Comprehensive Hydropower Plan

Submitted as a proposed comprehensive plan under section 10(a) of the Federal Power Act.
October 1, 1982

STATE OF MAINE

Joseph E. Brennan, Governor

OFFICE OF ENERGY RESOURCES
State House Station 53
Augusta, Maine 04333
Phone (207) 289-3811

STATE OF MAINE

COMPREHENSIVE HYDROPOWER PLAN

October 1, 1982

VOLUME I

Joseph E. Brennan
Governor

State of Maine
Executive Department
OFFICE OF ENERGY RESOURCES
State House Station 53
Augusta, Maine 04333
(207) 289-3811

Gordon [illegible]
Director

October 1, 1982

Mr. Charles M. Butler III
Chairman
Federal Energy Regulatory Commission
825 N. Capitol Street N.E
Washington, D.C 20426

Dear Mr. Butler:

Pursuant to Section 10(a) of the Federal Power Act, the State of Maine hereby submits its comprehensive plan for hydropower development. This plan is submitted on behalf of Governor Joseph E. Brennan.

The plan consists of the following sections:

1. Executive Order 1 FY 82/83. This order mandates the submission of this plan and State action to protect certain river stretches and tributaries from development. Appended to this Order is a list of river tributaries also designated for protection. A copy of this Order has been forwarded previously to the Federal Energy Regulatory Commission.

2. Maine Rivers Study (Volume 2 of the plan). This study provides background information on the characteristics of Maine rivers and was the basis for the Executive Order. It, too, was forwarded previously.

3. Analysis of Maine's electric energy needs in 1990 and 2000, prepared by the Office of Energy Resources. This document indicates the role that hydropower can play in meeting Maine's electric energy needs. It includes a list of sites where hydropower development is proposed and where future regulatory approval may be sought.

4. Summary of Statewide fisheries plan of the Departments of Inland Fisheries and Wildlife and of Marine Resources, both of which have regulatory authority, and of the Atlantic Sea-Run Salmon Commission. This summary provides information, by site, of the expected fish passage requirements.

The State of Maine notes that this plan provides for a balanced approach, allowing for significant hydropower development, while providing for the protection of certain river stretches, both of which are essential for the safeguarding of the State's unique environment and the reduction of its dependence on high-cost and imported energy resources, in accordance with the State Energy Policy. The State of Maine requests that the Federal Energy Regulatory Commission be guided, insofar as possible by this plan. The plan will be updated, as circumstances warrant.

The State of Maine plans to intervene before the Federal Energy Regulatory Commission, both in support of and in opposition to specific proposed site developments, in furtherance of this plan.

Sincerely,

Gordon L. Weil

GLW/lab
Encl.

EXECUTIVE ORDER

Office of
The Governor

No. 1 FY 82/83
Date July 6, 1982

MAINE RIVERS POLICY

WHEREAS, the waters of Maine are held in trust by the State for the benefit of the people, and their use is a proper subject for the exercise of stewardship by the State; and

WHEREAS, the Department of Conservation was directed by the State Energy Policy of June 1981 to identify river stretches that provide unique recreational opportunities of natural values, and to submit to the Governor a strategy for the protection of those river stretches, and has accordingly submitted such a report based on the "Maine Rivers Study" conducted under its auspices; and

WHEREAS, The Departments of Marine Resources and of Inland Fisheries and Wildlife, and the Atlantic Sea Run Salmon Commission, were directed by the State Energy Policy to prepare a statewide fisheries plan for submission to the Governor, and have accordingly submitted such a plan; and

WHEREAS, it is necessary to protect certain river stretches identified by the Department of Conservation from unwise development, and to preserve them for the future; and

WHEREAS, sufficient river resources exist to allow for the protection of our most valuable river stretches and the development of Maine's indigenous, renewable energy resources; and

WHEREAS, it is also necessary to ensure the wise use of all the river resources identified in the "Maine Rivers Study" by means of improved environmental regulation;

NOW, THEREFORE, I JOSEPH E. BRENNAN, Governor of the State of Maine order that the following river stretches be designated as meriting special protection:

Allagash: Gerald Brook to Telos Lake

Aroostook: Sheridan Dam to Millinocket Lake

Dead: Kennebec River to Flagstaff Lake

Dennys: Hinkley Point to headwaters of Meddybemps Lake

East Machias: Newcomb Point to Pocomoonshine Lake, including Maine River

Kennebec: Bay Point to Edwards Dam, Augusta; The Forks to Harris Dam

Narraguagus: Fickett Point to headwaters

Machias: Fort O'Brian Point to Fifth Machias Lake, including Fourth and Fifth Lake Streams

Moose: Attean Pond to Canadian Border

Penobscot: Main Stem from Sandy Point to Veazie Dam, including Eastern Channel; East Branch from Medway to Grand Lake Matagamon; West Branch from Ambajejus Lake to western boundary of T-3, R-10; and from Chesuncook Lake to Seboomook Lake

Pleasant: Seavey Point to Pleasant River Lake

West Branch Pleasant: Main Stem to Fourth West Branch Pond

Saco: East Limington to New Hampshire border

St. Croix: Oak Point to Spednik Lake

St. John: One mile above the foot of Big Rapids to Baker Branch

Sheepscot: Wiscasset to headwaters

as well as certain related tributaries identified in the Department of Conservation report as contributing to the unique recreational or natural values of these river stretches; and

IT IS FURTHER ORDERED, that to protect these stretches of rivers, it shall be the policy of the State that no new dams shall be constructed on these stretches, and that additional development or redevelopment of dams existing on these stretches as of the date of this Order shall be designed and executed in a manner that either enhances the significant resource values of these river stretches, or does not diminish them; and

IT IS FURTHER ORDERED, that actions of Executive Departments and Agencies shall be consistent with the policy stated in this Order; and

IT IS FURTHER ORDERED, that the State Planning Office, in collaboration with the Cabinet Committee on Hydropower Policy, shall survey and assess the adequacy of existing legal, regulatory and administrative mechanisms to provide for the use in the best interests of the people, of those river stretches identified as having outstanding significance in the "Maine Rivers Study", particularly along the so-called B, C, and D rivers. The Office shall submit a report together with appropriate recommendations to the Governor not later than December 1, 1982; and

IT IS FURTHER ORDERED, that the Office of Energy Resources shall prepare an analysis of the need for electricity generated by hydropower to meet demand as projected in the Comprehensive Energy Resources Plan for 1990 and 2000, and shall submit such analysis to the Governor no later

than September 1, 1982; and

IT IS FURTHER ORDERED, that the Office of Energy Resources shall prepare a comprehensive plan as envisaged in Section 10(a) of the Federal Power Act, to be submitted for use by the Federal Energy Regulatory Commission (FERC), such plan to include: this Executive Order and the Maine Rivers Study, the hydropower analysis provided for above, the essential elements of the statewide fisheries plan, and when appropriate information on action taken pursuant to recommendations to strengthen legal, regulatory and administrative mechanisms relating to those of river resources and their protection, and that this plan be submitted initially to FERC not later than October 1, 1982.

IT IS FURTHER ORDERED, that this Executive Order and the Maine Rivers Study shall be transmitted to the Federal Energy Regulatory Commission forthwith, and that the Commission and its staff, when reviewing hydropower projects in Maine, shall be informed that this is State policy for use of the river stretches designated in this Executive Order.

JOSEPH E. BRENNAN
GOVERNOR

A River Tributaries of High Significance

- Allagash Tributaries:
    - Musquacook Stream: Allagash River to Clear Lake
    - Chemquasabamticook Stream: Long Lake to Ross Lake
    - Allagash Stream: Chamberlain Lake to headwaters
- Aroostook Tributaries:
    - Millinocket Stream: Aroostook River to Millinocket Lake
    - Munsungan Stream: Aroostook River to Munsungan Lake
    - St. Croix Stream: Aroostook River to Hall Brook
    - Squa Pan Stream: Aroostook River to Squa Pan Lake
    - Machias River: Aroostook River to headwaters of Big Machias Lake
- Machias River Tributaries:
    - West Branch Machias River: Machias River to headwaters of Lower Sabao Lake
    - New Stream and Old Stream: Machias River to headwaters of Old Stream
    - Mopang Stream: Machias River to Mopang Lake
- East Branch of the Penobscot Tributaries:
    - Wassataquoik Stream: East Branch Penobscot River to headwaters
    - Webster Brook: Grand Lake Matagamon to Telos Lake
    - Seboeis River: East Branch Penobscot River to headwaters of Grand Lake Seboeis
    - Sawtelle Brook: Seboeis River to headwaters
    - Shin Brook: Seboeis River to headwaters
- St. John Tributaries:
    - Big Black River: St. John River to Canada
    - Northwest Branch of St. John River: St. John River to Beaver Pond
    - Southwest Branch of St. John River: Baker Branch to five miles downstream of Canadian border
    - Baker Branch: St. John River to one and one-half miles below Baker Lake

THE PROJECTED CONTRIBUTION OF HYDROELECTRIC GENERATION TO MEETING MAINE'S ELECTRICITY NEEDS IN 1990 AND 2000

Office of Energy Resources

Executive Order 1 FY 82/83 requires the Maine Office of Energy Resources to prepare an estimate of the contribution that hydropower could make to meeting the State's electricity needs in the years 1990 and 2000.

The report covers electricity generated both by and for utilities and by others for utilities, and electricity generated by non-utilities for their own use. Amounts produced by self-generators are not included in the analysis, but the sites are listed. Based on current information, 54 megawatts (283 gigawatt hours) will be developed by the self-generators in addition to the amounts for utility use.

The OER estimates are generally expressed in terms of the energy that would be produced from hydro projects as a share of total energy consumption. Consequently, energy is expressed in terms of gigawatthours (one gigawatt is equivalent to 1,000 megawatts or 1,000,000 kilowatts). 5.25 gigawatt hours is the average amount of electricity produced by one megawatt of capacity.

Maine's utilities project hydropower production for use in Maine to increase by 790 GWH (150 MW of capacity) during the period until 2000. The OER projects that hydropower production will be greater, but could not reasonably be expected to increase by more than 2500 GWH (476 MW of capacity). The OER

finds that a more likely amount of hydropower development is 1500 GWH (285 MW of capacity). (These figures represent annual hydropower production in the year 2000.)

It is important to note that none of these three projections would be sufficient to back out oil-fired generation entirely in either 1990 or 2000. Consequently, it would not back out any projected coal-fired generation which might replace oil.

The State Energy Policy calls for increased reliance on indigenous and renewable resources, such as hydro, in preference to imported and nonrenewable resources, such as oil. This policy is based on the fact that oil as a fuel will become more expensive. Thus, it is desirable to develop as much hydropower as possible. Of course, not all available hydro resources will be developed, because of the desire to recognize valid environmental concerns.

The projections contained in this report will be updated as underlying data changes or its accuracy is improved.

Table 1, in which hydropower is expressed in terms of megawatts of capacity, allows a determination of the degree to which oil would be backed out in terms of the amount of new hydropower generation. As the amount of hydropower increases, the role of oil-fired generation decreases.

To use Table 1, select the amount of hydropower that is expected to have been developed by 1990 or 2000 and then determine the degree to which reliance on oil-fired generation would be reduced. For example, if 100 megawatts of new hydro

power had been developed by 1990, then oil would contribute 12% to Maine's electricity mix in that year. If the amount of new hydropower had risen to 300 megawatts in 2000, then Maine's reliance on oil to produce electricity would have been cut to 8%. (To the extent that the use of coal might increase to the point that it would have replaced oil to be backed out by hydropower, then the amount of coal-fired generation would be reduced.)

Tables 2 and 3 contain the projections made by Maine utilities and the OER concerning the sources of electricity generation during the period until the end of the century with special reference to the years 1990 and 2000.

Table 1 is based on projections made by Maine utilities and the New England Power Pool (NEPOOL). The overall projection of future electricity consumption is the same forecast contained in OER's Comprehensive Energy Resources Plan for 1982. We have chosen to use OER's projection because it was derived independently of regulatory considerations which may influence utilities to give what may prove to be undue importance to certain elements used to prepare load growth estimates.

It is important to note that the OER load growth projection is based on a forecast of substantial energy conservation. Load growth is based on population growth, economic development and, to a lesser extent, the substitution of electricity for oil as oil prices increase. (The substitution effect occurs, for example, when a family stops using oil to heat a room and only uses an electric heater for brief periods in that room. Total

energy use can be reduced, and energy bills cut although electricity consumption is increased.) Such a load growth projection must also reflect conservation. OER's conservation projection is based on past behavior, reflecting lower residential, commercial and industrial demand for electricity in the light of sharp price increases, as well as conservation resulting from non-price factors. In view of past Maine performance, the projection allows for a substantial amount of energy conservation. Additional conservation could result from either electricity price increases greater than those projected by OER, the institution of mandatory conservation measures or greater conservation resulting from the projected electricity price increases than OER has previously forecast.

In every other regard, the first table reflects the plans currently in use by Maine utilities and NEPOOL concerning sources of electricity supply. (See graph Page 13 A)

The table also uses the utilities' estimates of the amount of additional hydropower that will be developed between now and 2000 (approximately 790 GWH out of approximately 13,800 GWH consumption in 2000).

The OER considers this to be a modest estimate. In general, utilities have not been enthusiastic about the federal Public Utilities Regulatory Policies Act (PURPA) which requires them to purchase electricity from small power producers. Accordingly, they may be reluctant to appear to be encouraging such generation and about 90% of their estimated hydropower growth reflects plants they intend to build. (The utilities'

hydropower estimates is below the OER figure and less than the amount that would be necessary to back out oil-fired generation.)

Table 2 contains the OER's electricity generation projections for the same period. The OER estimates differ from those of the utilities in several notable ways.

First, the Maine utilities assume a capacity factor of 70% for nuclear power plants (That would mean that, on the average, such plants would generate 70% of the electricity that might be produced if the plant operated at full capacity). In fact, the historic capacity factor of the Maine Yankee plant since it commenced operation is below 70% and the average capacity of all U.S. nuclear plants is just below 60%. Therefore, we have chosen to use a 60% capacity factor for nuclear generation (which allows for possible reactor aging) which has the effect of making Maine somewhat more dependent on oil in the future than the utilities suggest.

Second, we do not include the Seabrook II unit in our estimates of nuclear generated electricity. The outlook for this unit is sufficiently doubtful, given current financing difficulties being encountered by Public Service Company of New Hampshire and due to other factors, that the OER considers it likely that this unit will not go on line. This, too, contributes to increased reliance upon oil.

Third, we forecast the successful negotiation of the Phase II purchase of firm power from Hydro Quebec beginning in 1992. The utilities' estimate includes only Phase I, which is due to

begin in 1986. On the basis of a 2,000 megawatt NEPOOL Phase II purchase, Maine's share would be 169 megawatts. This purchase will reduce Maine's dependence on oil-fired generation.

Fourth, we include a larger estimate of non-hydro PURPA energy resulting from cogeneration than do the utilities who may not be enthusiastic about the development of this energy source. This forecast is based on the best estimates now made by the OER as a result of extensive industry contacts. Five large installations equal to the largest current cogeneration facilities plus several smaller units would be required to equal this projected contribution. To the extent this goal was not achieved, generation could be expected to come from oil or added hydropower. We have used the net cogeneration contribution after the suppliers' electricity purchases from utilities are taken into account.

Fifth, while we include an increase in coal-fired generation which might involve the construction of a new plant or plants, we neither presume nor preclude the possibility that a new plant will be located at Sears Island. (See graph Pg. 14A)

Table 4 provides data in connection with the maximum projected hydropower development of 2500 GWH; in all other respects the data is the same as in Table 3.

Following the Tables, OER provides an inventory of sites where hydropower may be developed to meet the amounts contained in its 1500 GWH (Basic hydro development scenario) and 2500 GWH (Maximum hydro development scenario) forecasts. This inventory does not necessarily represent sites which OER advocates for

development, but rather sites at which it appears development is most likely. In some categories, OER indicates that only a portion of the sites may be developed, but does not currently make a forecast as to which sites will be developed and which will not.

TABLE 1

OIL BACK-OUT POTENTIAL OF NEW HYDROPOWER

NEW HYDRO DEVELOPMENT (MW)	NEW HYDRO POWER PRODUCTION (GWH)	MAINE OIL DEPENDENCY** 1990	2000 WITH 200 MW NEW COAL CAPACITY	2000 WITHOUT 200 MW NEW COAL CAPACITY
0	0	17	20	31
100	526	12	16	27
200	1051	8	12	23
300	1577	3	8	19
400	2102	0	4	15
500	2628	0	1	12

* Average capacity factor of 60% assumed.

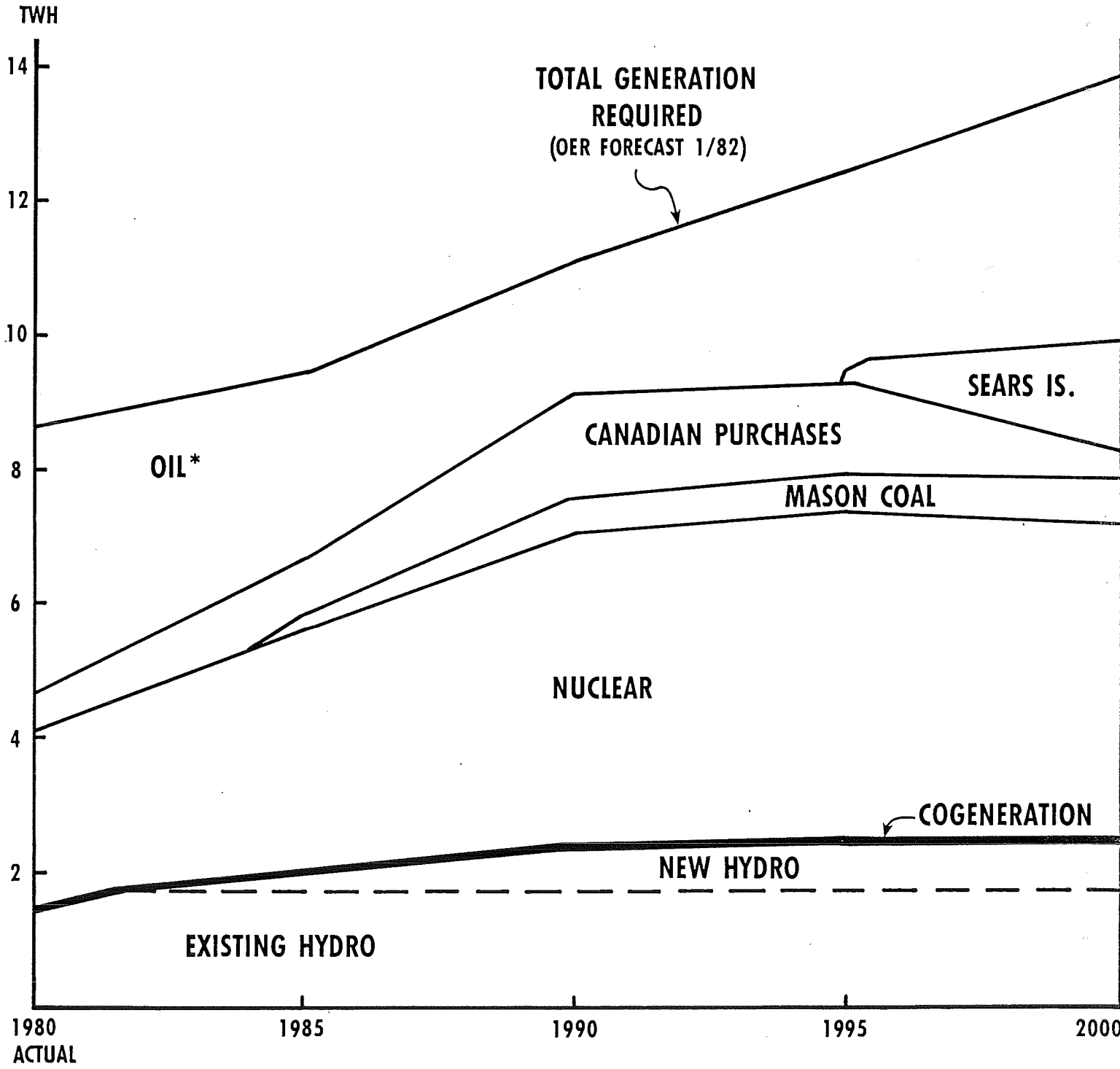
**Oil fired electricity supply as a percentage of total generation requirements.

TABLE 2
STATE-WIDE ELECTRIC ENERGY SUPPLY
PRESENT UTILITY PLANNING
790 GWH OF NEW HYDROPOWER BY THE YEAR 2000

	ACTUAL 1980	1985	1990	1995	2000
Existing Hydro	1539(18)	1786(19)	1786(16)	1786(14)	1786(13)
New Hydro	-	253(3)	729(7)	787(6)	787(5)
Maine Yankee	2161(25)	2694(28)	2669(24)	2687(22)	2678(19)
Other Existing Nuclear	349(4)	446(5)	431(4)	446(4)	358(3)
Seabrook I	-	442(5)	699(6)	723(6)	724(5)
Seabrook II	-	-	598(5)	693(6)	714(5)
Millstone 3	-	-	164(1)	184(1)	185(1)
Mason Coal	-	196(3)	508(5)	635(5)	668(5)
Sears Island	-	-	-	225(2)	1576(11)
New Brunswick Purchases	664(8)	854(9)	1183(11)	985(8)	-
Hydro-Quebec Purchases	-	-	400(4)	400(3)	400(3)
Cogeneration Purchases	38(1)	3	3	3	3
SUBTOTAL	4751(55)	6674(70)	9170(83)	9554(77)	9873(71)
TOTAL GENERATION REQUIREMENT (OER Forecast)	8694(100)	9552(100)	11073(100)	12467(100)	13832(100)
Uncommitted Energy Req'd.	3943(45)	2878(30)	1903(17)	2913(23)	3959(29)
NEPOOL Interchange and Purchases					
Non-oil	200 (2)				
Oil-Fired	2000 (23)	2878(30)*	1903(17)	2913(23)*	3959(29)*
Maine Oil Fired Generation	1738(20)				

All figures in gigawatt-hours. Numbers in parentheses represent percentages of total generation requirement. See notes and assumptions on Page 16.
*Split between NEPOOL and Maine oil-fired generation not presently available.

FIGURE 1
STATE-WIDE ELECTRIC ENERGY SUPPLY
PRESENT UTILITY PLANNING
790 GWH OF NEW HYDROPOWER
BY THE YEAR 2000



TWH = TRILLION WATT-HOURS = ONE THOUSAND GIGAWATT-HOURS

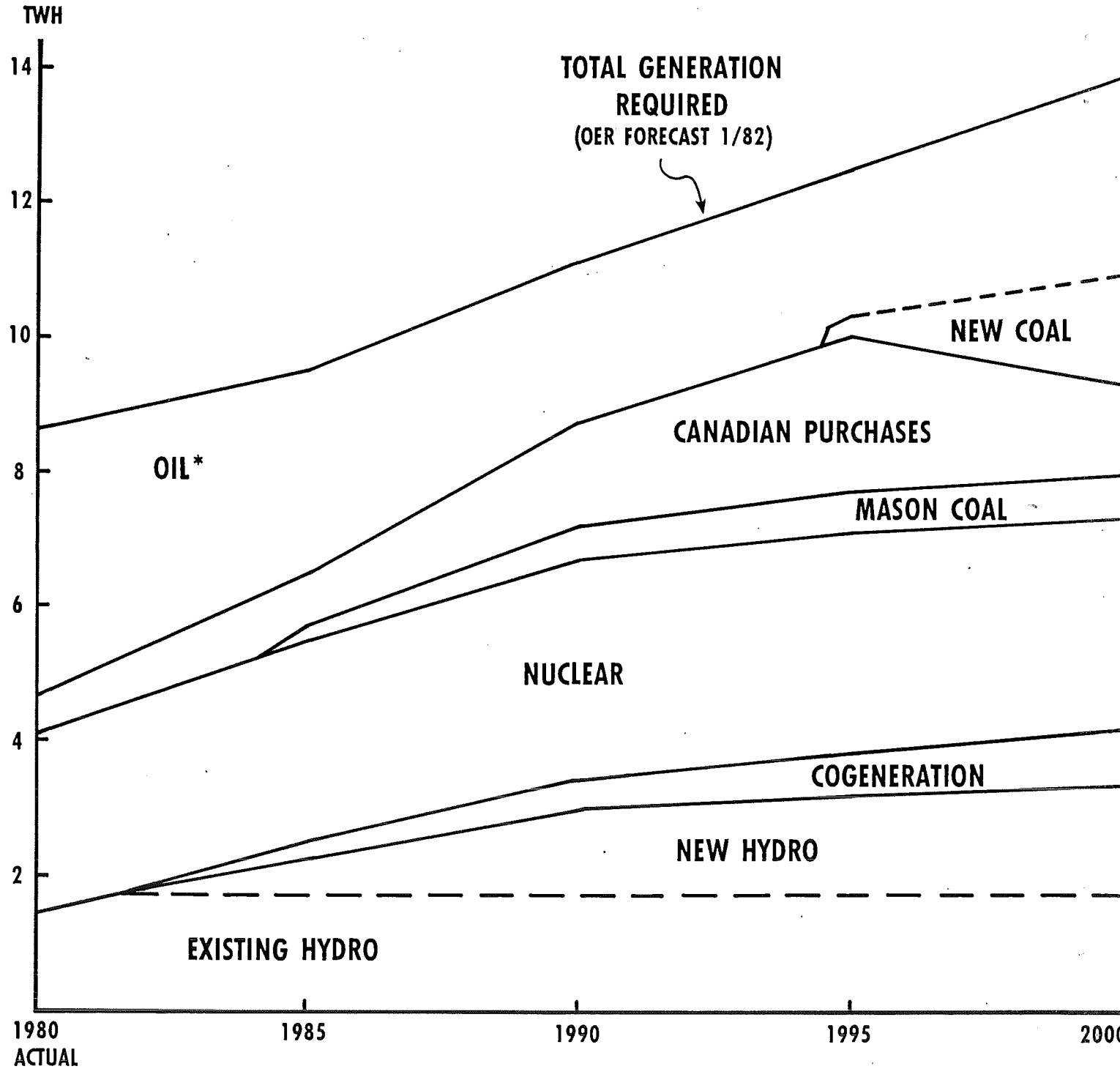
* AGGRESSIVE COAL CONVERSION IN NEW ENGLAND WOULD RESULT IN SOME COAL-FIRED NEPOOL INTERCHANGE SUBSTITUTING FOR SOME OIL USE.

TABLE 3
STATE-WIDE ELECTRIC ENERGY SUPPLY
1500 GWH OF NEW HYDROPOWER (OER PROJECTION) BY THE YEAR 2000

	ACTUAL 1980	1985	1990	1995	2000
Existing Hydro	1539(18)	1786(19)	1786(16)	1786(14)	1786(13)
New Hydro	-	500(5)	1200(11)	1400(11)	1500(11)
Maine Yankee	2161(25)	2196(23)	2196(20)	2196(18)	2196(16)
Other Existing Nuclear	349(4)	371(4)	371(3)	371(3)	283(2)
Seabrook I	-	442(5)	585(5)	585(5)	585(4)
Millstone 3	-	-	151(1)	151(1)	151(1)
Mason Coal	-	196(3)	508(5)	635(5)	668(5)
New Coal Plant	-	-	-	225(2)	1576(11)
New Brunswick Purchases	664(8)	854(9)	1183(11)	985(8)	-
Hydro-Quebec Purchases	-	-	400(4)	1265(10)	1265(9)
Cogeneration Purchases	38(1)	200(2)	400(4)	600(5)	800(6)
SUBTOTAL	4751(55)	6545(69)	8780(79)	10199(82)	10810(78)
TOTAL GENERATION REQUIREMENT (OER Forecast)	8694(100)	9552(100)	11073(100)	12467(100)	13832(100)
Uncommitted Energy Req'd.	3943(45)	3007(31)	2293(21)	2268(18)	3022(22)
NEPOOL Interchange and Purchases					
Non-oil	200 (2)				
Oil-Fired	2000 (23)				
		3007(31)*	2293(21)*	2268(18)*	3022(22)*
Maine Oil Fired Generation	1738(20)				

All figures in gigawatt-hours. Numbers in parentheses represent percentages of total generation requirement. See notes and assumptions on Page 16.
*Split between NEPOOL and Maine oil-fired generation not presently available.

FIGURE 2
STATE-WIDE ELECTRIC ENERGY SUPPLY
1500 GWH OF NEW HYDROPOWER
BY THE YEAR 2000



TWH = TRILLION WATT-HOURS = ONE THOUSAND GIGAWATT-HOURS

* AGGRESSIVE COAL CONVERSION IN NEW ENGLAND WOULD RESULT IN SOME COAL-FIRED NEPOOL INTERCHANGE SUBSTITUTING FOR SOME OIL USE.

TABLE 4
STATE-WIDE ELECTRIC ENERGY SUPPLY
2500 GWH OF NEW HYDROPOWER (OER PROJECTION) BY THE YEAR 2000

	ACTUAL 1980	1985	1990	1995	2000
Existing Hydro	1539(18)	1786(19)	1786(16)	1786(14)	1786(13)
New Hydro	-	700(7)	1500(14)	2100(17)	2500(18)
Maine Yankee	2161(25)	2196(23)	2196(20)	2196(18)	2196(16)
Other Existing Nuclear	349(4)	371(4)	371(3)	371(3)	283(2)
Seabrook I	-	442(5)	585(5)	585(5)	585(4)
Millstone 3	-	-	151(1)	151(1)	151(1)
Mason Coal	-	196(3)	508(5)	635(5)	668(5)
New Coal Plant	-	-	-	225(2)	1576(11)
New Brunswick Purchases	664(8)	854(9)	1183(11)	985(8)	-
Hydro-Quebec Purchases	-	-	400(4)	1265(10)	1265(9)
Cogeneration Purchases	38(1)	200(2)	400(4)	600(5)	800(6)
SUBTOTAL	4751(55)	6745(71)	9080(82)	10899(87)	11810(85)
TOTAL GENERATION REQUIREMENT (OER Forecast)	8694(100)	9552(100)	11073(100)	12467(100)	13832(100)
Uncommitted Energy Req'd.	3943(45)	2807(29)	1993(18)	1568(13)	2022(15)
NEPOOL Interchange and Purchases					
Non-oil	200 (2)				
Oil-Fired	2000(23)				
		2807(29)*	1993(18)*	1568(13)*	2022(15)*
Maine Oil Fired Generation	1738(20)				

All figures in gigawatt-hours. Numbers in parentheses represent percentages of total generation requirement. See notes and assumptions on Page 16.
*Split between NEPOOL and Maine oil-fired generation not presently available.

NOTES AND ASSUMPTIONS:

TABLE 2

Hydropower includes utility owned facilities and other facilities

Nuclear generation includes Maine's share of Connecticut Yankee, Massachusetts Yankee and Vermont Yankee. Assumes Seabrook I on line prior to 1985, Seabrook II and Millstone 3 prior to 1990. Industry capacity factor of 70% used to calculate energy production from nuclear plants.

Coal generation includes Mason station and Sears Island (586 MW plant with 200 MW owned by CMP). Sears Island assumed on line prior to 2000.

Canadian purchases include energy from Hydro Quebec Phase I (690 MW line assumed in place prior to 1990) and 150 MW New Brunswick purchase. New Brunswick purchase assumed to expire prior to 2000.

Total generation requirements are OER forecasts.

Growth in non-oil NEPOOL interchange is dependent on aggressive coal conversion throughout New England.

TABLE 3 and 4

Hydropower includes utility owned facilities and other facilities

Nuclear generation includes Maine's share of Connecticut Yankee, Massachusetts Yankee and Vermont Yankee. Assumes Seabrook I and Millstone 3 on line prior to 1990. Capacity factor of 60% used to calculate energy production from nuclear plants.

Coal generation includes Mason station and 200 MW of new coal capacity assumed on line prior to 2000.

Canadian purchases include energy from Hydro Quebec Phase II (2000 MW line assumed in place prior to 1995) and 150 MW New Brunswick purchase. New Brunswick purchase assumed to expire prior to 2000.

Cogeneration supply is net of in-plant industrial electricity requirements. Current cogeneration supply (biomass) is approximately 150 GWH.

Total generation requirements are OER forecasts.

Growth in non-oil NEPOOL interchange is dependent on aggressive coal conversion throughout New England.

BASIC HYDRO

DEVELOPMENT SCENARIO

PROJECTED HYDRO DEVELOPMENT:

Category of Projects		Capacity Change
I.	Existing Dams Currently in Licensing and Permitting Process And Dams Not On Line Prior to January 1, 1982	98.5 MW
II.	Incremental Capacity at Existing Generating Dams	52.5 MW
III.	Development of Additional Utility Sites	77.0 MW
IV.	Existing Dams Not Currently in Licensing and Permitting Process	32.0 MW
V.	Undeveloped Sites (New Dams)	25.0 MW
		285.0 MW

A detailed analysis of how figures were derived follows:

I. EXISTING DAMS CURRENTLY IN LICENSING AND PERMITTING PROCESS AND DAMS NOT ON LINE PRIOR TO JANUARY 1, 1982*

This estimate includes the Shawmut and Brunswick Dams, brought on line since January 1, 1982, and assumes development at all other existing dam projects which have obtained FERC licenses and exemptions. In addition, the estimate assumes development of 5 projects at existing dams and generating facilities where license applications are pending, and assumes that 75% of the proposed capacity at existing dams in the preliminary permit stage will also be developed. This list does not include projects of self-generators or projects in which the power will be sold to New Hampshire. The breakdown of these projects is as follows:

EXISTING DAMS CURRENTLY IN LICENSING AND PERMITTING PROCESS
AND DAMS NOT ON LINE PRIOR TO JANUARY 1, 1982

Category	Capacity Change (KW)
A. Licensed Projects and Additions Not On Line Prior to January 1, 1982	25,550
B. License Applications at Existing Dams	28,875
C. Exemption Granted (Existing Dams)	2,190
D. Exemption Applications (Existing Dams)	1,060
E. Preliminary Permits/Other (Total: 56.4 MW)[1]	40,825
	98,500 KW

1. Assumes development of approximately 75% of the total capacity (56.4 MW) of this category of projects.

* License and Permit Status as of September 1, 1982

A. Licensed Projects and Additions Not On Line Prior to January 1, 1982*

Project River	Developer	Capacity Change (KW)	Development Type
Brunswick Androscoggin	CMP	19,000	existing dam[1]
Shawmut Kennebec	CMP	4,000	existing generating facility
West Buxton Saco River	CMP	1,500	existing generating facility
Kesslen Mousam	Kennebunk Light & Power	150	existing dam
American Tissue Cobbosseecontee	Swift Paper Co.	900	existing dam

1. Dam Built Since 1980

* Excludes self-generators and dams where power is to be sold to New Hampshire utilities.

B. License Applications At Existing Dams

Project River	Developer	Capacity Change (KW)	Development Type
Hiram Saco	CMP	8,500	existing generating facility
Pejepscot Androscoggin	Androscoggin Water Power	8,425	existing generating facility
Barkers Mill Upper Little Andro.	Maine Hydro. Development Corp.	950	existing dam
East Machias East Machias	Washington County Hydro Associates	1,500	existing dam
West Enfield	Bangor Hydro	9,500	existing generating facility
		28,875	

C. Exemptions Granted

Project River	Developer	Capacity Change (KW)	Development Type
Grist Mill[1] Soudabscook	Laurence Gamble	200	existing dam
Milo[1] Sebec River	Swift River	660	existing dam
Columbia Falls[1] Pleasant River	KW Inc.	500	existing dam
Kennebago Project[1] Kennebago River	Kennebago Corp.	380	existing dam
Moosehead Mfg. Piscataquis	Moosehead Mfg.	300	existing dam
West Winterport Marsh Stream	John C. Jones	150	existing dam
		2,190	

1. All Applicable State and Federal Licenses and Permits Acquired.

D. Exemption Applications

Project River	Developer	Capacity Change (KW)	Development Type
New Mills Cobbosseecontee	Gardiner Water District	110	existing dam
Rocky Gorge Great Works	Rocky Gorge Corp.	400	existing dam
Frankfort Marsh Stream	Quinn Hydro Tech.	550	existing dam
		1,060	

E. Preliminary Permits/Other*
(Existing Dams)

Project River	Developer	Capacity Change (KW)	Development Type
Worumbo Mills Androscoggin	Worumbo Hydro	13,800	existing generating facility
Sebec Sebec Lake	John Cotten	750	existing dam
Littlefield Little Andro.	Gleeson, Sawyer, Baird	1,000	existing dam
Lowell Tannery Passadumkeag	Pumpkin Hill Power	803	existing dam
Bangor Water Works Penobscot	Swift River	10,750[1]	existing dam
Rangeley Rangeley Lakes	CMP	300	existing dam
Upper Project	CMP	1,500	existing dam
Aziscohos	CMP	5,500	existing dam
Middle Project	CMP	1,500	existing dam
Waverly Avenue Sebasticook	Chris Anthony	720	existing dam
Sennebec Sennebec Pond	Gleeson, Sawyer	400	existing dam
Green Lake Green Lake	R. S. Kleinschmidt	300	existing dam
Hacketts Mill Little Andro.	Hacketts Mill Hydro	450	existing dam
Robbins Lumber St. George	Robbins Lumber	127	existing dam
Megunticook Megunticook	Elements Power Corp.	100	existing dam
Madison Kennebec	Madison Electric Works	7,100	existing dam
Big Sandy Big Sandy	Madison Electric	6,000	existing dam
Stony Brook* Stony Brook	Small Hydro East	30	existing dam
Marsh Stream*	Peter Graham	5	existing dam

E. Preliminary Permits/Other Cont.

Project River	Developer	Capacity Change (KW)	Development Type
Days Mill* Kennebunk	Roland Matson	65	existing dam
Smelt Hill* Presumpscot	Clinton Smith	1,200	existing dam
Brassua* Moose River	Kennebec Water Power Co.	4,000	existing dam
		56,400	

1. The site of the project has not yet been determined, so the average of the range of proposals was chosen.

* State Permitting Activity and Contact has occurred.

II. INCREMENTAL CAPACITY OF EXISTING GENERATING DAMS*

Assumes development of incremental capacity at the following existing generating dams. These sites are currently not in the permitting and licensing process, but are sites where serious interest has been expressed, and money committed to exploring development options.

Incremental Capacity at Existing Generating Dams

Project River	Developer	Capacity Change (MW)	Development Type
Cataract Saco	CMP	6.2	expansion, existing generating facility
Williams Kennebec	CMP	5.6	expansion, existing generating facility
Lewiston Canal Androscoggin	CMP	24.0	expansion at existing canal system
Edwards Kennebec	Edwards Manufacturing	10.0	expansion, existing generating facility
Milstar Kennebec	CMP/Milstar	4.0	expansion, existing generating facility
Ft. Halifax Sebasticook	CMP	2.7	expansion, existing generating facility
		52.5	

* Does not include expansions already in licensing and permitting process already counted, (i.e. Hiram, West Enfield, West Buxton, Shawmut, Brunswick, Pejepscot, Madison.)

III. DEVELOPMENT AT ADDITIONAL UTILITY SITES

Assumes development of the following sites included in utility short term and long term plans:

Project	Developer	Size
Basin Mills	Bangor Hydro	30.0 MW (preliminary permit site)
Castle Hill	Maine Public Service	18.0 MW (preliminary permit site)
Non Designated 1	Bangor Hydro	18.0 MW
Non Designated 2	Bangor Hydro	4.0 MW[1]
Non Designated 3	Bangor Hydro	2.0 MW[1]
Non Designated 4	Bangor Hydro	5.0 MW[1]
		77.0 MW

1. May be expansions at existing generating facilities.

IV. EXISTING DAMS NOT CURRENTLY IN LICENSING AND PERMITTING PROCESS

Assumes 32 MW of development at existing dams in the State not currently in some stage of development. 32 MW represents approximately 50% of the capacity of existing dams in the State over 250 KW (analyzed under a 70% Plant Factor) which are not on "A" Rivers or "A" Tributaries of high significance recommended for protection.

The New England River Basin Commission (NERBC) inventory of dams was used as the source listing. Existing dams over 250 KW, as well as a small number of breached dams identified by NERBC as economically attractive, were analyzed by river stretch*. Existing dams were analyzed by NERBC under a 70% Plant Factor; since a 60% Plant Factor more accurately reflects plant factors of hydro projects presently being developed, total capacity figures provided for each river stretch were adjusted to represent capacity assuming 60%.

The breakdown of dams according to river stretch is as follows:

	No. of Sites	Capacity (MW) 60% Plant Factor
A. "A" Rivers: Existing Dams Greater Than 250 KW	16	17.3
"A" Tributaries: Not Specifically Recommended for Protection	4	2.1
B. "B" Rivers: Existing Dams Greater Than 250 KW	9	8.3
C. "C" Rivers: Existing Dams Greater Than 250 KW	16	38.0
D. "D" Rivers and Unclassified Rivers: Existing Dams Greater Than 250 KW	10	12.1
		77.8

In addition, there are over 200 additional dams in the State capable of generating between 50 KW and 250 KW which were not included in these analyses. Obviously, many of these dams may be developed as well.

* This inventory is thought to be the most reliable inventory of existing dams in New England, but still is less than accurate in predicting capacity at individual sites since many factors were overlooked which could both increase or decrease power generated, i.e., penstocking, minimum flow requirements, etc. Additionally, many dams were excluded from the inventory.

A. Existing Dams Greater Than 250 KW

"A" Rivers

River	Dam: Location	Size (KW)
West Branch Pleasant River	Brownville	265
Aroostook	Sheridan	1,030
Dead	Flagstaff Lake Dam	340
Narraguagus	Cherryfield Ice Control	272
East Branch Penobscot (Webster Stream)	Telos Lake	1,361
East Branch Penobscot	Grand Lake Matagamon	1,410
Saco	Swan Falls	774
Sheepscot	Head Tide/Alna	341
Sheepscot	Whitefield/Coopers Mills	273
St. Croix	Vanceboro	679
St. Croix	Milltown Dam	2,117
Saco	Limington	269
Soudabscook[1]	Hampden	392
Kenduskeag[1]	Bangor	514
Cobbosseecontee[1]	Gardiner	450
Cobbosseecontee[1]	West Gardiner	370
Machias	Whitneyville	1,008 (breached)
Machias	Machias 4	1,764 (breached)
Machias	Machias 2	1,260 (breached)
Machias	Machias 1	1,274 (breached)
		16,163

1. Not an "A" Tributary specifically recommended for protection by the Maine Rivers Policy Executive Order of July 6, 1982.

TOTAL CAPACITY: 70% Plant Factor: 16,163

TOTAL CAPACITY: 60% Plant Factor: 19,395

B. Existing Dams Greater Than 250 KW

"B" Rivers

River	Dam: Location	Size (KW)
Grand Lake	Grand Lakes St. Dam	403
South Branch Penobscot	Pittston/Canada Fall Lake Dam	590
Carrabassett	New Portland	1,252 (breached)
Union	Graham Lake Ellsworth	1,455
Piscataquis	Guilford	425
Carrabassett	New Portland	488
Carrabassett	Kingfield Water District	323
Carrabassett	Anson	1,624
Crooked	Harrison/Otisfield	328
		6,888

TOTAL CAPACITY: 70% Plant Factor: 6,888

TOTAL CAPACITY: 60% Plant Factor: 8,265.6

C. Existing Dams Greater Than 250 KW

"C" Rivers

River	Dam: Location	Size (KW)
Kennebec	Benton, Fairfax	5,112 (breached)
Kennebec	Anderson Mills	11,850 (breached)
Swift	Byron	588 (breached)
Sebasticook	Pittsfield	346
Sebasticook	Clinton	815 (breached)
Sebasticook	Burnham	1,980
Sebasticook	Hartland	592
Sebasticook	Burnham	300
Penobscot	Old Town	4,564
Little Ossipee	Limerick/Waterboro	775
Nezinscot	Turner	280
Ossipee	Porter/Parsonfield	441
Presumpscot	Westbrook	423
Presumpscot	Standish	2,272
Ossipee	Porter/Parsonfield 2	819
Meduknekeag	Cary's Mill	475
		31,632

TOTAL CAPACITY: 70% Plant Factor: 31,632

TOTAL CAPACITY: 60% Plant Factor: 37,958

D. Existing Dams Greater Than 250 KW

"D" and "Unclassified" Rivers

River	Dam: Location	Size (KW)
Little Madawaska	Little Madawaska/Caribou	960
Sebec	Milo	1,143
Great Works	Rte. 4 Dam, South Berwick	786
Saco	Spring/Bradbury, Biddeford	3,570
Moosehead Lake Outlet	Big Squaw	2,083
Kezar Lake	Lovell	298
Inlet Sebago Lake	Naples	337
Great Works	South Berwick	313
Little Androscoggin	Oxford	329
West Branch Presque Isle	Whitney Brook	292
		10,111

TOTAL CAPACITY: 70% Plant Factor: 10,111

TOTAL CAPACITY: 60% Plant Factor: 12,133

V. UNDEVELOPED SITES

Assumes development of 25 MW or approximately 45% of the capacity of proposed new dams currently in the FERC Permitting and Licensing stage, excluding those dams on the "A" Rivers and Castle Hill and Basin Mills, two projects already mentioned in the utility plans.

Project River	Developer	Capacity Change (KW)	Development Type
License Applications:			
Benton Falls Sebasticook	Everett Whitman	3,400	new dam
Preliminary Permits:			
Somerset Big Sandy	Madison Electric Works	11,500[2]	new dam
Gilead Androscoggin	Gilead	8,000	new dam
Moose River Moose River	Jackman Lake Restoration	4,000	new dam
Gordon Falls Mattawamkeag	Gordon Falls Hydro Assoc.	20,000	new dam
Medomak Project Medomak	Medomak Hydro	360	new dam[1]
North Anson Carrabassett	Madison Electric Works	3,500[2]	new dam
Carrabassett Carrabassett	Madison Electric Works	4,400[2]	new dam
		55,160	

1. The Medomak proposal call for construction of two new dams and development at one existing dam.

2. Revised estimate reflecting results of detailed feasibility study.

MAXIMUM HYDRO

DEVELOPMENT SCENARIO

PROJECTED HYDRO DEVELOPMENT:

In addition to 285 MW in the Basic Hydro Development Scenario, Additional Development At:

Category of Projects	Capacity Change
I. Existing Dams	20 MW
II. Incremental Capacity at Existing Generating Dams	35 MW
III. New Dams	135 MW
	190 MW

A detailed analysis of how figures were derived follows:

I. EXISTING DAMS

Assumes development of an additional 20 MW of capacity at existing dams in the State over 250 KW not currently in some stage of Licensing and Permitting process. The calculation was based on the same assumptions as the category of Existing Dams Not Currently in the Licensing and Permitting Process, which was included in the first scenario.

II. INCREMENTAL CAPACITY AT EXISTING GENERATING DAMS

Assumes an additional 35 MW of development at existing generating sites in the State, not yet mentioned in this analysis. These existing generating sites include many utility dams where expansions are possible, but to date, have not received serious attention.

The Corps of Engineers estimated that there were 130 MW of incremental capacity at 41 existing generating dams in the State. Increased capacity has already been licensed, added, or considered for 14 sites already accounted for in the basic hydro development scenario; thus, aditional expansions at existing generating sites appear possible.

III. UNDEVELOPED SITES

Assumes an additional 135 MW of capacity from new dam sites. NERBC listed 31 economically attractive sites for new dams, totalling 300 MW of capacity assuming a 40% Plant Factor (40% Plant Factor was chosen to reflect storage facilities.) Excluding these sites on "A" Rivers, those sites previously included in other categories in this analysis, and those sites precluded if other new dams in close proximity were to be built, 135 of this 300 MW of potential remain.

However, by assuming 135 MW of additional development at new sites, we do not assume that all hydro potential at undeveloped sites will be developed. Unfortunately, NERBC did not identify many viable undeveloped sites as evidenced by the fact that less than half of the sites currently being pursued were identified by NERBC. Additionally, NERBC seriously underestimated potential, as evidenced by the following discrepancies between NERBC estimates and actual development proposals:

	NERBC Estimate[1]	Developers' Estimate
Basin Mills	9.3	30.0
Gordon Falls	6.7	20.0
Castle Hill	8.6	18.0 MPS and Corps Estimate
Masardis	4.8	10.0
Gilead	6.7	8.0
	36.1 MW	86.0 MW

1. Assumes 40% Plant Factor

III. Undeveloped Sites cont'd.

The Corps of Engineers estimate of undeveloped site potential, after subtracting Dickey-Lincoln and Cobscook Bay, is 620 MW (41 sites.) Only three (3) of the 41 sites identified by the Corps are currently being pursued.

Obviously, undeveloped potential estimates vary greatly, and accuracy appears a difficult task without more detailed study. However, given OER's information, 135 MW appears to be only a fraction of the potential of attractive undeveloped new dam sites.

SELF-GENERATORS

DEVELOPMENT SCENARIO

PROJECTED HYDRO DEVELOPMENT

Category of Projects	Capacity Change
I. Licensed Projects Not Yet Brought On Line	19.89 MW
II. Undeveloped Sites (New Dams)	34.00 MW
	53.89 MW

I. LICENSED PROJECTS NOT YET BROUGHT ON LINE

Project River	Developer	Capacity Change (KW)	Development Type
Otis-Livermore* Androscoggin	International Paper	16,740 KW	existing generating facility
Great Works Penobscot	Diamond International	3,150 KW	existing generating facility
		19,890 KW	

* Expansions at 3 sites: Otis (9,900 KW), Livermore (500 KW), and Jay (6,340 KW).

II. UNDEVELOPED SITES

Project River	Developer	Capacity Change (KW)	Development Type
Big A West Branch Penobscot	Great Northern	34,000	new dam

STATEWIDE FISHERIES PLAN

Under the State Energy Policy, the Department of Inland Fisheries and Wildlife, the Department of Marine Resources and the Atlantic Sea-Run Salmon Commission were asked to prepare a Statewide Fisheries Plan. These agencies have developed such a plan, designed to foster the development of fisheries for certain designated species on the rivers of the State.

For the purposes of this comprehensive plan, the Statewide Fisheries Plan has been applied specifically to the potential development sites identified by the Office of Energy Resources. This summary version of the Statewide Fisheries Plan follows. Active sites are those where the regulatory process has at least, begun. Nonactive sites are those where no regulatory actions have yet been requested.

The summary provides for six specific approaches for implementation each of which requires one of three actions by hydro developers. These are indicated below.

As other parts of this comprehensive plan, specific site requirements may change over time and appropriate revisions will be submitted.

For more complete information on the Statewide Fisheries Plan and its implementation, the appropriate agency, responsible for fisheries development, should be addressed directly.

Implementation of the Statewide Fisheries Plan

1. Fish passage required when project developed.

2. Fish passage required within 5 years of beginning development.

3. Fish passage may be required in the future, depending upon specified circumstances.

4. No fish passage required at this time.

5. Existing fish passage. Improved fish passage required when developed.

6. Existing fish passage. Improved fish passage may be required in the future, depending upon specified circumstances.

Actions Required of Hydro Developers

Fish passage plans required as part of development 1 and 2 and 5.

Fish passage plans not required but desirable and may be required later 3 and 6

Fish passage plans not required and there is no current information to indicate requirement later 4

FISH PASSAGE REQUIREMENTS AT ACTIVE DAMS

PENOBSCOT RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
West Enfield Penobscot	Salmon restoration program objective is to develop a major run of naturally produced wild Atlantic Salmon	Existing generating dam with fish passage: 9500 kw proposed addition
	Currently a large part of run consists of hatchery reared salmon	Numerous generating dams above and below with fish passage: Milford Great Works Howland Veazie Additional generating dams without passage: Orono Veazie
	Existing fish passage. Improved fish passage required when redeveloped	Existing dams: Bangor Water Works: 8500 to 13000 kw (partially breached)
Basin Mills Penobscot	See West Enfield for fishery considerations	Undeveloped site: 30,000 kw proposed
	Up and downstream fish passage required when project developed	See West Enfield for dams above and below
Bangor Water Works Penobscot	See West Enfield for fishery considerations	Existing dam: 8500 to 13,000 kw proposed (partially breached)
	Up and downstream fish passage required when project developed	See West Enfield for dams above and below

PENOBSCOT RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Moosehead Manufacturing Piscataquis	Shad and alewives have not been observed in this area although sea-run fish have free passage from the ocean to this site Existing fish passage. Improved upstream and downstream fish passage may be required in the future depending upon species development and power plant configuration	Existing dams: 300 kw proposed Dams above: Guilford: 425 kw (has fish passage) Brown's Mill: generating dam (has fish passage)
Gordon Falls Mattawamkeag	Mattawamkeag at and above Gordon Falls is only 1500 sq. mile watershed in the State which is unobstructed and unpolluted. Atlantic Salmon present now Up and downstream fish passage required when project developed	Undeveloped site: 20,000 kw proposed
Lowell Tannery Passadumkeag	Eel fishery present Sea-run Atlantic salmon present, natural production in Passadumkeag Up and downstream fish passage required when project developed	Existing dam: 803 kw proposed (partially breached)

PENOBSCOT RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Sebec Lake Sebec	Landlocked salmon reproduction potential Fish passage may be required in the future, depending upon changes in present stock of landlocked salmon and passage of anadromous fish	Existing dam: 1000 kw proposed Dam below: Town of Milo: 600 kw (being developed) Milo Electric Light: 1143 kw
Frankfort Marsh Stream	Present alewife levels: poor potential: 15,600 pounds Private and special law (1977) mandated fish passage constructed under supervision of DMR Up and downstream fish passage required when project developed	Existing dam: 300 kw proposed Dams above: Brooks (generating) West Winterport: 150 kw proposed
West Winterport Marsh Stream	Present alewife levels: poor Fish passage may be required in the future, depending upon increase in resource value of alewives, and alewife resource expansion	Existing dam: 150 kw proposed Dam below: Frankfort: 300 kw proposed Dam above: Brooks
Big A West Branch Penobscot	Brook trout, landlocked salmon present Fish passage may be required in the future, depending upon current review	Undeveloped site: 34,000 kw proposed Generating dam above: Ripogenous Generating dam below: Millinocket East Millinocket Dolby North Twin (has fish passage)

KENNEBEC RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Moose River Project Moose River	Trout and salmon population are present Fish passage may be required in the future, depending upon stock of resident salmon and trout	Undeveloped site: 3400 kw proposed
Brassua Moose River	No plans to introduce andronomous fish into these waters. Existing fish passage not in operation. Brassua is a strategic barrier dam preventing migration of bass Fish passage may be required in the future depending upon migration of bass	Existing dam: 4000 kw proposed
North Anson Carrabassett	Fish passage may be required in the future, depending upon species management changes and establishment of fish passage at downstream dams on the Kennebec	Undeveloped site: 3500 kw proposed Dams above: Kingfield: 323 kw New Portland: 488 kw New Portland: 1252 kw (breached)
Carrabassett Carrabassett	Brook trout present Fish passage may be required in the future depending upon species management changes and establishment of fish passage at downstream dams on the Kennebec	Undeveloped site: 4400 kw proposed Dams above: Kingfield: 323 kw New Portland: 488 kw New Portland: 1252 kw (breached)

KENNEBEC RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Madison Kennebec	Atlantic salmon and American shad - future concern Fish passage may be required in the future, depending upon species management changes and establishment of fish passage at downstream dams on the Kennebec	Existing generation dam: 7,100 kw proposed Numerous generating dams below: Anson Abenaki Edwards Weston Shawmut Winslow Generating dams above: William Wyman Harris
Somerset Big Sandy	Native brook and brown trout present Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec	Undeveloped site: 11500 kw proposed
Big Sandy Big Sandy	Native brook and brown trout present (also stocked brown trout) Fish passage may be required in the future, depending upon species management and establishment of fish passage at downstream dams on the Kennebec	Existing dam: 6000 kw proposed

KENNEBEC RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Waverly Ave Sebasticook	Present alewife levels: none Potential: 3,800,000 pounds. Based on access to following spawning habitat: China Lake 3922A Patten Pond 712A Lovejoy Pond 324 Unity Pond 2528A Pleasant Pond 768A Great Moose 3584 Big Indian Pond 990 Little Indian Pond 143A Sebasticook Lake 4288 Wassokeag Lake 1062A Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec	Existing dam: 720 kw proposed Dams below: Fort Halifax: CMP: (generating dam) Pittsfield: Cianchette: 346 kw Burnham: Burnham Hydro: 1980 kw Dams above on East Branch Sebasticook (preventing access to Lake Sebasticook, Wassookeag): Newport: Guilford Industries: 227 kw Town of Newport: 194 kw Corinna: Eastland Woolen Mill 1: 53 kw Corinna: Eastland Woolen Mill 2: 50 kw Corinna: Eastland Woolen Mill 3: 58 kw Dexter: Eastland Woolen Mill: 50 kw Dexter: Eastland Woolen Mill: 50 kw Dexter: Eastland Woolen Mill: 50 kw Dexter: Eastland Woolen Mill: 50 kw Dams above on Main Stem (dams preventing access to Great Moose Lake, Indian Pond): Hartland Tanning: 226 kw Town of Hartland: 592 kw Dam preventing access to Unity Pond: Burnham: 300 kw (breached) 2 additional dams preventing access to China Lake Numerous completely breached dams on Sebasticook all presently passable to fish

KENNEBEC RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Benton Falls Sebasticook	Present alewife levels: none Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec	Undeveloped site: 3400 kw proposed See Waverly Ave. for list of dams above

ANDROSCOGGIN RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Worombo Mills Androscoggin	Present shad levels: none Shad potential: 85,000 to 125,000 adults Present alewife levels in Androscoggin above Brunswick and Little Androscoggin: none. Commercial alewife fishery below Brunswick on Androscoggin River Potential alewife levels (excluding Thompson Lake which is unavailable for alewife spawning): 660,000 pounds Downstream fish passage required when project developed. Upstream fish passage may be required in the future, depending upon success of restoring anadromous fish species via Brunswick fishway and trap and truck operations	Expansion of existing Androscoggin generating facility: 13,800 kw proposed addition Generating dams below on Androscoggin: Pejepscot Brunswick (has fish passage) 11 dams above on Little Androscoggin

ANDROSCOGGIN RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Barkers Mill (Upper) Little Androscoggin	Present alewife levels in Little Androscoggin: alewives stocked in Sabattus Pond in 1982 Potential levels: 660,000 pounds based on access of following habitat: Tylor Pond 625A Range Ponds 1047A Tripp Pond 768A Pennesseewassee Lake 922A Downstream fish passage required when project developed. Upstream fish passage may be required in the future, depending upon successful fish run to that dam	Existing dam: 950 kw proposed (partially breached, still does not allow passage) Generating dams below Androscoggin: Brunswick: (has fish passage) Pejepscot: (no present fish passage) Worumbo Mills: (no present fish passage) Dams below on Little Androscoggin Auburn: Barkers Mill Lower Dams above on Little Androscoggin Auburn: Littlefield: 1000 kw proposed (partially breached dam) Poland/Minot Hacketts Mills: 400 kw proposed Mechanic Falls: Marcal: (generating dam) Welchville: Marcal: 329 kw Dams blocking access to Range Ponds (alewife spawning habitat) Poland: Range Pond (Lower) Marcal Poland: Range Pond (Upper) Marcal Dam blocking access of Penneseewassee Lake: Town of Norway Dam 1: 50 kw Town of Norway Dam 2: 40 kw Norway Manufacturing: 103 kw

ANDROSCOGGIN RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Littlefield Little Androscoggin	See Barkers Mill Upper for fishery considerations	Partially breached dam: 1000 kw proposed
	Downstream fish passage required when project developed. Upstream fish passage may be required in the future depending upon a successful fish run to that dam	See Barkers Mill Upper for names of 5 dams below, 8 above
Hacketts Mill Little Androscoggin	See Barkers Mill Upper for fishery considerations	Existing dam: 440 kw proposed
	Downstream fish passage required when project developed. Upstream fish passage may be required in the future, depending upon successful fish run to that dam	See Barkers Mill Upper for names of 6 dams below, 7 above
Gilead Androscoggin	Trout potential Possible Atlantic Salmon potential	Undeveloped site: 8000 kw proposed
	No plans for sea run fish species development	Numerous existing generating dams below without passage: Bates Manufacturing Deer Rips Gulf Island Otis Livermore (4) Boise Cascade (2)
	Fish passage may be required in the future, depending upon changes in fish management brought about by improved water quality	

ANDROSCOGGIN RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Upper Project Mooselookmeguntic	Dam considered by IF&W to be beneficial barrier Drawdown associated with hydropower operation could enhance fishery No fish passage required at this time	Existing dam: 1500 proposed
Rangely Rangely Lake	No fish passage required at this time	Existing dam: 300 kw proposed
Aziscohos Magalloway	Dam considered by IF&W to be a beneficial barrier to migration of undesirable species No fish passage required at this time	Existing dam: 5500 kw proposed
Middle Project Rapid River	Dam considered by IF&W to be a beneficial barrier to migration of undesirable species Fish passage may be required in the future, depending upon fish species management changes, and establishment of fish passage at downstream dams on the Androscoggin	Existing dam: 1500 kw proposed

MID-COASTAL WATERSHEDS

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Medomak Project Medomak	Present alewife levels: 26,000 pounds potential level: 178,000 pounds This fishery controlled by town of Waldoboro and managed jointly with DMR Up and downstream fish passage re-required when project developed	1 existing dam, 2 undeveloped sites: 360 kw proposed
Sennebec Pond St. George	IF&W brown trout management (have started stocking sea-run brown trout and will monitor success) Present alewife levels: 544,000 pounds potential level: 750,000 pounds This fishery controlled by town of Warren Up and downstream fish passage required when project developed	Existing dam: 400 kw proposed
Robbins Lumber St. George	IF&W brown trout management Present alewife levels: 544,000 pounds potential: 750,000 pounds Up and downstream fish passage re-quired when project developed	Existing dam: 127 kw proposed

MID-COASTAL WATERSHEDS

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Megunticook Project Megunticook	No fish passage required at this time	Two existing dams: 100 kw proposed Dams below: Camden Seabright: 50 kw Camden Moss Tents: 140 kw Camden Knowlton St. Dam Camden Knox Wooden Dam #3

EASTERN COASTAL WATERSHEDS

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
East Machias East Machias	Shad present and caught in recreational/ commercial fisheries One of only 6 rivers in the United States with natural runs of Atlantic salmon. Salmon run supports an important recreational fishery Present alewife levels: 78,000 pounds, potential: 1,400,000 pounds Up and downstream fish passage required when project developed	Existing dam: 1500 proposed Dams above: Gardiner Lake outlet: 80 kw (has fish passage) Crawford Lake: Pokey Dam: 50 kw (has fish passage)
Green Lake Green Lake	No anadromous fish No fish passage required at this time	Existing dam: 300 kw proposed

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Days Mill Kennebunk	No fish passage required at this time	Existing dam: 60 kw proposed
Boston Felt Milton Leatherboard Lower Great Falls South Milton North Rochester Milton Mills Salmon Falls River	Fish passage may be required in the future depending upon the establishment of fish passage at lower dams, changes in current fish management and mitigation of pollution	Existing dam: 300 kw proposed Existing dam: 600 kw proposed Existing dam: 1300 kw proposed Existing generating dam: proposed addition Existing generating dam: proposed addition 3 existing dams: 263 kw proposed Numerous other dams on Salmon Falls River: two of which are licensed
Rocky Gorge Great Works	No fish passage required at this time	Existing dam: 500 kw proposed Numerous dams above: South Berwick: Great Works: 190 kw South Berwick: Great Works: 160 kw North Berwick: Rt. 9 Upper: 60 kw North Berwick: Rt. 9 Lower: 60 kw North Berwick: Hillside Cemetery Dam: 50 kw

PRESUMPSCOT RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Smelt Hill Presumpscot	Present alewife levels: unknown Potential: 30,000 pounds without fish passage at Highland Lake; 128,000 pounds if fish passage is provided at Highland Lake Up and downstream fish passage required in 5 years	Existing dam: 1200 kw proposed Dam above: Highland Lake

SACO RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Hiram Saco River	Inland brown trout management. Some Atlantic salmon present	Existing generating dam: 8200 kw proposed addition
	Fish passage may be required in the future depending upon the introduction of Atlantic Salmon	Numerous generating dams below: Bonny Eagle West Buxton Upper West Buxton Lower Skelton (has fish passage) Cataract (has fish passage)

ST. JOHN RIVER BASIN

PROJECT/RIVER	FISHERY CONSIDERATIONS/ FISH PASSAGE REQUIREMENTS	HYDROPOWER/INDUSTRIAL CONSIDERATIONS
Castle Hill Aroostook	Sea-run Atlantic salmon present Significant natural brook trout fishery programs Up and downstream fish passage required when project developed	Undeveloped site: 18,000 kw proposed Dam upstream: Sheridan: 1030 kw Dam downstream: Caribou (generating, has fish passage)

FISH PASSAGE REQUIREMENTS AT NON-ACTIVE DAMS

PENOBSCOT RIVER BASIN

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Hampden Souadabscook	392	Up and downstream fish passage required when developed
Brownville Pleasant River	265	Up and downstream fish passage required when developed
Guilford Piscataquis	425	Existing fish passage; improved fish passage may be required in the future depending upon species development and power plant configuration
Old Town Penobscot	4564	Up and downstream fish passage required when developed
Telos lake Webster Brook	1361	No fish passage required at this time
Milo Sebec	1143	Fish passage may be required in the future depending upon changes in present stock of landlocked salmon and passage of anadromous fish
Pittston Canada Falls Lake Dam	580	Existing fish passage currently not operating
Bangor Kenduskeag	514	Up and downstream fish passage required when developed
Grand Lake Matagamon	1410	Existing fish passage

KENNEBEC RIVER BASIN

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Benton/Fairfield (breached) Kennebec	5112	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
Anderson Mills (breached) Kennebec	11850	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
Kingfield (breached) Carrabassett	313	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
New Portland Carrabassett	1252	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
New Portland Sandy Stream	488	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
Pittsfield Sebasticook	346	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
Hartland Sebasticook	592	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
Burnham Sebasticook	1980	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec
Burnham Sebasticook	300	Fish passage may be required in the future depending upon species management changes, and the establishment of fish passage at downstream dams on the Kennebec

KENNEBEC RIVER BASIN

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Yorktown Paper Mill Cobbosseecontee	450	No fish passage required at this time
Big Squaw Moosehead Lake Outlet	2083	Existing fish passage
Flagstaff Lake Dam Dead River	340	Existing fish passage currently not operating
Spears Mill Cobbosseecontee	370	No fish passage required at this time

ANDROSCOGGIN RIVER BASIN

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Turner Nezinscot	323	No fish passage required at this time
Oxford Little Androscoggin	329	Downstream fish passage required when project developed; Upstream fish passage may be required in the future, depending upon successful fish run to that dam
Byron (breached) Swift River	588	No fish passage required at this time

MID COASTAL WATERSHEDS

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Coopers Mills Sheepscot	273	Up and downstream fish passage required when developed
Head Tide/Alna Sheepscot	341	Up and downstream fish passage required when developed

EASTERN COASTAL WATERSHEDS

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Machias (breached) Machias	1764	Up and downstream fish passage required when developed
Whitneyville (breached) Machias	1008	Up and downstream fish passage required when developed
Machias (breached) Machias	1260	Up and downstream fish passage required when developed
Machias (breached) Machias	1274	Up and downstream fish passage required when developed
Ellsworth Graham Lake West Branch Union	1455	No fish passage required at this time
Cherryfield Ice Control Dam Narraguagus	272	Up and downstream fish passage required when developed
Vanceboro St. Croix	679	Existing fish passage; improved fish passage required when redeveloped
Grand Lake Stream Grand Lake	403	Existing fish passage; improved fish passage may be required in the future, depending on power plant configuration facilities and mode of operation

SOUTH COASTAL WATERSHEDS

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
S. Berwick Great Works	313	No fish passage required at this time
S. Berwick Great Works	786	No fish passage required at this time

PRESUMPSCOT RIVER BASIN

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Standish Presumpscot	2272	No fish passage required at this time
Westbrook Presumpscot	423	No fish passage required at this time
Hansen/Otisfield Crooked River	328	Up and downstream fish passage required when developed
Naples Long Lake	337	No fish passage required at this time

SACO RIVER BASIN

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Swan Falls Saco	774	Fish passage may be required in the future, depending upon the introduction of Atlantic Salmon
Limington Saco	269	Fish passage may be required in the future, depending upon the introduction of Atlantic Salmon
Porter/Parsonfield Ossipee	441	Fish passage may be required in the future, depending upon the introduction of Atlantic Salmon
Porter/Parsonfield Little Ossipee	819	Fish passage may be required in the future, depending upon the introduction of Atlantic Salmon
Limerick/Waterboro Little Ossipee	775	Fish passage may be required in the future, depending upon the introduction of Atlantic Salmon
Spring Bradbury Saco River	3570	Fish passage may be required in the future, depending upon the introduction of Atlantic Salmon
Lovell Kezar Lake	298	No fish passage required at this time

ST. JOHN RIVER BASIN

PROJECT/RIVER	SIZE (kw)	FISH PASSAGE REQUIREMENTS
Little Madawaska Little Madawaska	960	Existing fish passage
Whitney Brook W. Branch Presque Isle	292	Up and downstream fish passage required when developed
Sheridan Dam Aroostook	1030	Up and downstream fish passage required when developed