

PLANNING STATUS REPORT

WATER RESOURCES APPRAISAL FOR HYDROELECTRIC LICENSING

This is one of a series of revised Planning Status Reports for major river basins in the United States. The original reports, which were prepared several years ago, are being revised as part of a program of Water Resources Appraisals for Hydroelectric Licensing. The revised reports provide updated information on water resources for use by the Federal Energy Regulatory Commission and its staff when considering hydroelectric licensing and other work. The reports present data on water resource developments, existing and potential, and on water use by existing and projected steam-electric generating facilities. The reports also summarize past and current planning studies. The information presented in these reports was abstracted from available sources and involved no new analyses. The report is a staff effort which was not prepared for adoption or approval by the Commission, and does not commit or prejudice later Commission action.

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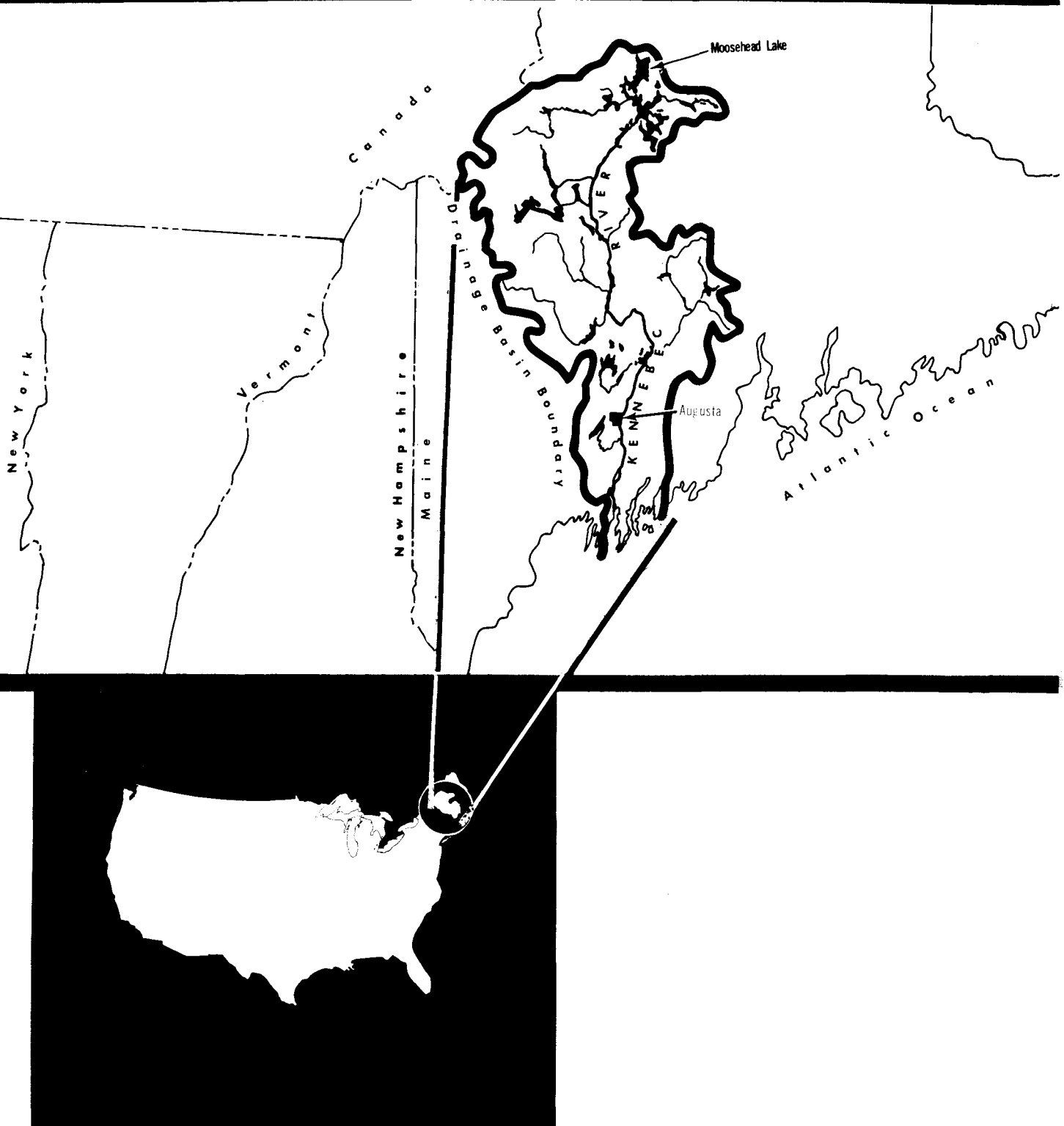
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THE KENNEBEC RIVER BASIN



DESCRIPTION OF THE BASIN

The Kennebec River basin is located in the west central portion of Maine. It is bounded by the Androscoggin River basin on the west, the Penobscot on the north and east, the Maine Coast on the south, and the Casco Bay drainage area on the southwest. The northwestern edge of the basin forms a part of the international boundary between the United States and Canada. The basin has a maximum length, in a north-south direction, of about 149 miles and a maximum width of about 72 miles. The total area of the watershed is approximately 5,900 square miles and constitutes about 18 percent of the total area of Maine. The main stem of the Kennebec River begins at Moosehead Lake and flows southerly 165 miles to the Atlantic Ocean at Hunniwell Point. The river is tidal to Augusta, 45 miles north of its mouth. Between its origin and mean tide at Augusta, the river falls about 1,026 feet in a distance of 120 miles, an average gradient of 8.5 feet per mile. A stream profile, figure 1, and a detailed basin map, figure 2, are included at the end of this report.

The principal headwater tributaries of the Kennebec River are the Moose and Roach Rivers, flowing into Moosehead Lake, the largest body of water in Maine. Four principal tributaries are the Dead, Carrabassett, Sandy, and Sebasticook Rivers. The drainage areas of these 4 major tributaries account for nearly 48 percent of the total area of the Kennebec River basin.

Most of the Kennebec River basin is located in upland areas, principally the Charlton and Bangor Upland. A large section in the upper part of the basin, including the Dead River and Moosehead Lake areas, is an extension of the White Mountains and is composed of rocky granitic lands with large areas of slate and shale. Many of the mountain peaks on the northwestern perimeter of the basin and in the Moosehead Plateau reach elevations of 2,600 feet to 3,900 feet above sea level. Mount Sugarloaf, at an elevation of 4,237 feet in the northwestern part of the Carrabassett River watershed, is the highest point in the basin. Steep hills and mountains cover half of the basin, and rolling hills cover the other half. The topography of the area gradually changes from mountains and gentle foothills at the headwaters to the wide flat valleys characteristic of a coastal plain. Below Waterville, the valley widens and is less than 100 feet above sea level. The majority of the landscape units are forest-town with lesser amounts of forest-wildland. Many lakes and ponds are scattered throughout the basin including the scenic Belgrade Lakes near Waterville. There are 31 major lakes and ponds of more than 1,000 surface acres in the Kennebec watershed. These lakes and ponds cover about 5 percent of the total basin area.

The climate of the Kennebec River basin is characterized by frequent changes of weather. The summers are relatively cool and the winters are severe, particularly at inland and upland locations. Except for occasional coastal storms, most of the weather changes are the result of the movement of air masses generally from west to east across the country. Average annual temperature is about 42 degrees Fahrenheit or 6 degrees Celsius. Temperatures during the year vary from 90 degrees Fahrenheit to below -30 degrees Fahrenheit.

Annual precipitation over the basin averages about 42 inches with over 50 inches at the higher headwater elevations. Snowfall over the watershed varies from about 65 inches annually in the lower portions of the basin to over 120 inches in the Moosehead Lake area. The average runoff from the basin is about 1.6 cubic feet per second per square mile or 22 inches annually.

DESCRIPTION OF THE BASIN

The 1970 population of the basin was about 176,000, or about 18 percent of the population of Maine. The population density was less than 30 persons per square mile, and only a dozen towns had densities over 100 persons per square mile. Over 50 percent of the population was in the cities and towns adjoining the main river at and downstream of Skowhegan. The upper portion of the basin is even more sparsely settled. Four of the major cities and towns in the basin and their 1970 populations are Augusta (21,945), Waterville (18,192), Skowhegan (7,601), and Gardiner (6,685).

Interstate 95, U.S. routes 1, 1A, 2, and 201, and various State and local roads exist throughout the basin. Augusta has a commercial airport as well as limited passenger bus service.

About 250,000 acres, or 8 percent of the area, is cropland. The major agricultural activities include production of dairy products, poultry products, and forest products. Leading crops include potatoes, apples, vegetables, hay, and horticultural specialties.

Forests are a basic element in the economy. More than 75 percent of the land area is wooded. The forests supply the raw material for the numerous wood-using industries. Forest products production activities such as logging, wood transportation, and pulp and paper manufacturing dominate land and water use in this area. The chief products of industry, in addition to forest products, are textiles, shoe manufacturing, food processing, and tanning. The two principal manufacturing centers, Augusta and Waterville, are both located on the Kennebec River in the lower part of the basin.

EXISTING WATER RESOURCE DEVELOPMENTS

The Kennebec River basin is a multiple water use area with impoundments used for power generation, industrial water supply, and recreation. The rivers, particularly the Kennebec and Sebasticook Rivers, are used mainly for industrial processing and domestic and industrial waste disposal. The rivers in the basin are not currently being used for sources of domestic water supplies, due to either lack of sufficient quantity, or poor water quality. The Carrabassett and Dead Rivers are primarily recreation rivers. The lower main stem of the Kennebec and the Sebasticook have poor water quality and cannot be used satisfactorily for either water supply or recreation.

There are 17 existing water power installations in the basin with a total installed capacity of 215,620 kilowatts of which 186,450 kilowatts are owned by electric utility companies and 29,170 kilowatts are owned by industrial establishments. This includes 6,790 kilowatts equivalent in hydromechanical capacity. Electric utility service in the basin is provided by the Central Maine Power Company. Three small utilities, the municipal system of Madison, and Carrabassett Light and Power Company also supply small portions of the area. Carrabassett Light and Power Company has no generating capacity. The existing hydroelectric projects in the Kennebec River basin are listed in table 1.

EXISTING WATER RESOURCE DEVELOPMENTS

Table 1
Existing Hydroelectric Projects
Kennebec River Basin

Project	Map No.	River	River Mile	Drainage Area (sq mi)	Usable Power Storage Capacity (ac ft)	Owner 1/	Installed Capacity (kW)	Static Head (ft)	Initial Power Operation
Eustis	1	N. Br. Dead	NA	NA	190	Lawrence Keddy	250	12	1950
Edwards Division	2	Kennebec	13	5,550	2,300	Augusta Dev. Corp.	3,500	19	1913
Union Gas	3	Messalonskee	2	205	0	Central Maine Pwr. Co.	1,500	38	1935
Automatic	4	Messalonskee	4	200	0	Central Maine Pwr. Co.	800	23	1924
Rice Rips	5	Messalonskee	7	180	0	Central Maine Pwr. Co.	1,600	42	1918
Oakland	6	Messalonskee	8	175	0	Central Maine Pwr. Co.	2,800	65	1925
Ft. Halifax	7	Sebasticoock	1	975	4,000	Central Maine Pwr. Co.	1,500	22	1908
Big Sandy (Norridgewock)	8	Sandy	3	619	0	Madison Electric Works	450	15	1914
Lockwood	9	Kennebec	61	4,270	1,000	Millstar Mfg. Corp. 2/	4,800	21	1919
Winslow	10	Kennebec	63	4,268	2,000	Scott Paper Co.	3,730	23	1906
Shawmut	11	Kennebec	68	4,200	5,000	Central Maine Pwr. Co.	4,650	24	1913
Weston	12	Kennebec	82	3,950	2,550	Central Maine Pwr. Co. 3/	12,000	32	1920
Abenaki	13	Kennebec	95	3,230	0	Madison Paper Co.	3,650 4/	42	1917
Anson	14	Kennebec	96	3,230	0	Madison Paper Co.	6,000	24	1923
Williams	15	Kennebec	111	2,740	3,050	Central Maine Pwr. Co.	13,000	45	1939
Wyman	16	Kennebec	120	2,625	60,300	Central Maine Pwr. Co.	72,000	135	1930
Harris	17	Kennebec	152	1,382	19,000	Central Maine Pwr. Co.	76,600 5/	148	1954
Totals					99,390		208,830		

1/ All utilities are privately owned.

2/ Leased to Central Maine Power Co.

3/ Skowhegan Water Co. owns a minor interest in the plant.

4/ Does not include 6,790 kilowatts, the equivalent of 9,100 horsepower in mechanical units.

Hydropower plants on the Kennebec River with an aggregate capacity of 206,620 kilowatts, develop 509 feet of the total fall of 955 feet between full pool elevation at the Harris (Indian Pond) project and mean tide at Augusta. This includes 6,790 kilowatts of hydromechanical energy from one plant. The 7 plants on tributary streams have an aggregate capacity of 8,900 kilowatts and develop a total gross head of 217 feet. All projects are run-of-river except Harris (Indian Pond) and Wyman which are stations with adequate pondage for daily and weekly streamflow regulations.

There are no existing Federal reservoir projects in the Kennebec River basin and none are authorized. Commercial navigation is carried on in the 45-mile tidal portion of the Kennebec River between Augusta and the Atlantic Ocean.

The Kennebec River is well regulated by the many lakes in the basin. Existing lakes, ponds, and storage developments are described in table 2. Development of storage dams began over a century ago at Moosehead Lake, the largest lake in Maine, with a surface area of about 74,890 acres. This lake contains over 4 million acre-feet of water, of which 544,000 acre-feet can be withdrawn. Moosehead Lake holds about 41 percent of the total usable storage capacity in the basin amounting to 1,333,000 acre-feet. Flagstaff Lake, the second largest lake, has a surface area of 17,950 acres and total storage capacity of about 277,000 acre-feet. The lake is almost entirely man made and has a usable storage capacity of 276,600 acre-feet.

EXISTING WATER RESOURCE DEVELOPMENTS

Table 2

Existing Lakes, Ponds, and Storage Reservoirs Kennebec River Basin

River	Lake, Pond, or Reservoir	Owner 1/	Drainage Area (sq mi)	Surface Area (ac)	Total Storage Capacity (ac-ft)	Usable Storage Capacity (ac-ft)	Drawdown (ft)	FERC Project No.
Kennebec	Webber Pond*	-	NA	1,252	19,400	0	-	-
	Three Mile Pond*	-	NA	1,077	14,500	0	-	-
	Pierce Pond	-	NA	1,650	60,100	0	-	-
	Moxie Pond	CMP	89	1,747	18,700	14,700	8	2613
	Indian Pond (Harris)	CMP	1,355	3,746	72,300	19,000	5	2142
	Wyman	CMP	2,595	3,145	208,400	60,300	20	2329
	Hayden	-	NA	1,446	20,500	0	-	-
Totals	7			14,063	413,900	94,000		
Cobbosseecontee	Cobbosseecontee*	SDW	NA	5,543	171,700	40,000	7.7 2/	-
	Annabessacook*	-	NA	1,420	25,300	0	-	-
	Maranacook	-	NA	1,673	43,900	4,500	3	-
	Wilson	-	NA	582	-	-	3-5	-
Totals	4			9,218	240,900	44,500		
Messalonskee	Messalonskee	CMP	175	3,510	110,000	32,500	10	-
	Long Pond	-	114	2,714	74,000	5,400	2	-
	Great Pond	CMP	82	8,239	161,500	22,300	3	-
	North Pond*	-	NA	2,115	28,000	4,200	2	-
	East Pond	-	NA	1,705	26,300	6,800	4	-
	Ellis-McGrath Ponds	CMP	NA	1,121	-	0	-	-
Totals	6			19,404	399,800	71,200		
Sebasticook	China	-	NA	3,922	86,500	20,000	6	-
	Unity Pond (Lake Winnecook)	-	NA	2,520	40,000	0	-	-
	Great Moose	-	235	3,504	52,000	24,000	7	-
	Sebasticook*	CMP	135	4,288	79,000	20,000	5	-
	Wassookeag	AAC	NA	1,062	20,400	6,000	6	-
Totals	5			15,296	277,900	70,000		-
Carrabassett	Embden Pond	MDIFG	NA	1,568	83,000	0	-	-
Totals	1			1,568	83,000	0		
Dead	Flagstaff	CMP	520	17,950	277,000	276,600	36	2612
	Spencer	CMP	49	1,619	49,000	14,700	3/ 8.6 3/	-
Totals	2			19,569	326,000	291,300		
Moose and Roach (to east outlet of Moosehead)	Moosehead	KLD	1,242	74,890	4,251,000	544,000	7.5	2671
	Brassua	CMP	710	8,979	270,000	196,500	30	2615
	Long Pond	-	114	3,053	27,300	0	-	-
	Wood Pond	-	NA	2,150	60,600	0	-	-
	Attean Pond	-	NA	2,745	40,700	0	-	-
	Halob Pond	-	NA	1,055	13,000	0	-	-
	First Roach Pond	RRD	63	3,270	176,500	21,500	7	-
Totals	7			96,142	4,839,100	762,000		
Basin Totals	32			175,560	6,580,600	1,333,000		

1/ CMP - Central Maine Power Co; KLD - Kennebec Log Driving Co.; MDIFG - Maine Department of Inland Fisheries and Game; AAC - Amos Abbott Co.; RRD - Roach River Dam Co.; SDW - S D Warren Co.

2/ Water not now being used.

3/ Gates have been removed and storage is no longer available.

* Among 12 lakes undergoing eutrophication, termed "Lake Stress Quality" (LSQ) by the State of Maine.

Source: USGS Water Resources Data for Maine 1974, and Maine Department of Environmental Protection.

EXISTING WATER RESOURCE DEVELOPMENTS

The active storage in the basin is operated by the Kennebec Water Power Company for use by downstream utilities and several paper manufacturing companies. The Kennebec Water Power Company is directed to maintain a minimum streamflow of 2,500 cubic feet per second at Madison. When hydrologic conditions are favorable, 4,500 cubic feet per second are continuously released to provide maximum benefits to downstream hydroelectric plants.

In addition to storage for hydroelectric purposes, the extensive reservoir system on the upper Kennebec also serves as a flood retardation system affording protection for downstream towns and villages.

The Kennebec River extends into the wilderness area of Maine and contains a variety of natural features that are suitable and desirable for outdoor recreation. These include scenic lakes, rivers, streams, mountains, unique natural areas, and forest characteristics in the upper basin, and many lakes, streams, and woodlands in the lower valley. The areas that are the most conducive to inland recreation are centered around Moosehead Lake, Bigelow and Sugarloaf Mountains in the upper basin, the Belgrade Lakes west of Waterville, and the lake area west and south of Augusta. Poor water quality of the Kennebec River in its southern reaches precludes any use of this portion of the river for recreational purposes at this time. Winter sports such as skiing, ice skating, and snowmobiling are rapidly becoming an important industry in the State of Maine.

Provisions for recreation facilities are considered at all FERC licensed projects operating in the Kennebec River basin. For many years, the most popular project areas have been Moosehead Lake, Indian Pond, Wyman Reservoir, and Williams. Because of poor accessibility and water quality, recreational development at some licensed projects is limited.

The greatest quantity and variety of outdoor recreation facilities in the Kennebec River basin are provided by private industry. Paper companies and electric utilities cooperate with public and local agencies to provide basic outdoor recreational opportunities on company lands. Local, State, and Federal agencies also maintain outdoor recreation facilities in the basin.

Pulp and paper mills, the prime cause of water quality degradation, are presently constructing pollution abatement facilities throughout the basin. Most major municipalities have treatment facilities completed or under construction. Water quality problems persist along the lower Kennebec River and estuary, the Sebasticook River, the East Branch of the Sebasticook River, and in 12 other lakes and ponds. The most serious water quality problems on the Kennebec River existed downstream of Winslow due to pulp and paper mill waste. A new pulp mill constructed upstream in 1978 replaced the existing sulfite pulp mill. The new pulp process will substantially lower organic loadings into the river and improve the water quality below Winslow.

There are no steam-electric plants located in the area.

STATUS OF HYDROELECTRIC LICENSING

Fifteen of the 17 existing hydroelectric powerplants in the Kennebec River basin are under Federal Energy Regulatory Commission license. One potential project, American

STATUS OF HYDROELECTRIC LICENSING

Tissue, was issued a minor license May 9, 1979. In addition, there are four storage projects with no generating facilities that are licensed by the Commission. Applications have been filed for preliminary permits for two projects, one which would consist of five plants. The 15 existing licensed projects account for over 98 percent of all the hydroelectric power produced in the Kennebec River basin.

Two other existing projects in the basin remain unlicensed: the 250-kilowatt plant (Eustis) owned by Lawrence Keddy and the 450-kilowatt facility (Big Sandy) owned by Madison Electric Works.

The licensing status of these hydroelectric projects is summarized in table 3.

WATER RESOURCES PLANNING

Prior Studies and Reports

The "308" report of the Corps of Engineers on the Kennebec River basin, dated December 3, 1930, concluded that the extension of facilities for navigation was not economically feasible; damages from floods are rare and relatively minor; the basin is well supplied with power; and irrigation is unnecessary. Under these conditions, Federal participation was not recommended at that time.

The New England-New York Inter-Agency Committee (NENYIAC) study and report for 28 different river basins was authorized by the Flood Control Act of 1950 and was published as Senate Document No. 14, 85th Congress, 1st Session, 1955. The report presents an inventory of the land and water resources of the New England-New York region. Recommended were further water quality control, increased recreation facilities, conservation of forest land, further hydroelectric power development, and increased preservation of fish and wildlife resources. Potential hydroelectric power and storage projects recommended in the NENYIAC Coordinated Basin Plan for the Kennebec River basin are described in a later section of this report.

The North Atlantic Regional Water Resources Study (NAR) prepared by the North Atlantic Regional Water Resources Study Coordinating Committee in June 1972, examined a variety of water and related land resources and needs in formulating a coordinated program to guide future resource development and management. The NAR Study report presented a water resource program as a framework for future action based on a planning period to the year 2020, with benchmark planning for the years of 1980 and 2000. Twenty-one different areas were investigated including the Kennebec River basin. No specific recommendations were presented for the Kennebec River basin.

In 1973 "Environmental Reconnaissance of Alternative Pumped Storage Sites in New England" was published by the Power and Environment Committee of the New England River Basins Commission (NERBC). Bingham No. 3, Site Leo, Pleasant Ridge, and Robinson Pond in the Kennebec River basin were among 14 pumped storage sites in New England recommended for possible further study.

A report for watershed protection and flood prevention for the Twenty-Five Mile Stream Watershed was published in 1974 by the U.S. Department of Agriculture's Soil Conservation Service. The watershed is in the extreme eastern portion of the basin and is subject to heavy flooding near Lake Winnecook.

WATER RESOURCES PLANNING

Table 3
Licensing Status
Kennebec River Basin

<u>Project</u>	<u>FERC Project No.</u>	<u>Type of License 1/</u>	<u>Date of Issue or Application</u>	<u>Date of License Expiration</u>
Harris (Indian Pond)	2142	MO	May 21, 1954	Dec 31, 2001
Shamut	2322	MO	Mar 5, 1964	Dec 31, 1993
Weston	2325	MO	Oct 15, 1964	Dec 31, 1993
Wyman	2329	MO	Nov 16, 1964	Dec 31, 1993
Williams	2335	MO	Jul 24, 1964	Dec 31, 1987
Abenaki	2364	MO	Aug 3, 1964	Dec 31, 1993
Anson	2365	MO	Aug 11, 1964	Dec 31, 1993
Edwards Division	2389	MO	Aug 12, 1964	Dec 31, 1993
Fort Halifax	2552	MO	Sep 12, 1968	Dec 31, 1993
Automatic	2555	NO	Aug 30, 1968	Dec 31, 1993
Union Gas	2556	NO	Aug 30, 1968	Dec 31, 1993
Rice Rips	2557	MO	Feb 24, 1969	Dec 31, 1993
Oakland	2559	MO	Feb 24, 1969	Dec 31, 1993
Lockwood	2574	MO	Dec 31, 1969	Dec 31, 1993
Winslow	2611	MO	Jul 1, 1969	Dec 31, 1993
Flagstaff Res.	2612	MO	Apr 12, 1979	Dec 31, 1997
Moxie Res.	2613	MO	Jun 11, 1969	Dec 31, 1993
Brassau Res.	2615	NO	Sep 16, 1977	Dec 31, 1993
Moosehead Lake	2671	NO	Aug 5, 1976	Dec 31, 1993
American Tissue	2809	NO	May 9, 1979	Apr 4, 2019
Madison	2830	PA	Dec 13, 1977	-
Carrabassett	2830	PA	Dec 13, 1977	-
North Anson (Dev.)	2830	PA	Dec 13, 1977	-
Somerset	2830	PA	Dec 13, 1977	-
Big Sandy (Norridgewock)	2830	PA	Dec 13, 1977	-
Madison Development (Lower Abenaki)	2915	PA (conditional)	Mar 13, 1979	-

1/ MO-major outstanding license; NO-minor outstanding license; PA-application for preliminary permit.

WATER RESOURCES PLANNING

As part of the "Second National Assessment of Water and Related Land Resources" by the U.S. Water Resources Council, the regional sponsor, the New England River Basins Commission, published "Initial Identification of Water and Related Land Problems in New England" in November 1975. The purpose of the National Assessment is to identify water resource problems throughout the United States and to recommend changes and solutions for Federal programs, funding, institutional arrangements, and data collection procedures.

The report, divided by State, and then by planning areas, includes two regional planning bodies for the Kennebec basin; the North Kennebec Regional Planning Commission and the Southern Kennebec Valley Regional Planning Commission. The participants listed those resource issues considered important in their respective areas now and in the next 10 to 25 years. Among the regional issues considered were energy production, fishways, and balances between hydroelectric interests and recreation. Future stages of the Regional and National Assessment will concentrate on the most serious problems for additional evaluation and analysis.

In compliance with section 303(e) of the Federal Water Pollution Control Act Amendments of 1972, water quality management plans of the Kennebec River basin and preliminary drafts of the Sebasticook River basin have been published by the Environmental Protection Agency. The Kennebec basin plans were finalized after a series of public hearings in 1976. Recommendations included the installation of additional stream gages, a reassessment of main stem classification when major treatment facilities are operational, and need for studies of lake eutrophication.

A Corps of Engineers' study was completed in November 1975 for the flood plains of the Kennebec River in the communities of Augusta, Hollowell, Chelsea, Farmingdale, Gardiner, Randolph, Pittston, Richmond, Dresden, and Merrymeeting Bay.

The Kennebec River basin is included in the water supply study, authorized under title 1 of the 1965 Flood Control Act (Public Law 89-298) for the Federal Government to examine water supply problems in the Northeast. No completion date has been scheduled.

The New England River Basins Commission (NERBC) prepared an overview report on the Kennebec River basin in order to fulfill a portion of the Water Resources Planning Act of 1965. The report was completed in 1979. The NERBC is currently investigating the feasibility and implications of hydropower expansion in New England. Its major thrust is in the development of existing dams and has inventoried over 10,000 sites. The "Level B" study is funded by the Water Resources Council and is scheduled for completion in early 1981.

POTENTIAL WATER RESOURCE DEVELOPMENTS

Potential Hydroelectric Developments

Potential hydroelectric developments in the Kennebec River basin are shown in table 4. None is authorized for construction.

One plan consists of converting the existing Moosehead Lake Reservoir to a hydroelectric development. The maximum elevation of Moosehead Lake would be maintained at its

POTENTIAL WATER RESOURCE DEVELOPMENTS

Table 4

Potential Hydroelectric Projects Kennebec River Basin

<u>Project</u>	<u>Map No.</u>	<u>River</u>	<u>River Mile</u>	<u>Drainage Area (sq mi)</u>	<u>Gross Head (ft)</u>	<u>Potential Capacity (kW)</u>	<u>Storage Capacity Usable for Power (1,000 ac-ft)</u>
<u>Conventional</u>							
Big Sandy (Norridgewock)	8	Sandy	3	619	15	10,000	-
Shawmut	11	Kennebec	68	4,200	24	3,500	-
Anson	14	Kennebec	96	3,230	24	1,500	-
Moosehead Lake ^{1/}	18	Kennebec	163	1,242	64	24,000	^{2/}
Cold Stream	19	Kennebec	145	1,416	195	90,000	Pondage
The Forks	20	Kennebec	138	1,691	110	48,000	Pondage
Grand Falls	21	Dead	14	769	-	-	226.9
Pierce Pond Div.	22	Pierce Pond Stream	^{3/}	788	690	180,000	10.0
North Anson	23	Kennebec	105	2,797	29	10,000	Pondage
Madison ^{4/}	24	Kennebec	94	3,230	22	18,000	Pondage
Madison Development (Lower Abenaki)	24A	Kennebec	94	-	23	8,600	-
Greenleaf	25	Sandy	9	513	120	10,000	100.0
Somerset	26	Sandy	8	-	-	22,500	-
Carrabassett	27	Carrabassett	NA	-	-	12,000	-
North Anson (Dev.)	28	Carrabassett	NA	-	-	5,500	-
American Tissue	29	Cobbosseecontee	1	-	-	900	-
Total						444,500	
<u>Pumped Storage</u>							
Pleasant Ridge	30	Kennebec	122	-	-	1,900,000	-
Site Leo	31	Kennebec	127	-	-	1,450,000	-
Robinson Pond	32	Kennebec	126.5	-	-	7,930,000	-
Bingham No. 3	33	Kennebec	124	-	939	1,890,000	19.0
Total						13,170,000	

^{1/} Would replace existing storage structure.

^{2/} No additional storage capacity. The existing 544,000 acre-feet of usable storage capacity would be used for power.

^{3/} Flow pumped from Dead River to Pierce Pond Stream via canal.

^{4/} Would inundate Abenaki Project No. 2364.

present full-pool level of 1,028.75 feet. The 544,000 acre-feet of storage capacity currently available in the lake, with a maximum drawdown of 7.5 feet, would be regulated by the new dam which would replace the existing dam at the east outlet of the lake. The present dam at the west outlet would remain intact. With a tailwater elevation of about 965 feet, the project would utilize a gross head of 64 feet. The powerhouse would contain generating facilities for 24,000 kilowatts capable of an average annual generation of 66,700,000 kilowatt-hours at a capacity factor of 32 percent.

POTENTIAL WATER RESOURCE DEVELOPMENTS

The Cold Stream site is located about 3.5 miles upstream of the village of The Forks and 0.2 miles above the confluence of Cold Stream and the Kennebec River. The powerhouse, located approximately 500 feet downstream of the dam, would contain generating facilities for 90,000 kilowatts. There would be no provision for storage other than daily pondage requirements.

The Forks site is located on the Kennebec River about 4 miles below the junction of the Dead and Kennebec Rivers at the village of The Forks. The powerhouse, located approximately 500 feet downstream from the toe of the dam, would contain generating facilities with a capacity of 48,000 kilowatts. There would be no provision for storage other than pondage for daily requirements.

Grand Falls would be located at the village of The Forks, about 0.5 miles below the junction of Spencer Stream and the Dead River. The gross drainage area at the site is 769 square miles of which 520 square miles are controlled by the existing Flagstaff Reservoir. The project would provide 226,900 acre-feet of usable storage capacity to be utilized in conjunction with the Pierce Pond power project. These two projects are linked together to form the Pierce Pond Diversion.

The Pierce Pond project provides for power generation and the diversion of flow from the Flagstaff Reservoir and the Grand Falls Reservoir project on the Dead River, by means of a pumping station and canal, to Pierce Pond on Pierce Pond Stream. Pierce Pond would be raised 33 feet to form a pool at an elevation of 1,175 feet. The powerhouse would contain six 30,000-kilowatt generating units for a total of 180,000 kilowatts. A pumping installation near the upper end of the Grand Falls Reservoir, just below the existing Long Falls Dam, together with pressure lines and a canal to Pierce Pond, would be required. Pondage of 10,000 acre-feet would be utilized.

The North Anson site is located about 3 miles upstream of the village of North Anson. Two 5,000-kilowatt generating units would be installed in the powerhouse. Pondage at the site would be limited.

The Madison site is located about 1-1/2 miles below the town of Madison. A gross head of 64 feet would be developed between a headwater elevation of 222 feet and a tailwater elevation of 158 feet. The project would include a powerhouse with an installed generating capacity of 24,000 kilowatts. The headwater elevation of the Madison project would be the same as that of the Abenaki project located about 1 mile upstream. Construction of Madison would inundate the Abenaki development.

The Greenleaf project site is located on the Sandy River between the village centers of Starks and Mercer. A gross head of 120 feet would be developed between a headwater elevation of 320 feet and a tailwater elevation of 200 feet. A single, 10,000-kilowatt generating unit would be installed in the powerhouse. The reservoir would provide 100,000 acre-feet of storage capacity with 35 feet of drawdown. Fishways would be provided.

The Pleasant Ridge site is located about 6 miles northwest of Bingham. It is similar to several other proposed pumped-storage sites in this area because it would utilize Wyman Lake, a hydroelectric impoundment on the Kennebec River, for the lower pool. The upper pool would be formed by building dikes around Rowe, Brandy, and Bean Ponds, which are small lakes lying west of Wyman Lake. The upper pool would include a surface area of about 800 acres and would inundate about 250 acres of forested land. The potential generating capacity at Pleasant Ridge is 1,900,000 kilowatts. This area was once considered by the Central Maine Power Company for the Rowe Pond project.

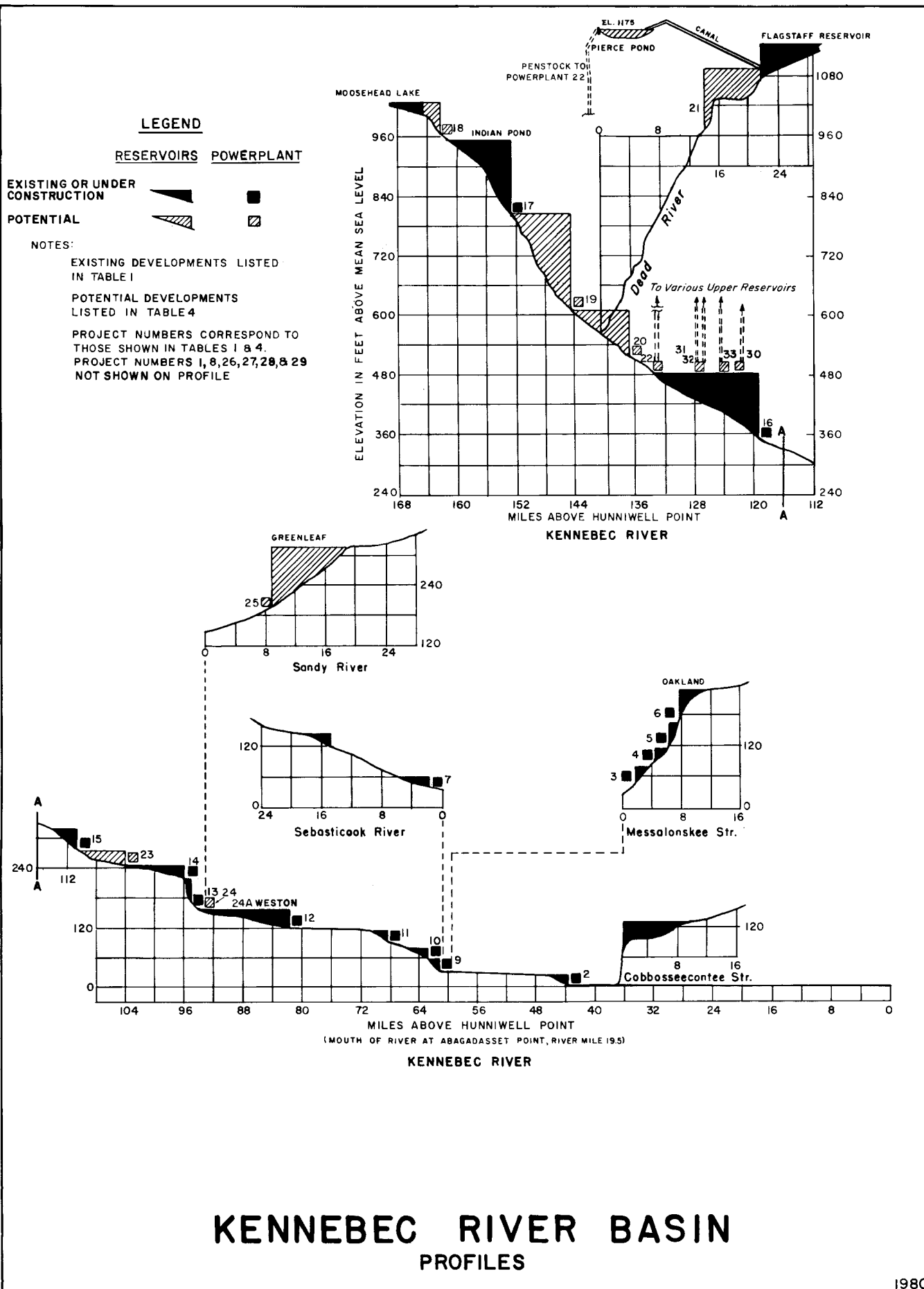
POTENTIAL WATER RESOURCE DEVELOPMENTS

Site Leo lies about 12 miles north of Bingham. It is one of the four pumped storage sites for which Wyman Lake would constitute the lower pool. The upper pool is sited in a forested region and does not involve the inundation of an existing natural body of water. There is a potential capacity of 1,450,000 kilowatts in the development of this site.

The location of Robinson Pond would be about 12 miles north of Bingham. The lower pool would be provided by the existing Wyman Lake, while the upper pool would be several miles to the east in a large depression at the southwestern foot of Moxie Mountain. The upper pool would be very large, encompassing a total area of about 1,400 acres. It would utilize natural topography for the northern end which would be diked across Robinson Pond Outlet immediately south of Moores Bog. The pool would inundate several relatively small ponds and a large expanse of wetlands. As estimated by the New England River Basins Commission, the potential capacity of Robinson Pond is 7,930,000 kilowatts.

Bingham No. 3 would be located about 10 miles northwest of Bingham, Maine. The lower pool would consist of the existing Wyman Lake, an impoundment on the Kennebec River currently used for hydroelectric generation. The upper pool would be formed by constructing dikes around Lost Pond, a 20-acre body of water lying west of Wyman Lake. The land around the upper pool site is currently used for logging. The Bingham No. 3 site has a potential hydroelectric capacity of 1,900,000 kilowatts.

There are 32 retired hydro plants in the basin with a total capacity of 7,300 kilowatts. None of these projects is shown on the basin map or profile.



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