finance the necessary projects, a condition prevailing today as well.

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11. Regional Planning, op. cit., p. 61.

It was undoubtedly one of the insights of the Constitution's authors in giving the Federal Government power over interstate commerce that not only were national considerations significant, but that only the Government could pay the bills. Since the Federal Government must be accepted as a participant, it is more important that the states define their own position in relation to it, than attempt to restrain Federal action. Such attempts, if successful, would serve to widen the area in which nothing could be done; if unsuccessful, they demonstrate the failure of regional self-help, and serve to widen the area of Federal action. In either case the states are the losers. This, in brief, has been the past experience of the four Connecticut River states.

But in the limited recognition granted the states in the 1944 Act there is an opportunity for the assumption of responsibility that goes with participation. There are ample precedents for the undertaking thus implied. The New England Regional Planning Commission was organized in 1934 under the guidance of the National Planning Board, "to establish a permanent body for the coordination of planning effort in the several New England States and for the making of basic regional studies for this area".<sup>12</sup> There have been other examples of regional organizations in New England, serving both governmental and private interests. There has been considerable experience in the writing of interstate compacts, the means by which the states would assume the necessary responsibilities: the ill-fated Flood Control Compact of 1936, the Pollution

12. Ibid., p. 1.

Control Compact of 1947, and the present discussions on a new flood control agreement.

There is thus a basis for the formation and effectuation of a regional water resources policy. Most of the major problems of the Connecticut River have been discussed by all the interested states. There has been enough experience in relations with the Federal Government for a compact commission to benefit greatly thereby. In contrast to conditions in 1937, the position of the Federal Government in watershed development has been clarified by clear enunciations of legislative intent and by judicial sanction of Congressional action. Finally, New England thinks of itself as a region, and has a long history of acting as a unit politically, an advantage not possessed by all other groups of states which have embarked on cooperative ventures.

Within the four states themselves there exist agencies which are well equipped to assist in the establishment of a water resources policy for the Connecticut River Basin. Besides the agencies concerned with planning and water, there are other state organizations which would be concerned, and which are listed in Table II-20, page 112. Each of the four states has a Commission on Interstate Cooperation patterned after the model drafted by the Council of State Governments. There have been, in addition, numerous legislative investigations of water resources and related problems. A valuable fund of research data and qualified specialists thus exists.

TABLE II-20

A PARTIAL ROSTER OF STATE AGENCIES CONCERNED WITH THE  
CONNECTICUT RIVER.

CONNECTICUT

Department of Agriculture  
Board of Fisheries and Game  
State Forestry Department  
Geological and Natural History Survey Commission  
Department of Health  
Connecticut Development Commission  
Department of Public Works  
Public Utilities Commission  
State Water Commission  
State Flood Control and Water Policy Commission

MASSACHUSETTS

Department of Agriculture  
Department of Conservation  
Department of Public Health  
State Planning Board  
Department of Public Works  
Public Utilities Commission

NEW HAMPSHIRE

Department of Agriculture  
Fish and Game Commission  
Department of Forestry and Recreation  
State Board of Health  
State Planning and Development Commission  
Public Service Commission  
Water Resources Board

VERMONT

Department of Agriculture  
Department of Conservation and Development  
Department of Public Health  
State Planning Board  
Board of Public Works  
Public Service Commission  
State Water Conservation Board

Source: The Council of State  
Governments, The Book of the  
States, 1943-44, pp. 420-483.

SECTION 3. PROPOSALS: THE INTERSTATE COMMISSION  
ON THE CONNECTICUT RIVER.

It is proposed that an Interstate Commission on the Connecticut River be established by Connecticut, Massachusetts, New Hampshire and Vermont. This Commission should be the planning agency for the Connecticut River Basin, with the power and means to study the physical, economic and social problems of that watershed, and to make recommendations for their solution to the Governors of the States.

The Commission should sponsor and carry out investigations and surveys of the water resources of the valley, as well as its industrial, agricultural, and recreational assets, liabilities and potentialities; it should sponsor research in the use of resources, and make all its findings available to agricultural, industrial and governmental organizations; it should assist and cooperate with all public and private groups whose work affects the welfare of the valley, such as planning boards, Chambers of Commerce, the New England Council, etc.

The principal function of the Interstate Commission will be to formulate a water resources policy for the Connecticut River Basin, and to use that policy as the basis for all negotiations with the agencies of the Federal Government. Through such a unity of plan and purpose, the Commission, acting for the states, will have a more powerful tool for bargaining than exists now, with separate interstate bodies acting individually

on separate phases of one great problem. Through such a policy, the Commission will be able to enhance the position of the Connecticut River states not only in the initial planning stages of projects, but also by channeling their effectuation through it.

The Commission's water policy for the Connecticut River Basin will be, in effect, a master plan for that area. It will encompass flood control, navigation, the development of the remaining hydroelectric potential, pollution control, the investigation of new areas for the relocation of those affected by the construction of dams and reservoirs, water supply, irrigation, reforestation and recreation.

Although there are federal agencies interested in each phase of watershed development listed above, there is no national water policy. As noted in Chapter I, under flood control, the National Resources Committee sought to formulate such a national policy through the drainage basin studies of its Water Resources Committees. But so long as pollution is the concern of the Public Health Service, flood control and navigation of the Corps of Engineers, power of the Federal Power Commission, and so on, a Commission acting for the four states of the Connecticut River watershed under a carefully worked out plan of its own, will be at an advantage in being able to deal with all federal agencies because of that single, integrated policy.

The Commission should be composed of twenty members,

five from each state. These should include a State Senator and Representative, chosen by their respective chambers, who are also members of their state's Commission on Interstate Cooperation; the chairman of the state planning agency, the chairman of the state's water resources agency; and a member at large appointed by the Governor from among his administrative officials, or from the state's roster of specialists in water resources or planning. It would be preferable that no member of the Commission has in his professional background affiliations of any kind with power, railroad or shipping interests.

The Commission should have a permanent staff, to include at least one engineer with broad experience in water problems, at least one research assistant experienced in the compilation of social and economic data and trained in planning, an executive secretary, and the necessary clerical assistance. The principal function of the executive secretary would be to maintain constant contact with members of Congress and the federal agencies, not only to keep informed of developments in the field of water resources, but to sponsor Commission programs and seek federal assistance. He would also be charged with publications, reports, sponsoring the Commission's activities and plans before planning agencies and Congressional committees, and public relations generally.

The Commission should be empowered to use existing data and facilities of state planning and water agencies, as well as call upon private organizations, state and other

universities for technical assistance in the formulation of a water resources policy and all its details. In this connection, the work of the New England Drainage Basin Committees and the Water Resources Committee of the New England Regional Planning Commission should be referred to and brought up to date. An exhaustive, impartial study of the Hartford to Holyoke canal is required in order to settle the merits of that issue. A New England Power Survey now being made for the New England Council by Truman Safford of Charles T. Main, Inc., might well serve the Commission as a guide to the remaining hydroelectric potential in the Basin.

Since the Commission will be a planning agency, the actual effectuation of the recommended programs will be left to the individual states, and through them to the municipalities affected. Since the facilities of state organizations will be used in the formation of plans and policies, the working out of details might well be assigned to the planning agency, but this should be at the option of the states.

An immediate, vital task for the Interstate Commission should be the writing of a new Flood Control Compact, under the terms of which Connecticut and Massachusetts would reimburse Vermont and New Hampshire for tax losses suffered as a result of dams and reservoirs. It has been noted previously that discussions along these lines are now being held, but it might be added that another source of difficulty lies in the downstream states' insistence that local

benefits from the reservoirs be considered in the allocation of costs and benefits.

The Interstate Commission should actively encourage the creation in New Hampshire and Vermont of state agencies with powers broad enough to fulfill the pledges required of signatories to the Pollution Control Compact, and should at the same time seek to have those states become signatories. The work of the Pollution Control Commission should be taken over by the proposed Interstate Commission on the Connecticut River. The two states outside the Basin, Rhode Island and Maine, (if the latter becomes a party to the Pollution Compact), should be included in all discussions of the Commission relating to pollution abatement.

The overlapping of the functions of the proposed Commission and the present Pollution Control Commission raises a question concerning the scope of the recommended planning function. Does the principle of the Interstate Commission on the Connecticut River Basin, logically extended, mean a different commission for each of New England's seven other interstate rivers? or would it not be better to strive for the revivification of the New England Regional Planning Commission, through which a water resources policy for all New England can be formulated and effectuated ?

It cannot be denied that New England is a functional region for planning purposes, and that it would be highly desirable if a regional planning agency could be re-established. But the Connecticut River Basin is a functional area within the larger region, and its problems are import-

ant enough of themselves to require solution within the framework of the Basin area. Catherine Bauer has questioned the practicability of comprehensive regional planning as envisioned by a recent Yale University publication,<sup>1</sup> on the grounds that it is too broad, and for public acceptance requires a focal, fighting issue, which though more parochial in scope and limited in accomplishment, may lead to broader problems later. In terms of this approach, the attainment of the proposed Commission might point the way for a newly organized effort to secure comprehensive regional planning in New England.

Larger questions are also raised by these issues. As noted previously, the Connecticut River Basin is a sub-region, only part of a larger unit. A water policy for that river should be coordinated with one for New England, which in turn is a sub-region of the country, for which, finally, there should be a national water policy. Since such a program does not exist, the proposals herein contained are based on the assumption that although a water resources program for all New England and the country would be more desirable, an integrated plan for the development of the Connecticut River watershed may be realized more quickly and easily. On that assumption, an Interstate Commission should be created, and the success of its organization and program will materially benefit future efforts to restore regional and national planning.

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1. McDougal, M., Rotival, et al. The Case for Regional Planning with special reference to New England, New Haven, Connecticut: Yale University Press, 1947.

The most serious objection which might be raised against this proposal for the creation of an Interstate Commission is that it optimistically depends on concerted and enlightened action by the states. The record of previous New England efforts in regional action is sufficient rebuttal, but to that might be added that its local roots, based on local experience and understanding, will bespeak its value for the four states concerned.

New England has long fought against the continued transference of functions to the Federal Government, and the particular phases of this resistance in the field of watershed development have been described in Chapter I. The most effective means of preventing further federal assumption of state and regional functions would be a demonstration of the adequacy of the New England states to cope with the problems presented. The method herein proposed, an Interstate Commission on the Connecticut River, would be the most effective way of demonstrating that ability for the water resources problems of the Connecticut River Basin.

WATER RESOURCES  
OF THE CONNECTICUT RIVER BASIN

APPENDICES

THE CONNECTICUT RIVER VALLEY FLOOD CONTROL COMPACT

WHEREAS, the Commonwealth of Massachusetts and the States of Connecticut, New Hampshire and Vermont recognize that destructive floods upon the Connecticut River, upsetting orderly processes and causing loss of life and property, including the erosion of lands, and impairing and obstructing highways, railroads and other channels of commerce between the aforesaid states, constitute a menace, and that investigations and improvements of said Connecticut River and its tributaries, including the watersheds thereof, for flood control purposes are in the interest of the general welfare of the aforesaid states; and

WHEREAS, under Section 4 of an Act of the Congress of the United States of America entitled "Public-No. 738--74th Congress--An Act authorizing the construction of certain public works on rivers and harbors for flood control, and for other purposes," approved June 22, 1936, "the consent of Congress" was "given to any two or more states to enter into compacts or agreements in connection with any project or operation authorized by such act for flood control or the prevention of damage to life or property by reason of floods upon any stream or streams or their tributaries which lie in two or more such states, for the purpose of providing, in such manner and such proportion as may be agreed upon by said states and approved by the Secretary of War, funds for construction and maintenance, for the payments of damages, and for the purchase of lands, easements and rights of way in connection with such project or operation"; and

WHEREAS, the Connecticut River, together with its tributaries, is such a waterway as is defined in said Act of Congress above referred to, and the adequate and proper regulation of the destructive floods hereinbefore referred to upon said Connecticut River and its tributaries can best be accomplished by the mutual agreement and co-operation of the states hereinbefore named, by and through a joint or common agency; and

WHEREAS, under and by the terms of said Act of Congress, hereinbefore referred to, the entire cost of construction of the various projects for flood control therein defined, is to be paid and discharged by the United States, and the signatory states hereto desire to avail themselves of the advantages and benefits accruing to them thereby and to be relieved of such cost of construction.

NOW, THEREFORE, the said Commonwealth of Massachusetts and States of Connecticut, New Hampshire and Vermont do hereby enter into the following compact, to wit:

#### ARTICLE I

The principal purposes of this compact are:

(a) To promote interstate comity among and between the signatory states;

(b) To provide adequate storage capacity for impounding the waters of the Connecticut River and its tributaries, designed primarily for the protection of life and property from floods;

(c) To provide a joint or common agency through which the signatory states, while promoting, protecting and preserving to each the local interest and sovereignty of the respective signatory states, may more effectively cooperate in accomplishing the object of flood control in the basin of the Connecticut River and its tributaries, and, among other things:

(1) To acquire by lease from the states signatory hereto, or some of them, all lands, easements and rights of way necessary for the construction of the projects herein contemplated, without cost to the United States, except as provided in said Act of Congress hereinbefore referred to;

(2) To hold and save the United States free from damages due to the construction works;

(3) To maintain and operate all the works herein contemplated after completion in accordance with regulations prescribed by the Secretary of War;

(4) To accept from the signatory states hereto, and from any other source, contributions of moneys as hereinafter set forth for the purposes herein set forth, including without limiting the same, funds for the acquisition of lands, easements and rights of way, for the payment of damages and for the operation and maintenance of said flood control reservoirs, and the expenses incidental thereto and to the functions of the Connecticut River Valley Flood Control Commission hereinafter created.

## ARTICLE II

There is hereby created "The Connecticut River Valley Flood Control Commission," hereinafter referred to as the Commission, which shall consist of twelve commissioners, three of whom shall be residents of the Commonwealth of Massachusetts; three of whom shall be residents of the State of Connecticut; three of whom shall be residents of the State of New Hampshire; and three of whom shall be residents of the State of Vermont.

The members of said commission shall be chosen by their respective states in such manner and for such term as may be fixed and determined from time to time by the law of each of said states respectively by which they are appointed. A commissioner may be removed or suspended from office as provided by the law of the state for which he shall be appointed; and any vacancy occurring in said commission shall be filled in accordance with the laws of the state wherein such vacancy exists.

A majority of the members from each state shall constitute a quorum for the transaction of business, the exercise of any powers or the performance of any duties, but no action of the commission shall be binding unless at least two of the members from each State shall vote in favor thereof.

The compensation of the members of said commission shall be fixed, determined and paid by the state which they respectively represent. All necessary expenses incurred in the performance of their duties shall be paid from the

funds of said commission.

The commission shall elect from its members a chairman, vice-chairman, clerk and treasurer. Such treasurer shall furnish to said commission, at its expense, a bond with corporate surety, to be approved by said commission, in such amount as said commission may determine, conditioned for the faithful performance of his duties.

The commission shall adopt suitable by-laws, and shall make such rules and regulations as it may deem advisable governing the operation of flood control projects, not inconsistent with the laws of the signatory states or laws of the United States, and any rules or regulations lawfully promulgated thereunder.

The commission shall make an annual report to the governor of each of the signatory states, setting forth in detail the operations and transactions conducted by it pursuant to this compact and any legislation thereunder, which said reports shall be submitted to the respective legislatures.

The commission shall keep a record of all its meetings and proceedings, contracts and accounts, and shall maintain a suitable office, where its maps, plans, documents, records and accounts shall be kept, subject to public inspection at such times and under such regulations as the commission shall determine.

### ARTICLE III

The Commission shall constitute a body, both corporate

and politic, with full power and authority,—

(1) To acquire by lease and to hold lands, easements and rights of way for reservoirs herein contemplated, and for the use and enjoyment thereof;

(2) To hold, maintain and operate reservoirs, including appurtenances, for the purposes of flood control;

(3) To receive funds and moneys from the signatory states or other sources, for the purpose of acquiring, operating and maintaining such reservoirs as may hereafter be constructed within the basin of the Connecticut River under the terms of this compact, including, without limiting the same, funds for the acquisition of lands, easements and rights of way, for the payment of damage and for the maintenance and operation of said reservoirs, and the expenses incidental thereto and to the functions of the commission;

(4) To sue and be sued;

(5) To have a seal and alter the same at pleasure;

(6) To appoint and employ such agents and employees as may be required in the proper performance of the duties hereby committed to it, and to fix and determine their qualifications, duties and compensation;

(7) To enter into such contracts and agreements, and to do and perform any and all acts, matters and things as may be necessary and essential to the full and complete performance of the powers and duties hereby committed to and imposed upon it in connection with the construction, operation and maintenance of the system of reservoirs here-

by or hereafter authorized and as may be incidental thereto;  
and

(8) To have such additional powers and duties as may hereafter be delegated to or imposed upon it from time to time by the action of the legislature of any of said states, concurred in by the legislatures of the other states.

The commission shall be charged with the duty, and it is hereby authorized and empowered, to give such assurances, satisfactory to the Secretary of War, as are required by Section 3 of the Act of Congress hereinbefore referred to.

The commission shall make, or cause to be made, such studies as it may deem necessary, in co-operation with the War Department, for the development of a comprehensive plan of flood control, as herein defined, and for the efficient management and regulation of said flood control system, and from time to time shall make reports and recommendations in respect thereto to the signatory states.

The commission shall not pledge the credit of the signatory states, or any of them, nor shall it convey, encumber, or in any way undertake to alienate the lands, easements and rights of way so leased to it, as hereinafter provided, or any part thereof, or any interest therein, except by and with the consent of the signatory states.

#### ARTICLE IV

There shall be established in the Connecticut River basin as an initial plan of flood control eight of the following eleven proposed reservoirs, to wit:

(a) Three of the four following reservoirs in the State of Vermont.

(1) At Victory on the Moose River, controlling a drainage area of approximately sixty-six (66) square miles, and providing flood control storage for approximately seven (7) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control, and in addition thereto to be so designated and constructed as to provide for further development by increasing the storage capacity, the added storage to be used for water conservation or power development at the option of the State of Vermont.

(2) At Union Village on the Ompompanoosic River, controlling a drainage area of approximately one hundred twenty-six (126) square miles, and providing flood control storage for approximately four and one-half ( $4\frac{1}{2}$ ) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control and also for a recreational lake, to be maintained during the summer months at a substantially constant minimum level, to be fixed by the Chief of Engineers of the United States Army, except when increased temporary storage is required for flood control.

(3) At North Hartland on the Ottauquechee River, controlling a drainage area of approximately two hundred twenty-two (222) square miles, and providing

flood control storage for approximately four and one-tenth (4.1) inches of runoff over said drainage area, the dam at said reservoir to be for flood control purposes only.

(4) At Groton Pond on the Wells River, controlling a drainage area of approximately seventeen and three-tenths (17.3) square miles, and providing flood control storage for approximately seven (7) inches of runoff over said drainage area, and the dam at said reservoir to be constructed in such manner as to provide for flood control and also for a recreational lake, the level of the water to be maintained during the summer months at a substantially constant minimum level, to be fixed by the Chief of Engineers of the United States Army, except when increased temporary storage is required for flood control.

(b) Three reservoirs in the State of New Hampshire as follows:

(1) At Bethlehem Junction on the Ammonoosuc River, controlling a drainage area of approximately ninety (90) square miles, and providing flood control storage for approximately six (6) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control and also for a recreational lake to be maintained during the summer months at a substantially constant minimum level, to be fixed by the Chief of

Engineers of the United States Army except when increased temporary storage is required for flood control.

(2) At Stocker Pond in the towns of Grantham and Springfield, controlling a drainage area of approximately thirty-four and four-tenths (34.4) square miles, and providing flood control storage for approximately six (6) inches of runoff over said drainage area, the dam at said reservoir to be constructed for flood control, and in addition thereto to be so designed and constructed as to provide for further development by increasing the storage capacity, the added storage to be used for water conservation or power development, at the option of the State of New Hampshire.

(3) At Surry Mountain on the Ashuelot River, controlling a drainage area of approximately one hundred (100) square miles, and providing flood control storage for approximately six (6) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control, and in addition thereto to be so designated and constructed as to provide for further development by increasing the storage capacity, the added storage to be used for water conservation or power development, at the option of the State of New Hampshire.

(c) Two of the four following reservoirs in the Commonwealth of Massachusetts:

(1) At Knightville on the Westfield River, con-

trolling a drainage area of approximately one hundred sixty-four (164) square miles, and providing flood control storage for approximately four and five-tenths (4.5) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control, and in addition thereto to be so designed and constructed as to provide for further development by increasing the storage capacity, the added storage to be used for water conservation or power development, at the option of the Commonwealth of Massachusetts; or to be constructed in such manner as to provide for flood control and also for a recreational lake to be maintained during the summer months at a substantially constant minimum level, to be fixed by the Chief Engineers of the United States Army, except when increased temporary storage is required for flood control, as said Commonwealth of Massachusetts may elect.

(2) At Tully on the Tully Brook, a tributary of Millers River, controlling a drainage area of approximately fifty (50) square miles, and providing flood control storage for approximately eight (8) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control, and in addition thereto to be so designed and constructed as to provide for further development by increasing the storage capacity, the added storage to be used for water conservation or power development, at

the option of the Commonwealth of Massachusetts; or to be constructed in such manner as to provide for flood control and also for a recreational lake to be maintained during the summer months at a substantially constant minimum level, to be fixed by the Chief of Engineers of the United States Army, except when increased temporary storage is required for flood control, as said Commonwealth of Massachusetts may elect.

(3) At Priest Pond on Priest Brook, a tributary of Millers River, controlling a drainage area of approximately eighteen and eight-tenths (18.8) square miles, and providing flood control for approximately six (6) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control, and in addition thereto to be so designed and constructed as to provide for further development by increasing the storage capacity, the added storage to be used for water conservation or power development, at the option of the Commonwealth of Massachusetts; or to be constructed in such manner as to provide for flood control, and also for a recreational lake to be maintained during the summer months, at a substantially constant minimum level, to be fixed by the Chief of Engineers of the United States Army, except when increased temporary storage is required for flood control, as said Commonwealth of Massachusetts may elect.

(4) At Lower Naukeag on the Millers River, controlling a drainage area of approximately nineteen and seven-tenths (19.7) square miles, and providing flood control storage for approximately five and one-tenth (5.1) inches of runoff over said drainage area, the dam at said reservoir to be constructed in such manner as to provide for flood control and also for a recreational lake, to be maintained during the summer months at a substantially constant minimum level, to be fixed by the Chief of Engineers of the United States Army, except when increased temporary storage is required for flood control.

The type and general plans for the construction of the eight reservoirs herein provided to be constructed as an initial plan of flood control on the Connecticut River Basin, are to be approved by the Connecticut River Valley Flood Control Commission, hereinbefore created, before any construction work thereon is begun or prosecuted.

Insofar as any of the foregoing reservoirs may be constructed for the combined purpose of flood control and recreational facilities, none of the signatory states wherein such reservoirs are located shall be obligated to pay any additional cost of construction.

#### ARTICLE V.

To the end that the Connecticut River Valley Flood Control Commission may give to the Secretary of War the assur-

ances required under Section 3 of the Act of Congress hereinbefore referred to, and that the lands, easements and rights of way necessary for the construction by the United States of the reservoirs and structures thereon, herein contemplated, may be provided, each state at the request of said commission shall proceed forthwith to acquire title to and possession of the lands, easements and rights of way within its territorial limits, which are determined and designated by the commission for the construction of such reservoir or reservoirs.

Such acquisition shall be by purchase or by the exercise of the right of eminent domain, as said commission may direct, and in the manner now or hereafter provided for by the laws of the states wherein such lands, easements and rights of way are located. Title to such lands, easements and rights of way shall be taken in the name of the state wherein the same are located. The cost of acquisition, as hereinafter defined, shall be borne by said commission and paid from and out of the funds contributed by the signatory states for such purpose, as hereinafter provided.

Each state, upon notice from and at the sole expense of said commission, shall forthwith proceed to make, or cause to be made, such highway relocations, including the acquisition of all necessary rights of way therefor, and the construction of such relocated highway, as may become necessary therein because of the construction, operation and maintenance of any reservoir or reservoirs for flood control purposes. Provided, however, that due allowance

shall be made on account of any improved type of construction of such relocated highway. The character, location, route and construction of such relocated highways shall be determined by the state wherein such relocated highway is situated, or by its representatives.

In like manner, such states, at the expense of the commission, and upon its request, shall procure the relocation of any railroad, electric transmission, telephone or telegraph lines, or other public utility structures, including new rights of way therefor as may be essential on account of the construction, operation and maintenance of such reservoir for flood control purposes.

#### ARTICLE VI

The commission shall save the states in which such reservoirs are located, free and harmless from all loss, cost, damage or expense in connection with the control, operation and maintenance of such reservoir or reservoirs, except as hereinafter provided in Articles IX and XI.

The commission or the War Department in the construction and maintenance of such reservoir or reservoirs shall cause the area which may be flowed thereby when full, to be cleared of buildings and all such trees, brush and underbrush as from time to time may be damaged or killed by such flowage; shall cause borrow pits or banks, other excavations or unused accumulations of material and debris, to be leveled, graded, masked, removed or otherwise disposed of in such a way as to leave no holes or other un-

sightly conditions therein; and shall cause all water pockets to be properly drained and the premises affected by such flowage to be landscaped in such manner as may reasonably preserve the natural condition of such premises before such construction, except as the same necessarily may be changed thereby.

The lands, easements and rights of way leased shall be exempt from all taxation but the said commission shall make payments on or before the first day of October of each year to each town in which such lands, easements and rights of way, respectively, are located, of a sum equal to the taxes which would have been assessed against the said lands, easements and rights of way in such town if the same had been included in the list of taxable property for such year, at the assessed valuation of the same as determined for the tax year 1936. Provided, however, that no payment shall be made or required hereunder on account of reimbursement for loss of taxes on any structure which may be erected on such premises in connection with the construction or use of said project, or on account of any railroad or other public utility which may be relocated under the terms of this compact, and which is included in the list of taxable property in said town when relocated.

When said lands, easements and rights of way essential to the construction of any dam or reservoir shall have been acquired as hereinbefore provided, the state wherein the same are located, shall make, execute and deliver to said commission a good and sufficient lease of the same, to

include the structures thereon when completed and accepted by the state, except as hereinafter provided, upon the terms and conditions following, to wit:

(a) The said commission shall save the state in which said reservoirs are respectively located, free and harmless from all loss, cost, damage or expense in connection with the control, operation and maintenance of said reservoir or reservoirs except as hereinafter provided in Articles IX and XI.

(b) In the construction and maintenance of such reservoir or reservoirs, the area which may be flowed thereby, when full, shall be cleared of buildings and of such trees, brush and underbrush, as from time to time may be damaged or killed by such flowage; borrow pits or banks, other excavations or unused accumulations of material and debris, shall be leveled, graded, masked, removed or otherwise disposed of in such a way as to leave no holes or other unsightly conditions therein; all water pockets shall be properly drained; and the premises affected by such flowage shall be landscaped in such manner as may reasonably preserve the natural condition of such premises before such construction, except as the same necessarily may be changed thereby.

(c) The lands, easements and rights of way hereby leased shall be exempt from all taxation; but the said commission shall make payments on or before the first day of October of each year to each town in which such lands, easements and rights of way, respectively, are located, of a sum equal to the taxes which would have been assessed against the said

lands, easements and rights of way in such town if the same had been included in the list of taxable property for such year, at the assessed valuation of the same as determined for the tax year 1936. Provided, however, that no payment shall be made or required hereunder on account of reimbursement for loss of taxes on any structure which may be erected on such premises in connection with the construction or use of said project; or on account of any railroad or other public utility which may be relocated under the terms of this agreement, and which thereafter is included in the list of taxable property in said town when relocated.

(d) The lands, easements and rights of way herein described, are leased and demised solely for the purpose of flood control, and for no other purpose, and the said lessor hereby excepts from this lease and reserves unto itself all benefit or advantage of water conservation, power storage or power development, that may be inherent in such reservoir site, with the right, at such time as it may determine, and upon compliance with the requirements of the United States respecting the adjustment and payment of any added construction cost by reason of the type of construction adapted for that purpose, and the assumption and payment of the cost of acquiring any additional lands, easements and rights of way necessitated by such additional development, and the full preservation of the principal purpose of flood control, to develop the same in such manner and for such purpose as may be essential to the full beneficial use thereof.

(e) The term of said lease shall be for the period of nine hundred and ninety-nine years, subject only to be defeated by a breach of the terms or the conditions in this article set forth.

#### ARTICLE VII

The cost of acquisition of lands, easements and rights of way, as used or referred to herein, shall be deemed to include the cost of:

(1) The purchase or condemnation of lands, easements and rights of way of every kind and nature required or essential in the construction, development, operation and maintenance of such reservoirs as an effective agency for flood control, and including, among other things, camp sites, borrow banks or pits, rock ledges, gravel deposits and rights of way thereto in the vicinity of the dam necessary for the construction and maintenance thereof. Such camps are to be removed and the sites thoroughly cleaned up at no cost to the states or commission before being relinquished by the United States upon the completion of the construction work;

(2) The reconstruction, relocation or elevation of public highways, including bridges or other structures;

(3) The reconstruction or relocation of public service utilities, including railroads and the alteration of bridges and structures thereon, whether publicly or privately owned;

(4) The reconstruction or relocation of telegraph,

telephone or electric light or power distribution and transmission lines, pipe lines, aqueducts, water or gas mains; and

(5) Any other damages, expenses or costs that may be necessitated or incurred in procuring and providing the sites necessary for the construction of the reservoirs herein contemplated, including the cost and expense of acquiring such lands, easements and rights of way and procuring the reconstruction or relocation of the highways, bridges, railroads, telephone, telegraph and electric lines, pipes, aqueducts and mains above mentioned, or the rights of way for the same, or any other similar expenditures.

#### ARTICLE VIII

The rights to be acquired and exercised by the commission are solely for flood control purposes, and each of the respective signatory states wherein any reservoir may be situated, reserves respectively unto itself, all benefit or advantage of water conservation, power storage or power development that may be inherent in such reservoir site.

In the event any signatory state may wish to preserve to itself the value of such site for the purpose aforesaid, it may, through an appropriate agency of the state, so notify the United States, through its War Department, before any construction work is commenced hereunder for flood control purposes, so that the design and construction of the dam at such site may be developed in such manner as to

provide for further development as a storage reservoir for the conservation of water, enhancement of stream flow or power development.

Provided, however, that nothing herein contained shall be deemed to prevent any such state, at its option, at any time hereafter, by itself or through such agency as it may designate, from developing any such reservoir or reservoirs for use for water conservation, power storage or power development, in order that it may avail itself of the full beneficial use and enjoyment of the rights herein reserved. In such event, such state shall pay or provide for the payment of all costs or expenses necessary for such further development, including adaptation of any existing dam and works to such purpose, in accordance with plans approved by the secretary of war, and at all times fully preserve the primary purpose of flood control.

The terms and conditions under which any such signatory state shall make available the rights of water conservation, power storage or power development herein reserved shall be determined by separate agreement or arrangement between such state and the United States; and the type and general plans for the construction of such of the reservoirs as are herein contemplated to provide for such further development shall be approved by some agency of such state, for that purpose duly authorized, before any construction thereon is begun or prosecuted.

## ARTICLE IX

In order that an adequate fund may be established and created from which payments for the acquisition of lands, easements and rights of way may be made, the signatory states become bound and each hereby obligates itself to pay to the commission, the proportion of the cost of acquisition of lands, easements and rights of way respectively set forth below, and subject to the limitations hereinafter provided, as follows:

- (1) The Commonwealth of Massachusetts fifty percent thereof.
- (2) The State of Connecticut forty percent thereof.
- (3) The State of New Hampshire five percent thereof.
- (4) The State of Vermont five percent thereof.

Provided, however, that it is the understanding, intent and purpose of the parties hereto, that the cost of acquisition of lands, easements and rights of way for eight reservoirs, provided for herein, shall not exceed the sum of Two Million Seven Hundred Thousand (2,700,000) Dollars and that the drainage area of the Connecticut River Basin to be controlled thereby shall be approximately seven and 61/100 (7.61) percent thereof; and it is expressly provided that the maximum amount to which each of the signatory states shall be bound or obligated for cost of acquisition of lands, easements and rights of way on account of said eight reservoirs shall not exceed the respective proportions hereinbefore set forth of said sum of Two Million Seven Hundred Thousand (2,700,000) Dollars.

The fiscal year shall be deemed to begin on July 1st and end on June 30th. Payment by the signatory states of the cost of acquisition shall be made as and when requested by the commission on or after July 1, 1937; provided that not more than one-half of said sum of Two Million Seven Hundred Thousand (2,700,000) Dollars shall be required to be paid in any fiscal year after said date.

#### ARTICLE X

In the execution of the initial plan of eight reservoirs herein contemplated said commission, with the approval of the Secretary of War, shall determine the order in which the construction work on the same shall be commenced and prosecuted, except that it is hereby declared to be the intent and purpose of the signatory states that construction work shall be first begun on one reservoir project located in the Commonwealth of Massachusetts and upon one reservoir project located respectively in each of the States of New Hampshire and Vermont before further construction work is begun on any other reservoir.

The initial plan for the construction of eight reservoirs herein mentioned and provided for is part of a long range comprehensive program for flood control on the Connecticut River and its tributaries, the object and purpose of the signatory states being to enlarge and expand such flood control projects to an ultimate control, including the reservoirs hereinabove mentioned of approximately twenty-one percent of the drainage area thereof, at a

total maximum cost to the signatory states, including the cost herein specified, of not to exceed Ten Million Five Hundred Seventy-Five Thousand (10,575,000) Dollars, and the contributions by the respective signatory states, in the proportions hereinbefore set forth, shall not in any event exceed the total amount above stated.

In the further development of such comprehensive program, said commission shall determine from time to time the site, character, location and extent of such additional reservoirs, subject to the approval of the legislature of the state in which the same may be located.

#### ARTICLE XI

Each of the signatory states shall annually contribute and pay to the commission the respective proportions of the expense of operation and maintenance of the flood control reservoirs hereafter constructed under the terms of this agreement as follows:

The Commonwealth of Massachusetts fifty percent thereof,

The State of Connecticut forty percent thereof,

The State of New Hampshire five percent thereof,

The State of Vermont five percent thereof,

and each of said states shall make adequate provision for compliance on its part with the provisions of this Article, and the same shall be made available as and when required upon the requisition of the commission.

As a part of the expense of operation and maintenance

of said reservoirs the commission shall assume and pay to the respective towns entitled thereto the cost of reimbursement for loss of taxes, as set forth and required in subparagraph (c) in Article VI hereof, and shall pay all costs, incident to or damages resulting from the operation and maintenance of such flood control reservoirs, and shall save the United States free and harmless on account thereof, and shall pay all other costs or expenses which may be necessary in the operation and maintenance thereof, including the expenses of the members of said commission hereinbefore provided to be paid out of the funds of said commission.

#### ARTICLE XII

Each of the signatory states hereby releases and discharges the others of and from all damages, which may be claimed to result from the obstruction, detention, impounding, storage, release or diversion of the waters of said Connecticut River and its tributaries, in so far as the same may be in any way affected by the construction, operation or maintenance of the reservoirs herein contemplated.

#### ARTICLE XIII

This compact shall become operative and effective when approved by the legislatures of each of the signatory states and by the Congress of the United States. Notice of approval shall be given by the governor of each state to the governors of the other states and to the President of the United States,

and the President of the United States is requested to give notice to the governors of each of the signatory states of its approval by the Congress of the United States.

NEW ENGLAND INTERSTATE WATER POLLUTION  
CONTROL COMPACT

WHEREAS, The growth of population and the development of the territory of the New England states has resulted in serious pollution of certain interstate streams, ponds and lakes, and of tidal waters ebbing and flowing past the boundaries of two or more states; and

WHEREAS, Such pollution constitutes a menace to the health, welfare and economic prosperity of the people living in such areas; and

WHEREAS, The abatement of existing pollution and the control of future pollution in the interstate waters of the New England area are of prime importance to the people and can best be accomplished through the cooperation of the New England states in the establishment of an interstate agency to work with the states in the field of pollution abatement;

NOW, THEREFORE, The states of Connecticut and Rhode Island and the commonwealth of Massachusetts (the states of Maine, New Hampshire and Vermont when authorized and do join herein) are now bound and do agree as follows:

ARTICLE I

It is agreed between the signatory states that the provisions of this compact shall apply to streams, ponds and lakes which are contiguous to two or more signatory states or which flow through two or more signatory states or which have a tributary contiguous to two or more signatory states

or flowing through two or more signatory states, and also shall apply to tidal waters ebbing and flowing past the boundaries of two states.

#### ARTICLE II

There is hereby created the New England Interstate Water Pollution Control Commission (hereinafter referred to as the commission) which shall be a body corporate and politic, having the powers, duties and jurisdiction herein enumerated and such other and additional powers as shall be conferred upon it by the act or acts of a signatory state concurred in by the others.

#### ARTICLE III

The commission shall consist of five commissioners from each signatory state, each of whom shall be a resident voter of the state from which he is appointed. The commissioners shall be chosen in the manner and for the terms provided by law of the state from which they shall be appointed. For each state there shall be on the commission a member representing the state health department, a member representing the state water pollution control board (if such exists), and, except where a state in its enabling legislation decides that the best interests of the state will be otherwise served, a member representing municipal interests, a member representing industrial interests, and a member representing an agency acting for fisheries or conservation.

#### ARTICLE IV

The commission shall annually elect from its members a chairman and vice-chairman and shall appoint and at its

pleasure remove or discharge such officers. It may appoint and employ a secretary who shall be a professional engineer versed in water pollution and may employ such stenographic or clerical employees as shall be necessary, and at its pleasure remove or discharge such employees. It shall adopt a seal and suitable by-laws and shall promulgate rules and regulations for its management and control. It may maintain an office for the transaction of its business and may meet at any time or place within the signatory states. Meetings shall be held at least twice each year. A majority of the members shall constitute a quorum for the transaction of business, but no action of the commission imposing any obligation on any signatory state or on any person, firm or corporation therein shall be binding unless a majority of the members from such signatory state shall have voted in favor thereof. Where meetings are planned to discuss matters relevant to problems of water pollution control affecting only certain of the signatory states, the commission may vote to authorize special meetings of the commissioners of the states especially concerned. The commission shall keep accurate accounts of all receipts and disbursements and shall make an annual report to the governor and the legislature of each signatory state setting forth in detail the operations and transactions conducted by it pursuant to this compact, and shall make recommendations for any legislative action deemed by it advisable, including amendments to the statutes of the signatory states which may be necessary to carry out the intent and purpose of

this compact. The commission shall not incur any obligations for salaries, office, administrative, traveling or other expenses prior to the allotment of funds by the signatory states adequate to meet the same; nor shall the commission pledge the credit of any of the signatory states. Each signatory state reserves the right to provide hereafter by law for the examination and audit of the accounts of the commission. The commission shall appoint a treasurer who may be a member of the commission, and disbursements by the commission shall be valid only when authorized by the commission and when vouchers therefor have been signed by the secretary and countersigned by the treasurer. The secretary shall be custodian of the records of the commission with authority to attest to and certify such records or copies thereof.

#### ARTICLE V

It is recognized, owing to such variable factors as location, size, character and flow and the many varied uses of the waters subject to the terms of this compact, that no single standard of sewage and waste treatment and no single standard of quality of receiving waters is practical and that the degree of treatment of sewage and industrial wastes should take into account the classification of the receiving waters according to present and proposed highest use, such as for drinking water supply, industrial and agricultural uses, bathing and other recreational purposes, maintenance and propagation of fish life, shellfish

culture, navigation and disposal of wastes.

The commission shall establish reasonable physical, chemical and bacteriological standards of water quality satisfactory for various classifications of use. It is agreed that each of the signatory states through appropriate agencies will prepare a classification of its interstate waters in entirety or by portions according to present and proposed highest use and for this purpose technical experts employed by state departments of health and state water pollution control agencies are authorized to confer on questions relating to classification of interstate waters affecting two or more states. Each signatory state agrees to submit its classification of its interstate waters to the commission for approval. It is agreed that after such approval, all signatory states through their appropriate state health departments and water pollution control agencies will work to establish programs of treatment of sewage and industrial wastes which will meet standards established by the commission for classified waters. The commission may from time to time make such changes in definitions of classifications and in standards as may be required by changed conditions or as may be necessary for uniformity.

#### ARTICLE VI

Each of the signatory states pledges to provide for the abatement of existing pollution and for the control of future pollution of interstate inland and tidal waters as described in Article I, and to put and maintain the waters thereof in

a satisfactory condition consistent with the highest classified use of each body of water.

#### ARTICLE VII

Nothing in this compact shall be construed to repeal or prevent the enactment of any legislation or prevent the enforcement of any requirement by any signatory state imposing any additional condition or restriction to further lessen the pollution of waters within its jurisdiction. Nothing herein contained shall affect or abate any action now pending brought by any governmental board or body created by or existing under any of the signatory states.

#### ARTICLE VIII

The signatory states agree to appropriate for the salaries, office, administrative, travel and other expenses such sum or sums as shall be recommended by the commission. The commonwealth of Massachusetts obligates itself only to the extent of sixty-five hundred dollars in any one year, the state of Connecticut only to the extent of three thousand dollars in any one year, the state of Rhode Island only to the extent of fifteen hundred dollars in any one year, and the states of New Hampshire, Maine, and Vermont each only to the extent of one thousand dollars in any one year.

#### ARTICLE IX

Should any part of this compact be held to be contrary to the constitution of any signatory state or of the United States, all other parts thereof shall continue to be in full force and effect.

## ARTICLE X

The commission is authorized to discuss with appropriate state agencies in New York state questions of pollution of waters which flow into the New England area from New York state or vice versa and to further the establishment of agreements on pollution abatement to promote the interests of the New York and New England areas.

Whenever the commission by majority vote of the members of each signatory state shall have given its approval and the state of New York shall have taken the necessary action to do so, the state of New York shall be a party to this compact for the purpose of controlling and abating the pollution of waterways common to New York and the New England states signatory to this compact but excluding the waters under the jurisdiction of the Interstate Sanitation Commission (New York, New Jersey and Connecticut).

## ARTICLE XI

This compact shall become effective immediately upon the adoption of the compact by any two contiguous states of New England but only in so far as applies to those states and upon approval by Federal law. Thereafter upon ratification by other contiguous states, it shall also become effective as to those states.

## BIBLIOGRAPHY.

- Bradley, Phillips. "The Connecticut Valley in Massachusetts-  
A Regional Potential", American Planning and Civic  
Annual, 1937, pp. 165-172.
- "A TVA for New England", 50 The American City 39-41,  
June, 1935.
- Chase, Stuart. Rich Land, Poor Land, New York: McGraw-Hill,  
1936.
- Clapp, Gordon R. and Menhinick, Howard K. "The Approach of  
the TVA to the Solution of Regional Problems",  
15 The Journal of Educational Sociology 136-148.  
November, 1941.
- Commonwealth of Massachusetts, Report of the Connecticut  
Valley Waterway Board on an Investigation of the  
Connecticut River, Boston, 1913.
- House Document 1735, Sanitary Condition of Certain  
Rivers of the Commonwealth, Boston, 1938.
- House Document 1730, Report of the Special Commission  
to Investigate Connecticut River Navigation, Boston,  
1947.
- House Document 1765, Report of the Special Unpaid  
Commission Relative to the Development of Inland  
Waterways of the Commonwealth, Boston, 1948.
- Council of State Governments, The Book of the States,  
1943-1944, Chicago, 1943.
- Daly, Edward J. "Discussion of the Legal Questions which  
have arisen in Connection with the Compact", Annual  
Report of the Connecticut Society of Civil Engineers,  
New Haven, Conn., 1938.
- Dewhurst, J. Frederic and Associates. America's Needs and  
Resources, New York: The Twentieth Century Fund, 1947.
- Federal Power Commission, Typical Electric Bills, 1947,  
Washington, 1947.
- Fenton, Walter S. "The New England Compacts for Flood  
Control", 21 Public Utilities Fortnightly 643-656,  
May 26, 1938.
- Frank, Bernard. "Some Aspects of the Evaluation of Watershed  
Flood Control Projects", 18 Journal of Land and Public  
Utility Economics 391-411, November, 1942.
- Hansen, Alvin H. and Perloff, Harvey S. Regional Resource  
Development, Washington: National Planning Association,  
1942.
- Harris, Seymour E. "New England's Decline in the American  
Economy", 25 Harvard Business Review 348-371,  
Spring, 1947.

- Hyson, Charles D. and Neal, Alfred C. "New England's Economic Prospects", 26 Harvard Business Review 156-180, March, 1948.
- Interstate Commission on the Delaware River Basin, Annual Report, 1947, Philadelphia, 1947.
- Interstate Commission on the Potomac River Basin, Its Policy and Program, Washington, 1946.
- Lilienthal, David E. TVA-Democracy on the March, New York: Harper, 1944.
- Massachusetts State Planning Board, Connecticut River, Drainage Basin Study No. 2, Boston, 1938.
- Mayott, Clarence W. Report on Flood Control, etc., Hartford, Conn:Hartford Electric Light Co., 1945.
- Analysis of Navigation Project on Connecticut River, Hartford, Conn: Hartford Electric Light Co., 1946.
- McDougal, M., Rotival et al. The Case for Regional Planning with special reference to New England, New Haven, Conn: Yale University Press, 1947.
- Mills, Charles M. "New England's Stand on Flood Control Compacts", 21 Public Utilities Fortnightly 451-462, April 14, 1938.
- National Resources Committee, Drainage Basin Problems and Programs, Washington, 1937.
- Drainage Basin Problems and Programs, 1937 Revision, Washington, 1938.
- Regional Factors in National Planning and Development, Washington, 1935.
- Energy Resources and National Policy, Washington, 1939.
- Industrial Location and National Resources, Washington, 1943.
- Regional Planning, Part III--New England, Washington, 1936.
- New England Interstate Water Pollution Control Commission, First draft of First Annual Report, Providence, 1948.
- New England Regional Planning Commission, Connecticut River Valley Water Resources Data, Boston, 1936.
- Connecticut River Valley Water Resources Bibliography, Boston, 1936.
- Water Resources of New England, Boston, 1937.
- The Rivers Speak, Boston, 1942.
- Newlands, James A. "Water Power Proposals which have Entered into the Writing of the Compact", Annual Report of the Connecticut Society of Civil Engineers, New Haven, Conn., 1938.

- Pritchett, C. Herman. The Tennessee Valley Authority, Chapel Hill, North Carolina: University of North Carolina Press, 1943.
- "Regional Authorities Through Interstate Compacts", 14 Social Forces 200-210, December, 1935.
- "Organization for Regional Planning", 23 Social Forces 387-394, March, 1945.
- "Co-ordinated Control of Water Resources", 18 State Government 27-29, February, 1945.
- Reid, Kenneth A. "Pollution Control--A Postwar Public Works Opportunity for the States", 18 State Government 30-32, February, 1945.
- Robinson, David W. "Voluntary Regionalism in the Control of Water Resources", 207 The Annals 116-123, January 1940.
- Ryan, Oswald. "The New England Flood and Power Compact Stymie", 21 Public Utilities Fortnightly 67-80, January 20, 1938.
- State of Connecticut, State Water Commission, Biennial Reports, 1934-1946, Hartford, Conn.
- Report on the Water Resources of Connecticut, Hartford, 1930.
- State of New Hampshire, Compact Covering Flood Control in The Connecticut River Basin, Manchester, 1937.
- Report on Interstate Compacts for Flood Control, Concord, 1938.
- State of Vermont, Water Resources and Electrical Energy, Montpelier, 1941,
- Vermont State Water Conservation Board, Effects in Vermont of the Comprehensive Plan for Flood Control of the Connecticut River, Montpelier, 1947.
- Turner, Ellwood J. "The Place of the States in the Field of Watershed Development", 18 State Government 19-22, February, 1945.
- U. S. Army, Corps of Engineers, Connecticut Valley Flood Control, Providence, October, 1939.
- Flood Control, Connecticut River Basin, Providence, October, 1945.
- Comprehensive Plan for Flood Control, Connecticut River Basin, Boston, March, 1947.
- U. S. Department of the Interior, The Floods of March 1936: Part I, New England Rivers, Washington, 1937.

U. S. House of Representatives, Committee on Rivers and Harbors, Hearings on the Improvement of the Connecticut River Between Hartford, Conn., and Holyoke, Mass., 76th Congress, 1st Session, 1939.

-----same, 77th Congress, 1st Session, 1941.

-----same, 78th Congress, 1st Session, 1943.

-----Document No. 412, 74th Congress, 2nd Session.

-----Document No. 455, 75th Congress, 2nd Session.

-----Document No. 165, 76th Congress, 1st Session.

-----Document No. 724, 76th Congress, 3rd Session.

Wadhams, Sanford H. "Historical Account of Flood Control Compacts for the Connecticut River", Annual Report of the Connecticut Society of Civil Engineers, New Haven, Conn., 1938.

-----"The Connecticut", 19 State Government 218-219, September, 1946.

Wolman, Abel. "Wanted--A National Water Policy", 19 State Government 215-217, September, 1946.

Work Projects Administration, Report on Sources of Pollution Connecticut River Valley Massachusetts, Boston, 1940.