

UNITED STATES OF AMERICA  
 FEDERAL ENERGY REGULATORY COMMISSION

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Bangor Hydro-Electric Company

Project No. 2727-003

ORDER ISSUING NEW LICENSE  
 (Major Project - Existing Dam)  
 ( Issued December 28, 1987 )

Bangor Hydro-Electric Company has filed a license application under Part I of the Federal Power Act (Act) to continue to operate and maintain the Ellsworth Project, located in Hancock County, Maine, on the Union River, a navigable waterway of the United States. <sup>1/</sup>

Notice of the application has been published. The motions to intervene that have been granted and the comments and protests filed by agencies and individuals have been fully considered in determining whether to issue this license, as discussed below.

Recommendations of Federal and State Fish and Wildlife Agencies

Section 10(j) of the Act, as amended by the Electric Consumers Protection Act of 1986 (ECPA), Public Law No. 99-495, requires the Commission to include license conditions, based on recommendations of federal and state fish and wildlife agencies, for the protection, mitigation, and enhancement of fish and wildlife. The environmental assessment (EA) for the Ellsworth Hydroelectric Project addresses the concerns of the federal and state fish and wildlife agencies, and makes recommendations consistent with those of the agencies.

Comprehensive Plans

Section 10(a)(2) of the Act, as amended by ECPA, requires the Commission to consider the extent to which a project is consistent with comprehensive plans (where they exist) for improving, developing, or conserving a waterway or waterways affected by the project. The plans must be prepared by an agency established pursuant to federal law that has the authority to prepare such a plan or by the state in which the facility is or will be located. The Commission considers plans to be within the scope of section 10(a)(2), only if such plans reflect the preparers' own balancing of competing uses of a waterway, based on their data and applicable policy considerations (i.e., consider and balance all relevant public use considerations). With regard to plans prepared at the state level, such plans are within the scope of section 10(a)(2),

<sup>1/</sup> 58 FPC 212 (1977).

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only if they are prepared and adopted pursuant to a specific act of the state legislature and developed, implemented, and managed by an appropriate state agency. 2/

The Commission has concluded that comprehensive planning under section 10(a)(2)(A), like comprehensive planning under section 10(a)(1), should take into account all existing and potential uses of a waterway relevant to the public interest, including navigation, power development, energy conservation, fish and wildlife protection and enhancement, recreational opportunities, irrigation, flood control, water supply, and other aspects of environmental quality. In order that the Commission may fully understand or independently confirm the content and conclusions of a comprehensive plan, it provided general guidelines for developing such plans that should contain the following: (1) a description of the waterway(s) that are subject to the plan, including pertinent maps; (2) a description of the significant resources of the waterway(s); (3) a description of the various existing and planned uses for these resources; and (4) a discussion of goals, objectives, and recommendations for improving, developing, or conserving the waterway(s) in relation to these resources. The more closely a plan conforms to these guidelines, the more weight it will have on the Commission's decisions. The Commission, however, will consider plans that do not meet the criteria for comprehensive plans, as it considers all relevant studies and recommendations in its public interest analysis pursuant to section 10(a)(1) to the extent that the documentation supports the plan.3/

The staff identified one comprehensive plan of the type referred to in section 10(a)(2) of the Act relevant to this project.4/ No conflicts were found. No resource plans that address various aspects of waterway management under section 10(a)(1) of the Act were brought our attention.

Based upon our review of the agency and public comments filed in this proceeding, and an independent analysis as discussed herein, it is concluded that the Ellsworth Project is best adapted to a comprehensive plan for the Union River, taking into consideration the beneficial public uses described in section 10(a)(1) of the Act.

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2/ See Fieldcrest Mills, Inc. 37 FERC ¶61,264 (1986).

3/ See Commission Order No. 481, issued October 20, 1987.

4/ Maine State Planning Office's State of Maine Comprehensive Rivers Management Plan 1987.

Federal Power Act - Section 15(a)

Section 4 of the ECPA amended Section 15 of the Act to specify a number of factors the Commission is required to consider in acting on applications for new license following the expiration of existing licenses.

1. The plans and abilities of the applicant to comply with the articles, terms, and conditions of any license issued to it and other applicable provisions of Part I of the Act (Section 15(a)(2)(A))

The Bangor Hydro-Electric Company (Bangor) states that, since obtaining the existing license, it has been committed to meeting the requirements of all the articles, terms, and conditions of the existing license. Bangor maintains that its past performance, in conjunction with its future operations and maintenance plans, and its record of compliance with the requirements of the jurisdictional agencies, demonstrate that it is committed to meeting the future requirements for the continued operation of the project.

Our review of the compliance record of the Bangor substantiates that the Bangor has generally complied with all articles, terms, and conditions of its existing license. Bangor has, on occasion, filed some compliance material late; however, staff will monitor closely Bangor's compliance in future requirements. Based on the above, and in consideration of the requirements of the new license, it is concluded that the Bangor will be able to comply with the terms and conditions of the new license and other provisions of Part I of the Act.

2. The plans of the applicant to manage, operate and maintain the project safely (Section 15(a)(2)(B))

The Bangor states that it is operating the generating facilities with a foremost concern for the safety of its employees and the public. Records indicate that there has never been an employee fatality. Also, there has been no injury or death to any member of the public within the project boundary. The Bangor has adopted a Safety Inspection Manual based on its operating experience, and this manual is continually updated. The project is, and will continue to be, operated as a peaking plant, which causes no extreme fluctuations, thus posing no project-caused hazard for fishermen and boaters. The Bangor has prepared an emergency action plan with a notification procedure to the public in case of a potential threat to life or property downstream.

Based upon our review of the specific information provided by the Bangor on various aspects of the project that affect public safety, inspection reports by the Commission's Regional Director, and independent consultant reports filed under Part 12 of our regulations, 18 C.F.R. Part 12 (1987), it is concluded that with article number 301, the Bangor's plans to manage, operate, and maintain the project safely, would be adequate.

3. The plans and abilities of the applicant to operate and maintain the project in a manner most likely to provide efficient and reliable electric service (Section 15(a)(2)(C))

The Bangor states that during the past years they have: (1) removed the two 1,000 kW horizontal units (Units No. 2 and 3) and installed two new 2,000 kW units, one in 1937, the other in 1938, (2) replaced the damaged racks in 1950, (3) rebuilt Units No. 1 and 4 in 1982, (4) repaired concrete forebay walls and walkway and replaced roof over Unit No. 1 in 1983, (5) replaced hydraulic braking systems on Units No. 1, 2 and 3 in 1985, (6) replaced hydraulic braking system on Units No. 1, 2, and 3 in 1985, (7) placed rip-rap along the downstream river bank adjacent to the parking lot and regulators to prevent erosion, and (8) provided several smaller repair work between 1937 and 1986.

There are no water resource projects located upstream of Ellsworth Dam, except the Graham Dam, which would require the Bangor to coordinate the operation of the Ellsworth project.

The plant is operated in an automatic mode in a manner that maximizes generating efficiency. Maintenance upkeep has included upgrading electrical systems and repairs to the project works.

Operation of the Ellsworth Project enables the Bangor to reduce the loading of its transmission lines and the substation. The hydroelectric plant provides low-cost generation in the Bangor's system, and these benefits are expected to increase in the future because of the escalation of fuel costs.

Based on the above considerations, review of the operation inspection reports by the Regional Director, the Bangor's past performance, and future plans to operate the project, we believe that the project is, and under the new license will continue to be operated and maintained in an efficient and reliable manner.

4. The need of the applicant over the short and long term for the electricity generated by the project to serve its customers (Section 15(a)(2)(D))

The applicant, Bangor, has applied to FERC for a new license to continue operation of the 8.9-MW Ellsworth Project. The project is located in the fastest growing portion of applicant's service area and substantial load growth is expected to continue.

Applicant's need for continuing operation of the project, over both the short and long terms is both economic and operational. From both economic and financial points of view, no source of replacement power is available which is cost-competitive with a hydroelectric facility whose original cost has been amortized, which has no fuel costs and which has modest operating and maintenance costs. From an operational point of view, the project provides the high reliability associated with hydroelectric facilities, has "black start" capacity which is used to bring other sources on-line in the event of a system outage, provides approximately 9 megawatts of spinning reserve and, when its output is not on dispatch, is available as a support source while repairs are being made. Additionally, it is the opinion of Staff that 79 years of operation and usefulness by, and to, the applicant give strong support to the applicant's need for the project and a new license.

In the event of denial of a new license, the applicant estimates the cost of replacement capacity and energy would be approximately \$43,000,000 (1987 dollars) for the first thirty years of the new license period. This estimate includes capital costs of existing and new combustion turbines and existing oil-fired steam plants. Also included in the estimate are fuel costs (principally imported oil) and operating and maintenance costs.

Other alternative sources of replacement power deserving consideration are the purchase of Canadian Hydropower and power from available cogeneration or small power producer facilities at avoided-cost rates.

The applicant has expressed concerns about the future costs and reliability of availability of replacement power purchases from a foreign sources (Canadian Hydro) or from sources which depend upon imported oil.

Except for Canadian hydro, alternative replacement power sources would consume non-renewable energy resources, principally oil, and would produce additional atmospheric pollution.

Accepting applicant's estimate of the 30-year cost of 43 million 1987 dollars for replacement power, staff estimates that, in 1987 dollars, the unit cost of replacement power for the year 1986 would have been \$0.0415 per kilowatt-hour. In 1986 the project produced 34,493,700 net kilowatt-hours of electrical energy at a unit cost of \$0.0101 per kilowatt-hour.

5. The applicant's existing and planned transmission services (Section 15(a)(2)(E))

If the applicant is granted a new license to continue operation of the project, no changes will be required on the transmission line emanating from the project switch-yard and carrying only project power. Changes required on other lines of applicant's system will be such changes as are required as a result of load growth.

If the license is not renewed and applicant loses the project power, the project transmission line will not be needed and the 34.5-kV Ellsworth Substation located adjacent to the Ellsworth project powerhouse as well as lines L-1 and L-10 will require relocation. Applicant estimates that the cost of relocating the transmission system components located within the Ellsworth project boundary would approach \$150,000.

Applicant states that loss of the Ellsworth Project would result in higher system line losses; adverse impact on system reliability; and substantial expenditures to replace system components including substations, distribution lines and transmission lines.

6. Whether the plans of the applicant will be achieved, to the greatest extent possible, in a cost effective manner (Section 15(a)(2)(F))

With regard to the Ellsworth Project, the Bangor upgraded and modernized the equipment, and reduced the overall operation expenses. Units No. 2 and 3 were replaced by upgraded units to achieve higher efficiency.

No increase of capacity is planned. With the hydraulic capacity of 2,300 cfs and minimum flow release of 90 cfs, the Bangor adequately utilizes the flows of the Union River.

There are no projects, proposed or constructed on the Union River that this project would impact, and neither State or Federal agencies commented on flood control, navigation, water supply or irrigation requirements in the basin.

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The Director orders:

(A) This license is issued to Bangor Hydro Electric Company (licensee), for a period of 30 years, effective January 1, 1988, to continue to operate and maintain the Ellsworth Project. This license is subject to the terms and conditions of the Act, which is incorporated by reference as part of this license, and subject to the regulations the Commission issues under the provisions of the Act.

(B) The project consists of:

(1) All lands, to the extent of the licensee's interests in those lands, enclosed by the project boundary shown by Exhibit G:

<u>Exhibit G-</u>	<u>FERC No. 2727-</u>	<u>Showing</u>
G-1	18	General Location Map
G-2	19	General Project Area Map
G-3	20	Project Boundary Map
G-4	21	Project Boundary Map
G-5	22	Project Boundary Map

(2) Project works consisting of: (a) Graham Dam, an earthfill dam with concrete core walls, about 750 feet long and 30 feet high and having a gated concrete spillway; (b) Graham Lake, a reservoir extending approximately 15 miles above Graham Dam having a surface area of 12,200 acres at normal water surface elevation 104.2 feet U.S.G.S. datum; (c) Ellsworth Dam, a concrete buttress dam located about 4 miles downstream of Graham Dam, approximately 377 feet long and 60 feet high with 26-inch-high flashboards on the spillway; (d) Lake Leonard, a forebay reservoir extending approximately 1 mile above Ellsworth Dam and having a surface area of 125 acres at normal water surface elevation 66.67 feet U.S.G.S. datum; (e) a reinforced concrete and concrete block masonry powerhouse containing one 2,500-kW generating unit, two 2,000-kW generating units, and one 2,400-kW generating unit; (f) the generator leads; (g) three 2.3/34.5-kV step-up transformers; (h) the 34.5-kV transmission line connecting the step-up transformers to the 34.5-kV bus of the Ellsworth substation; and (i) appurtenant facilities.

The project works generally described above are more specifically shown and described by those portions of Exhibits A and F recommended for approval in the attached Safety and Design Assessment.

As to the total project, the recreation resources are in accord with the Commission's policy on recreation.

#### Term of License

Section 5 of ECPA amended Section 15 of the Act specifying that any license issued under Section 15 shall be for a term which the Commission determines to be in the public interest, but not less than 30 years, nor more than 50 years. This new provision is consistent with pre-ECPA Commission policy, which was to establish 30-year terms for those projects which proposed no new construction or capacity, 40-year terms for those projects that proposed a moderate amount of new development, and 50-year terms for those projects that proposed a substantial amount of new development.<sup>5/</sup>

Bangor Hydro-Electric Company proposes no modifications to the existing project facilities or changes in operation of the project. Accordingly, the new license for the project will be for a term of 30 years.

#### Summary of Findings

An EA was issued for this project. Background information, analysis of impacts, support for related license articles, and the basis for a finding of no significant impact on the environment are contained in the EA attached to this order. Issuance of this license is not a major federal action significantly affecting the quality of the human environment.

The design of this project is consistent with the engineering standards governing dam safety. The project will be safe if operated and maintained in accordance with the requirements of this license. Analysis of related issues is provided in the Safety and Design Assessment attached to this order.

The Director, Office of Hydropower Licensing, concludes that the project would not conflict with any planned or authorized development, and would be best adapted to comprehensive development of the waterway for beneficial public uses.

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<sup>5/</sup> See Montana Power Company, 56 F.P.C. 2008 (1976).



(3) All of the structures, fixtures, equipment or facilities used to operate or maintain the project and located within the project boundary, all portable property that may be employed in connection with the project and located within or outside the project boundary, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) The Exhibit G described above and those sections of Exhibits A and F recommended for approval in the attached Safety and Design Assessment are approved and made part of the license.

(D) This license is subject to the articles set forth in Form L-3, (October 1975), entitled "Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters of the United States." The license is also subject to the following additional articles:

Article 201. The licensee shall pay the United States the following annual charge, effective January 1, 1988:

For the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 11,900 horsepower.

Article 202. Pursuant to Section 10(d) of the Act, a specified reasonable rate of return upon the net investment in the project shall be used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. One-half of the project surplus earnings, if any, accumulated under the license, in excess of the specified rate of return per annum on the net investment, shall be set aside in a project amortization reserve account at the end of each fiscal year. To the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year under the license, the amount of that deficiency shall be deducted from the amount of any surplus earnings subsequently accumulated, until absorbed. One-half of the remaining surplus earnings, if any, cumulatively computed, shall be set aside in the project amortization reserve account. The amounts established in the project amortization reserve account shall be maintained until further order of the Commission.

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The annual specified reasonable rate of return shall be the sum of the annual weighted costs of long-term debt, preferred stock, and common equity, as defined below. The annual weighted cost for each component of the reasonable rate of return is the product of its capital ratio and cost rate. The annual capital ratio for each component of the rate of return shall be calculated based on an average of 13 monthly balances of amounts properly includable in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rates for long-term debt and preferred stock shall be their respective weighted average costs for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10-year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 401. The licensee shall release a continuous minimum flow of 105 cubic feet per second (cfs) from the Ellsworth dam and the Graham dam from July 1 through April 30, and a continuous minimum flow of 250 cfs from May 1 through June 30, for the protection of fishery resources. These flows may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon agreement among the licensee, the U.S. Fish and Wildlife Service, and the Maine Department of Environmental Protection.

Article 402. The licensee shall operate the project so that water levels in Lake Leonard are maintained between the elevations of 65.7 feet mean sea level (msl) and 66.7 feet (flashboard crest), and water levels in Graham Lake are maintained between 104.2 feet msl and 93.4 feet msl. These requirements may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon agreement among the licensee, the U.S. Fish and Wildlife Service, and the Maine Department of Environmental Protection.

Article 403. The licensee, after consulting with the U.S. Fish and Wildlife Service, the Maine Department of Inland Fisheries and Wildlife, and the Maine Department of Environmental Protection, shall develop a study plan to determine the effectiveness of the water elevation management plan in controlling shoreline erosion and protecting water quality and providing for enhancement of fish and wildlife resources in Graham Lake. Within 6 months from the date of issuance of this license, the licensee shall file for Commission approval a copy of the study plan, the comments of the agencies on the plan, and a schedule for filing the results of the study. The Commission reserves the right to require modifications to the plan and the schedule.

According to the schedule approved by the Commission, the licensee shall file with the consulted agencies and with the Commission a report on the results of the study. The licensee shall also file for Commission approval any recommended measures for changes in project operation necessary for further minimizing the effects of project operation on fish and wildlife resources in Graham Lake, and shall include agency comments on the study results and on the licensee's recommendations. The Commission reserves the right to require changes to the measures.

Article 404. The licensee, after consulting with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Maine Department of Marine Resources, and the Maine Department of Environmental Protection, shall develop a study plan to determine the effectiveness of minimum flow releases required by article 401 to protect fishery resources at the Ellsworth Hydroelectric Project. Within 1 year from the date of issuance of this license, the licensee shall file for Commission approval a copy of the study plan, the comments of the agencies on the plan, and a schedule for filing the results of the study. The Commission reserves the right to require modifications to the plan and the schedule.

According to the schedule approved by the Commission, the licensee shall file with the consulted agencies and with the Commission a report on the results of the study. The licensee also shall file for Commission approval any recommendations for changes in project operation needed to ensure the protection of anadromous fish resources, a schedule for implementing the recommendations, and the comments of the agencies on the recommendations. The Commission reserves the right to require changes to the measures.

Article 405. The licensee, in cooperation with the U.S. Fish and Wildlife Service, the Maine Department of Inland Fisheries and Wildlife, and the Maine Department of Environmental Protection, shall develop a plan to install streamflow gages in the Union River to monitor the minimum flow releases required by article 401. The plan shall include the location and design of gages, method of flow data collection, and provisions for providing the flow data to the agencies within 30 days of the agencies' request for the data. The plan shall be filed within 6 months from the date of issuance of this license, and shall include the comments of the agencies on the plan. The Commission reserves the right to require modifications to the plan.

Article 406. The licensee, after consulting with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Maine Department of Marine Resources, and the Maine Department of Environmental Protection, shall develop a plan, consistent with any prescription made by the Secretary of the Interior, for upstream and downstream fish passage that shall include, but shall not be limited to, the following: (1) functional design drawings of upstream fish passage facilities; (2) functional design drawings of downstream fish passage facilities, including intake screens and bypass facilities;

(3) a quantification of the flows required for operation of the upstream and downstream fish passage facilities; (4) a schedule for constructing, operating, and maintaining the facilities; (5) a description of a program for monitoring the effectiveness of the upstream and downstream passage facilities, including a schedule for implementing the monitoring program and for filing with the consulted agencies and with the Commission, the program results and any recommendations for modifying project facilities or operation; and (6) provisions for maintaining the collection of Atlantic salmon broodstock that shall include, but shall not be limited to, the modification and operation of existing fish collection facilities. The licensee shall file the plan for Commission approval within 1 year after the date of issuance of this license, and shall include documentation of consultation and the comments of the agencies on the plan. The Commission reserves the right to require changes to the plan. Within 6 months after completion of construction, the licensee shall file as-built drawings of the fish passage facilities.

Article 407. The licensee, before starting any land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in this license, shall consult with the Maine State Historic Preservation Officer (SHPO), and shall file with the Commission a cultural resources management plan, prepared by a qualified cultural resource specialist. If the licensee discovers previously unidentified archeological or historic properties during the course of constructing or developing project works or other facilities at the project, the licensee shall stop all land-clearing and land-disturbing activities in the vicinity of the properties, shall consult with the SHPO, and the licensee shall file with the Commission a cultural resource management plan, prepared by a qualified cultural resource specialist.

A cultural resources management plan shall include the following: (1) a description of each discovered property, indicating whether it is listed on or eligible to be listed on the National Register of Historic Places; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating effects; (4) documentation of the nature and extent of consultation; and (5) a schedule for mitigating effects and conducting additional studies. The Commission may require changes to the plan.

The licensee shall not begin land-clearing or land-disturbing activities, other than those specifically authorized in this license, or resume such activities in the vicinity of a property discovered during construction, until informed that the requirements of this article have been fulfilled.

Article 408. The licensee, after consulting with the National Park Service, the Maine Bureau of Parks and Recreation, and the City of Ellsworth, shall prepare and file with the Commission for approval within 1 year from the date of issuance of this license, a revised Report on Recreational Resources that conforms to the requirements of the Commission's Regulations, 18 CFR at 4.51(f)(5). The Report shall include, but shall not be limited to, the following: (1) a description of existing and proposed recreational facilities; (2) identification of the entities responsible for constructing, operating, and maintaining any existing or proposed facilities; (3) maps or drawings showing the type and location of existing and proposed facilities at the project; (4) a map of land reserved for future recreational development; (5) a construction schedule, and (6) documentation of consultation with the agencies.

Article 409. (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain other types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the uses and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, cancelling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The types of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time and where said facility is intended to serve single-family type dwellings; and (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The licensee shall also ensure, to the satisfaction of the Commission's

authorized representative, that the uses and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges and roads for which all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certificates or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are

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located at least one-half mile from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from the edge of the project reservoir at normal maximum surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 45 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Hydropower Licensing, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include covenants running with the land adequate to ensure that: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project.

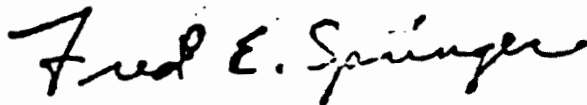
(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

(E) The licensee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to that filing. Proof of service on these entities must accompany the filing with the Commission.

(F) This order is issued under authority delegated to the Director and is final unless appealed under Rule 1902 to the Commission by any party within 30 days from the issuance date of this order. Filing an appeal does not stay the effective date of this order or any date specified in this order. The licensee's failure to appeal this order shall constitute acceptance of the license.



Fred E. Springer  
Acting Director, Office of  
Hydropower Licensing



ENVIRONMENTAL ASSESSMENT  
DIVISION OF ENVIRONMENTAL ANALYSIS, OFFICE OF HYDROPOWER LICENSING  
FEDERAL ENERGY REGULATORY COMMISSION

Ellsworth Project  
FERC No. 2727-003, Maine  
November 9, 1987

I. APPLICATION

Bangor Hydro-Electric Company (applicant) applied on December 19, 1984, for a new license for the Ellsworth Hydroelectric Project. The applicant supplemented the application on July 1, 1985, and March 5, 1986.

The Ellsworth Project is located on the Union River in the city of Ellsworth and the towns of Mariaville, Waltham, and Otis, in Hancock County, Maine (figure 1). The Union River flows into the Union River Bay, approximately 2 miles downstream from the project. There are no lands of the United States located within the project boundary.

II. RESOURCE DEVELOPMENT

A. Purpose

The existing project provides an estimated average annual generation of 31,055,000 kilowatthours (kWh) of electrical energy. All the power produced by the project is supplied to the applicant's transmission and distribution system and is sold directly to the applicant's customers.

B. Need for Power

The applicant requests a new license to continue operating the 8.9-megawatt (MW) project. The project is located in the fastest growing portion of the applicant's service area, and substantial load growth is expected to continue.

The applicant's need for continuing operation of the project, over both the short and long terms, is both economic and operational. From an economic point of view, no source of replacement power is available that is cost-competitive with the existing project, a hydroelectric facility for which original cost has been amortized, which has no fuel costs, and which has modest operating and maintenance costs. From an operational point of view, the project provides the high reliability associated with hydroelectric facilities, has "black start" capacity that is used to bring other sources on-line in the event of a system outage, provides approximately 9 MW of spinning reserve, and when its output is not on dispatch, is available as a support source while repairs are being made. Additionally, it is the opinion of the staff that 79 years of operation by and usefulness to the applicant give strong support to the applicant's need for the project and a new license.

### III. PROPOSED PROJECT AND ALTERNATIVES

#### A. Proposed Project

##### 1. Project Description

The existing project consists of a lower dam with a small reservoir and an upper dam with a large storage reservoir (figure 2). The lower dam, known as the Ellsworth dam, forms the upper limit of tidal influence of the Union River. The Ellsworth dam is a concrete structure, 65 feet high and 377 feet long, a 275-foot-long section of which comprises a spillway. Flashboards, 27 inches in height, are installed on the spillway crest; the top of the flashboards is at elevation 66.7 feet mean sea level (msl). The reservoir impounded by the Ellsworth dam, called Lake Leonard, has a surface area of 90 acres at its normal maximum elevation of 66.7 feet msl. The Ellsworth powerhouse, which is integral with the dam, contains four generating units with a total capacity of 8.9 MW. No transmission lines are included within the project.

The Graham dam is about 4 miles upstream from the Ellsworth dam. The dam is about 25 feet high, and consists of an earth dike, about 550 feet long, and a concrete spillway, about 80 feet long. Three Taintor gates and a log sluice gate are located on the spillway. The upper reservoir, Graham Lake, has a normal maximum surface area of 9,025 acres and a maximum length of about 10 miles. There is no powerhouse associated with the dam and the lake.

The project is operated in peaking mode; no change in project operation is proposed, other than to maintain a seasonal minimum flow downstream from the project dams. The applicant currently has no plans for further development of the Ellsworth Project for power generation.

##### 2. Proposed Mitigative Measures

The applicant proposes to install downstream fish passage facilities at the Ellsworth dam and to assist the city of Ellsworth in developing a riverside park.

#### B. Alternatives to the Proposed Project

The alternative to the proposed action is denial of a new license and cessation of project operation.

In the event of denial of a new license, the applicant estimates that the cost of replacement capacity and energy would be approximately \$43,000,000 (in 1987 dollars) for the first 30 years of the new license period. This estimate includes the capital costs of existing and new combustion turbines and existing oil-fired steam plants. Also included in the estimate are fuel costs (principally for imported oil) and operating and maintenance costs.

Other alternative sources of replacement power are purchasing Canadian hydropower and obtaining power from available cogeneration or from other small-power producers at avoided-cost rates.

The applicant has expressed concern about the future costs and reliability of the available replacement power purchases from Canadian hydro or from sources that depend upon imported oil.

Except for Canadian hydro, alternative replacement power sources would consume nonrenewable energy resources, principally oil, and would produce additional atmospheric pollution.

Accepting the applicant's estimate of the 30-year cost of \$43 million 1987 dollars for replacement power, the staff estimates that in 1987 dollars, the unit cost of replacement power for the year 1986 would have been \$0.0415 per kWh. In 1986, the project produced 34,493,700 net kWh of electrical energy at a unit cost of \$0.0101 per kWh.

#### IV. CONSULTATION AND COMPLIANCE

##### A. Agency Consultation

The Commission's regulations require prospective applicants to consult with appropriate resource agencies before filing an application for license. This constitutes an initial stage in compliance with the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, and other federal statutes. Prefiling consultation must be complete and must be documented in accordance with the Commission's regulations.

After the Commission accepts an application, concerned entities may submit formal comments during a public notice period. In addition, organizations and individuals may petition to intervene and to become a party to any subsequent proceedings. The Commission makes the comments provided by concerned entities part of the record and the staff considers the comments during the review of the proposed project. After the Commission issued a public notice of the application on December 16, 1985, the following entities commented on the application.

<u>Commenting entity</u>	<u>Date of letter</u>
Maine Office of Energy Resources	January 9, 1986
National Marine Fisheries Service	February 3, 1986
Department of the Army, New England Division Corps of Engineers	February 10, 1986
Maine Department of Marine Resources	February 13, 1986
Environmental Protection Agency	March 12, 1986
Department of the Interior	March 13, 1986

Permission to intervene was granted to the Maine Department of Environmental Protection (DEP). The applicant responded to the letters of comment on August 28, 1986.

## B. Water Quality Certification

The applicant requested water quality certification for the Ellsworth Hydroelectric Project on November 13, 1984. Pursuant to Commission Order No. 464, DEP was notified that the certification requirements of section 401 (a)(1) of the Clean Water Act 1/ were waived for the project and on April 2, 1987, DEP was invited to submit comments and recommendations on water quality. DEP issued a water quality certification for the Ellsworth Project on April 22, 1987. This environmental assessment for the Ellsworth Project directly addresses the concerns of DEP and makes recommendations to protect water quality consistent with DEP's concerns.

DEP recommended inclusion of license provisions regarding recreation and fisheries resources. These recommendations are outside the scope of Commission Order No. 464 because they do not provide for the protection of water quality. The environmental assessment prepared for this project adequately addresses the resource issues raised by DEP.

## V. ENVIRONMENTAL ANALYSIS

### A. Proposed Project

The staff's analysis shows that adverse effects of the proposed project on visual and socioeconomic resources would be insignificant.

#### 1. General Description of the Locale

The Union River Basin is characterized by numerous flat or gently rolling plains, a few high bedrock ridges and monadnocks, and a variety of lakes, ponds, and streams. Elevations in the basin range from sea level to a maximum of approximately 1,300 feet msl (Bangor Hydro-Electric Company, 1984, application, exhibit E).

Temperatures in the Union River Basin range from a mean minimum temperature in January of 14 degrees Fahrenheit (°F) to a mean maximum temperature in July of 70 °F. Prevailing westerly winds and cyclonic storms from the west and southwest bring most of the basin's precipitation. The average annual precipitation is about 43 inches. Precipitation is fairly uniform throughout the year, although coastal storms may bring periods of intense precipitation. In the coastal area, where the Ellsworth Project is located, the average annual snowfall is about 70 inches (Bangor Hydro-Electric Company, 1984, application, exhibit E).

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1/ 33 United States Code §1341(a)(1)(1982).

## 2. Geology and Soils

Affected Environment: The bedrock of the southern section of the Union River Basin consists of a wide zone of schist and gneiss intruded by great masses of granite. The overburden throughout the basin consists of glacial till aqueo-glacial outwash, and marine sediments. While the glacial till covers most of the bedrock in the region, extensive areas of till have in turn been buried by subsequent glacial outwash and marine materials. These materials, consisting of sand and gravel, form numerous and extensive outwash plains, deltas, kaines, and eskers. Many of the flat, swampy areas in the basin are largely the result of graded material washed out by the retreating glacier (Bangor Hydro-Electric Company, 1984, application, exhibit E).

Soils in the Union River Basin consist mainly of marine clays in the low-lying areas, with glacial tills above. The tills are of a coarse sandy or stony nature, are well to excessively drained, and contain hardpan about 2 to 3 feet below the surface. In the southern portion of the basin, these coarse acid tills originated from granite (Baum, 1982).

Environmental Impacts and Recommendations: Soils in the project area are highly erodible, and shoreline erosion was a problem around Graham Lake in the past, especially when the reservoir surface elevation was higher than 104 feet msl. In response to the concerns of owners of seasonal residences around Graham Lake, the applicant developed an operating rule curve (figure 3) that limited the normal maximum surface elevation to 104.2 feet msl. The applicant started operating Graham Lake according to this rule curve in 1980. DEP states that available evidence from the past 7 years indicates that the current mode of project operation is not resulting in unreasonable shoreline erosion.

To verify that project operation is not accelerating shoreline erosion, the licensee should conduct a study to determine the effectiveness of the water elevation management plan in controlling shoreline erosion.

Unavoidable Adverse Impacts: There would be minor, long-term erosion from wave and ice action on the shores of Graham Lake and its islands.

## 3. Water Resources

Affected Environment: The Union River, about 65 miles long, is located on the central Maine coast. The drainage area is about 546 square miles, and is bordered by coastal rivers and by the Gulf of Maine to the south, the Penobscot River basin to the west and north, and the Narraguagus River basin to the east.

The Ellsworth Project creates two impoundments on the Union River, Lake Leonard and Graham Lake. The Ellsworth dam, located on the mainstem near its tidal outlet, forms Lake Leonard, which has a surface area of about 90 acres at normal pool elevation (66.7 feet msl), a width of approximately 0.3 mile, and a maximum length of about 1.25 miles.

Graham dam impounds the Union River about 4 miles upstream of Ellsworth dam and creates Graham Lake, which has 9,025 surface acres at normal maximum surface elevation (104.2 feet msl), a maximum width of 2.75 miles, and a maximum length of approximately 10 miles. The Union River at Ellsworth dam has an average annual flow of 550 cubic feet per second (cfs).

Before 1986, minimum flows from Ellsworth dam and Graham dam consisted of leakage, estimated at 33 cfs and 22 cfs, respectively. In 1986, the applicant began releasing a continuous minimum flow of 105 cfs from each dam. The applicant currently operates the project as a peaking facility, depending on available inflows, and uses all available river flows 99 percent of the time. During the summer, the project operates for 2 to 4 hours a day; during the winter, about 6 to 8 hours a day; and during high-flow conditions (primarily in the spring and fall), up to 24 hours a day. Timed releases from Graham Lake are used at Ellsworth dam for power production. These releases result in minor (approximately 1 foot) surface elevation changes in Lake Leonard and greater changes (approximately 10 feet) in Graham Lake, as a result of operation within an operating rule curve established for Graham Lake.

Upstream from the Ellsworth Project, there are five retired, unlicensed hydroelectric projects and one operating, licensed project. The licensed project is the Green Lake Project, FERC No. 7189, which is located at the Green Lake National Fish Hatchery, on Reeds Brook between Green Lake and Graham Lake. (See figure 1.) Branch Lake, which is an impoundment of Branch Lake Stream, a tributary of Lake Leonard, provides water to the Ellsworth Water Company for domestic use (Bangor Hydro-Electric Company, 1984, application, exhibit E). Branch Lake has a usable storage capacity of 14,100 acre-feet (Federal Power Commission, 1965).

The water quality in the Union River in the project vicinity is good to poor. The water of Graham Lake and the water just below Graham dam, at Ellsworth Falls (a series of rapids, approximately midway between Ellsworth dam and Graham dam), meet the state's required class B-2 water quality standards. Class B-2 water is acceptable for recreational purposes, including water-contact recreation, for industrial and potable water supplies after adequate treatment, and for fish and wildlife habitat. The dissolved oxygen (DO) content must exceed 5 parts per million or 60 percent saturation, whichever is higher. From the area of the Union River below Ellsworth Falls to tidewater, water quality meets the

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state's required class C standards. Class C water is acceptable for recreational boating and fishing, for fish and wildlife habitat, and for other uses, except potable water supplies and water-contact recreation. The DO content of class C water must not be less than 5 parts per million. Water in the Union River below tidewater meets the state's required class SB-1 standards, for which water must be suitable for all clean water uses, including water-contact recreation, harvesting and propagation of shellfish, and fish and wildlife habitat.

Environmental Impacts and Recommendations:

Shoreline Erosion and Reservoir Turbidity

Water level changes in the impoundments could cause shoreline erosion and property loss, and because of related suspended sediment increases, could result in adverse changes to water quality. DEP states that wave action and high water levels have resulted in significant shoreline erosion problems along Graham Lake. The applicant modified the Graham Lake operating rule curve by 1 foot (from a normal maximum surface elevation of 105.2 feet msl to 104.2 feet msl) in an effort to minimize the problem. DEP states that this limit on the surface elevation appears adequate for managing shoreline erosion, and recommends that the applicant maintain the Graham Lake surface elevation within 104.2 feet msl and 92.4 feet msl, according to the applicant's proposed operation curve. To minimize shoreline erosion and turbidity in Lake Leonard, DEP recommends that the applicant maintain the level of Lake Leonard within 1 foot of the crest of the Ellsworth dam flashboards; that is, between 65.7 feet msl and 66.7 feet msl.

If impoundment elevation is not managed properly, the increase in suspended sediment levels would adversely impact water quality in nearshore areas. The proposed water surface elevation limits and the proposed rule curve would minimize shoreline erosion and changes in water quality. To protect water quality in Graham Lake and in the Union River, the licensee should operate Graham Lake according to the licensee's proposed operating rule curve, between elevations 104.2 feet msl and 93.4 feet msl, to the maximum extent possible. For the protection of water quality in Lake Leonard, the licensee should also maintain the level of the lake within 1 foot of the flashboard crest elevation, between 66.7 and 65.7 feet, to the maximum extent possible. To ensure that the proposed operating rule curve would adequately protect the water quality of Graham Lake, the licensee should establish a monitoring program to verify that the proposed impoundment elevation limits provide adequate protection for shorelines and water quality.

Unavoidable Adverse Impacts: There would be some increase in suspended sediment from wave and ice action on shoreline areas.

#### 4. Fishery Resources

Affected Environment: The Union River supports resident populations of warmwater and coldwater fish. Graham Lake has smallmouth bass (Micropterus dolomieu), chain pickerel (Esox niger), and white perch (Morone americana) populations, and occasional coldwater fish, including brown trout (Salmo trutta) and brook trout (Salvelinus fontinalis). The Union River between the Ellsworth and Graham dams has a variety of habitats, including riffles, runs, and pools, which primarily support smallmouth bass. Lake Leonard also has smallmouth bass, chain pickerel, and white perch. The river below the Ellsworth dam is tidal, and freshwater fish found there come from occasional movement from upstream populations of white perch, brown trout, and brook trout.

Before dams were constructed, the Union River supported runs of anadromous Atlantic salmon (Salmo salar), alewife (Alosa pseudoharengus), and American shad (A. sapidissima). The Union River is included in plans for restoration of Atlantic salmon to Maine (Beland, 1984). At present, the Atlantic Sea-Run Salmon Commission (ASRSC) manages the Union River to produce up to 250 adult salmon broodstock a year and to support a limited sport fishery below Ellsworth dam. ASRSC owns a fish-trapping facility at the base of Ellsworth dam. Adult salmon trapped at the facility are used as broodstock at the Green Lake and Craig Brook National Fish Hatcheries, which are operated by the U.S. Fish and Wildlife Service (FWS). The long-term goal of the ASRSC is to restore a self-sustaining run of salmon to the Union River, which has an estimated run potential of 1,000 adult salmon.

The Union River also currently supports a small alewife run. The run is a result of residual stocks from below Ellsworth dam, strays from tributary runs, and since 1933, fish trapped at Ellsworth and stocked in Graham and Leonard Lakes. The alewife population is currently harvested and managed by the city of Ellsworth, with the approval of the Maine Department of Marine Resources (DMR). The goal of DMR is full use of upstream habitat, which has the potential to produce an estimated 1 million pounds of fish a year.

#### Environmental Impacts and Recommendations:

##### Reservoir Fishery Resources

Operation of hydroelectric projects may cause changes in their associated impoundments that could adversely affect fish and wildlife resources in nearshore and shoreline areas. Depending on the time of year and the extent of the habitat affected, water-level fluctuations could have a significant adverse impact on fish resources through dessication, freezing, and increased turbidity in areas used by fish for cover, spawning, and rearing. DEP states that the surface area of Graham Lake varies by approximately 2,000 acres, when operated between the proposed elevations of 93.4 feet and 104.2 feet msl. The applicant states that there are no indications that present water level management is causing any problems



or limiting the smallmouth bass population. For the past 50 years, populations of sport fish in Graham and Leonard Lakes have been subject to water level management similar to that now proposed. During that time, resource agencies and the public have not raised concerns about the effects of water level fluctuations, and the available evidence suggests that the lakes support good sport fish populations. However, an opportunity exists for enhancement by minor alterations to the operating curve to further minimize impacts to fish resources, particularly during the spawning season. The licensee should monitor the effects of water level changes due to project operation on fish resources in Graham Lake, and if appropriate, adjust it for enhancement of the sport fishery.

#### Minimum Flow Releases

Minimum flow releases from the project dams are needed to maintain fish habitat, to facilitate anadromous fish migration, and to protect downstream water quality. The Department of the Interior (Interior) recommends that the applicant provide an instantaneous release from both dams of 105 cfs or the inflow to the project, whichever is less, based on the historical median August flow in the Union River at Ellsworth. DEP states that a minimum continuous flow release of 105 cfs at all times would minimize the chlorine residual toxicity from the city of Ellsworth's sewage effluent in the Union River below the Ellsworth dam. DEP and the National Marine Fisheries Service (NMFS) recommend that the applicant release from both dams an instantaneous flow of 105 cfs from July 1 through April 30 and 250 cfs from May 1 through June 30. DEP and NMFS also recommend that the applicant evaluate the adequacy of the minimum flow release of 250 cfs in maintaining anadromous fish resources and in the collection of salmon broodstock and after 5 years of implementation, if appropriate, revise the minimum flow releases. The applicant has proposed to release the minimum flows recommended by DEP and NMFS.

Historically, minimum flows from Ellsworth dam and Graham dam have consisted of uncontrolled leakage, estimated at 33 cfs and 22 cfs, respectively. Since July 30, 1986, the applicant has released a continuous minimum flow of 105 cfs from both dams. A minimum continuous flow of 105 cfs, the aquatic base flow (ABF), at all times below the Ellsworth and Graham dams would provide protection for fishery resources and maintain water quality.

During May and June, anadromous fish attempting to migrate up the Union River congregate below the Ellsworth dam. Both Atlantic salmon and alewives are present. Since salmon cannot be efficiently trapped until the alewife run is over, early-run salmon must remain below the dam. While salmon are holding below the dam, they would be vulnerable to fishing, especially at low flows, and may leave the river to seek alternative spawning habitat. At low flows, low oxygen concentrations would adversely affect holding fish during periods of low tide, high temperatures, particularly when a large run of alewives is present. A minimum continuous flow of 250 cfs exceeds twice the ABF and would provide

adequate cover and oxygen to protect anadromous fish. To protect fish resources in the Union River, the licensee should provide an instantaneous continuous release of 105 cfs from Ellsworth dam and from Graham dam from July 1 through April 30. To protect anadromous fish resources, the licensee should provide an instantaneous release of 250 cfs from both dams from May 1 through June 30. To ensure that such flows are appropriate, the licensee should monitor the effectiveness of these flows for the protection of fish resources, and if necessary, should provide recommendations to protect or to enhance those resources.

#### Fish Passage

The project dams currently block anadromous fish passage. An effort to restore anadromous fish is underway, supported by the trapping facility owned by ASRSC at the Ellsworth dam. The city of Ellsworth also employs the trap for commercial alewife harvest and its upstream stocking program.

NMFS states that the fish trapping facility at the Ellsworth dam is inadequate for anadromous fish passage, and that the facility should be modified to improve efficiency. Because large alewife runs collected at the trap may interfere with salmon collection, however, NMFS recommends that new upstream passage facilities be constructed at the Ellsworth Project to accommodate returning Atlantic salmon. Interior recommends that the applicant design, construct, operate, and maintain adequate upstream and downstream facilities for migratory fish. In a letter dated October 14, 1987, Interior, under section 18 of the Federal Power Act (Act), filed a "Reservation of Authority to Prescribe Fishways" at the Ellsworth Hydroelectric Project. 1/

DMR recommends that the existing fish trap facility be modified to improve trapping efficiency to obtain adult salmon and alewives for upriver stocking. DMR also recommends that in the event the city of Ellsworth does not continue to accept responsibility for stocking of alewives, the applicant should provide for upstream passage of alewives.

DEP recommends that the applicant modify the existing fish trap to accommodate projected annual runs of alewives and salmon and to provide for upstream stocking of alewives, should the city of Ellsworth discontinue its current stocking effort. DEP further recommends that the applicant provide upstream passage from the trapping facility for any adult salmon in excess of the 250 fish needed for hatchery broodstock.

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1/ Section 18 of the Act provides: "The Commission shall require the construction, maintenance, and operation by a licensee at its own expense of . . . such fishways as may be prescribed by the Secretary of Interior or the Secretary of Commerce as appropriate."

DEP recommends that the applicant provide downstream passage for salmon 30 months after at least 25 female and 12 male Atlantic salmon are stocked above Graham Lake. The applicant states that if the city of Ellsworth discontinues its stocking program, the applicant will modify the trapping facility to improve trap efficiency for upstream passage, provide for downstream alewife passage at the Ellsworth dam, and stock adult alewives in the project reservoirs.

The use of the existing fish trap below Ellsworth dam for alewife harvest and restoration stocking, while important for achieving ASRSC short-term management objectives, is inadequate for upstream anadromous fish passage. Modifying the trap could improve its efficiency in collecting adult salmon broodstock and alewives for upstream passage, but it would be at the expense of increased incompatibility with salmon collection as alewife run size increases. Also, as the long-term restoration goal of approximately 1,000 salmon is pursued, the usefulness of the trap in achieving this goal would decrease further. To protect and enhance anadromous fish resources in the Union River, the licensee, as prescribed by Interior and the Secretary of Commerce, should construct, operate, and maintain upstream and downstream fish passage facilities at the Ellsworth and Graham dams. For the protection of Atlantic salmon resources, the licensee should provide for the continued collection of salmon broodstock, and should monitor the effectiveness and efficiency of the facilities to ensure successful fish passage at the dams.

Unavoidable Adverse Impacts: During project operation, some injury and mortality to resident and anadromous fish could result from passage through the turbines.

## 5. Terrestrial Resources

Affected Environment: The plant associations of the project area are generally shown in figure 4. Lake Leonard is bordered on the east by a marsh. Typical wetland plant species are common cattail (Typha latifolia), arrowheads (Sagittaria spp.), sedges (Carex spp.), and softstem bulrush (Scirpus validus). The marsh is bordered by a forest composed of willows (Salix spp.), birches (Betula spp.), alders (Alnus spp.), and maples (Acer spp.). At higher elevations, the species composition of the forest is that of a mature white pine (Pinus strobus)-mixed hardwood forest. Typical hardwood species are red oak (Quercus rubra), white ash (Fraxinus americana), black ash (F. nigra), American beech (Fagus grandifolia), sugar maple (Acer saccharum), and paper birch (Betula papyrifera).

The banks on the west side of Lake Leonard are steeper and support a mixed pine-hardwood forest.

Marshes also occur along the eastern shore of Graham Lake. Typical wetland plant species are cattail, softstem bulrush, arrowhead, pickerelweed (Pontederia spp.), sedges, and meadowsweet spiraea

(Spiraea spp.). Timber was harvested recently on the east side of Graham Lake, and the area is now occupied by a transitional forest, composed of pioneer tree species, such as quaking aspen (Populus tremuloides), balsam poplar (Populus balsamifera), gray birch (Betula populifolia), and cherry (Prunus spp.).

Northwest of Graham Lake, barrens occur, surrounded by a mixed pine-hardwood forest. The barrens are areas where a thin layer of topsoil covers ledge and the vegetation consists of low-growing plants, such as grasses, blueberry (Vaccinium spp.), and common yarrow (Achillea millefolium). The barrens are fringed with aspens and poplars.

Soreal forest areas occur on the north end and on the east side of Graham Lake. Typical boreal forest tree species are tamarack larch (Larix laricina), northern white cedar (Thuja occidentalis), and black spruce (Picea mariana). Highbush blueberry (V. corymbosum) and sphagnum moss (Sphagnum spp.) are characteristic understory species.

The islands in Graham Lake comprise bog habitat. Black spruce and white pine are typical tree species found in this habitat. The understory contains shrubs, such as bog kalmia (Kalmia polifolia), and sedges. The islands are surrounded by emergent wetlands, composed of cattails, arrowhead, and pickerelweed.

Big game species occurring in the project area are black bear (Ursus americanus), moose (Alces alces), and white-tailed deer (Odocoileus virginianus). Other game species include American woodcock (Scolopax minor), ruffed grouse (Bonasa umbellus), Canada goose (Branta canadensis), green-winged teal (Anas crecca), blue-winged teal (A. discors), mallard (A. platyrhynchos), and American black duck (A. rubripes).

Environmental Impacts and Recommendations: Federal, state, and local agencies have not identified any adverse effect of project operation on botanical or wildlife resources, and the staff does not anticipate that relicensing of the project would have any adverse effect. The measures that the staff recommends to protect anadromous and resident fish in the project area (section on fishery resources) would indirectly benefit wildlife species whose diets include fish. The release of the minimum flows recommended by the staff might benefit marsh habitat and associated wildlife downstream from Graham dam.

Unavoidable Adverse Impacts: None.

## 6. Threatened and Endangered Species

Affected Environment: Bald eagles (Haliaeetus leucocephalus), which are federally listed as endangered, have three nesting territories near the project, two of which are on Graham Lake. Eagles from these territories and transient eagles would be expected in

the project area. No other threatened or endangered species is known to occur in the project area.

Environmental Impacts and Recommendations: FWS states that it does not anticipate that continued project operation would affect bald eagles adversely (letter from Bruce Blanchard, Director, Office of Environmental Project Review, Department of the Interior, Washington, D.C., March 13, 1986). The staff agrees, because eagles nest on Graham Lake under existing conditions and issuance of a new license would not affect those conditions. The applicant proposes recreational development at Lake Leonard, but not at Graham Lake. (See the section on recreation and other land and water uses.) Therefore, there would be no loss of eagle habitat caused by land clearing for recreational facilities, and no disturbance of eagles because of noise and human activity. Further, the measures that the staff recommends to protect anadromous and resident fish in the project area (section on fishery resources) would indirectly benefit bald eagles, for whom fish are a major food source.

Unavoidable Adverse Impacts: None.

## 7. Cultural Resources

Affected Environment: The applicant has conducted a cultural resources survey of the project area and found no properties in the project area that are listed on or eligible for listing on the National Register of Historic Places (Bourque and Kopec, 1984). The Maine State Historic Preservation Officer (SHPO) has reviewed the results of the survey and agrees that continued project operation would not affect National Register listed or eligible properties (letter from Earle G. Shettleworth, Jr., State Historic Preservation Officer, Maine Historic Preservation Commission, Augusta, Maine, October 31, 1984). The results of the survey and of the SHPO's concurrence with the no-effect determination are based on the proposed method of operation described in the application for a new license and in the applicant's subsequent filings.

Environmental Impacts and Recommendations: The SHPO's comments on the proposed relicensing of the project contemplate that the project would be operated as described in the application without significant changes. Changes to the project are occasionally found to be necessary after a license has been issued, and may require an application to amend the license. Under these circumstances, whether or not an application for amendment of license is required, the survey results and the SHPO's comments would no longer reliably depict the cultural resources impacts that would result from continued project operation. Therefore, before beginning land-clearing or land-disturbing activities within the project boundaries, other than those specifically authorized in the license and previously commented on by the SHPO, the licensee should consult with the SHPO about the need to conduct archeological or historical survey and to implement further avoidance or mitigative measures.

Also, land-clearing and land-disturbing activities could adversely affect archeological and historic properties not identified in the cultural resources survey. Therefore, if the licensee encounters such sites or properties during the development of project facilities, the licensee should stop land-clearing and land-disturbing activities in the vicinity of the sites or properties, should consult with the SHPO on the eligibility of the properties, and should carry out any necessary measures to avoid or to mitigate effects on the properties.

Sixty days before starting land-clearing or land-disturbing activities associated with any changes to the project, both proposed and necessitated, and 60 days before resuming land-clearing and land-disturbing activities in the vicinity of the sites or properties discovered, the licensee should file a plan and a schedule for conducting the appropriate studies, along with a copy of the SHPO's written comments on the plan and the schedule. The licensee should not start or resume land-clearing or land-disturbing activities, other than those specifically authorized in the license and commented on by the SHPO, or resume such activities in the vicinity of an archeological or historic property discovered during construction, until informed by the Commission that the requirements discussed above have been fulfilled.

Unavoidable Adverse Impacts: None.

#### 8. Recreation and Other Land and Water Uses

Affected Environment: Land use around Lake Leonard is primarily undeveloped woodland interspersed with residences. Most of the residential development is on the east side of the Union River and Lake Leonard. Residential development is more pronounced downstream and upstream of the Ellsworth dam.

Land use around the much larger Graham Lake is primarily residential, with a large percentage being seasonal dwellings.

Outdoor recreational uses at Graham Lake include boating, fishing, swimming, and camping. The total annual recreational use is estimated at 5,000 visitors, with a peak day use of 100 visitors. Most of the recreational use at Graham Lake is from residents of private vacation camps located adjacent to the project. There is an existing public boat-launching ramp, developed by the applicant, on project land adjacent to Graham dam.

Environmental Impacts and Recommendations: Relicensing of the Ellsworth Project would not have any environmental impact on recreation and land and water uses.

Although no specific recreational needs have been identified, the applicant entered into a memorandum of understanding (MOU) with the city of Ellsworth in 1984 to assist in the development of a park adjacent to Lake Leonard and the Union River downstream from Ellsworth dam. Plans for the park include nature trails, picnic

areas, boat and canoe launch facilities, a boat dock, a swimming area, and parking areas. The MOU states that the applicant would grant easements to the city of Ellsworth for access across project lands to trails and boat-launching facilities the city plans to install on the east side of the river, and to a canoe-launching facility the city would install on the west side of the river, downstream from the powerhouse. The MOU also states that the applicant would provide the following recreational improvements: (1) a safety boom, upstream from Ellsworth dam; (2) a security gate at the boat-launching facility the city plans to build on Lake Leonard; (3) a security fence, 300 feet long, in the area of the east abutment of Ellsworth dam; and (4) a plaque explaining project operation.

Interior states that the park that the applicant and the city of Ellsworth would develop should be adequate for meeting present recreation needs. Interior recommends that the applicant complete the proposed facilities within 2 years from the date of issuance of a new license, should include within the project boundary all lands developed or proposed for recreational development, and should develop an operation and maintenance schedule or implement an agreement for operation and maintenance services. DEP recommends that the applicant develop a specific plan to provide recreational facilities in accordance with the MOU.

The Report on Recreational Resources does not include a schedule showing when the applicant proposes to complete construction of the safety boom, security gate and fence, and informational plaque. The MOU specifies that the applicant would construct the safety boom and security gate after the city of Ellsworth completes the planned trail and boat landing, and would construct the security fence after the city completes the trails. The staff concedes that it is sensible to tie the timetable to when other recreational development by the city necessitates the safety and security measures. The staff agrees with Interior, however, that the licensee should provide a schedule for installing the proposed facilities. If the licensee believes that the city may not develop the park in a timely fashion, and that consequently, a definite schedule cannot be formulated, the applicant should consider other recreational development that can be implemented independently of action by the city. Therefore, the licensee should file a revised Report on Recreational Resources, including a specific recreation plan, prepared in coordination with the city of Ellsworth, the National Park Service, and the Maine Bureau of Parks and Recreation. The plan should identify the entities responsible for constructing, operating, and maintaining any existing or proposed facilities and should include any agreements for operation and maintenance services.

Sheet 6 of exhibit G shows the existing Graham Lake boat-launching facility and some of the recreational facilities that the applicant and the city of Ellsworth would install along Lake Leonard. The drawing does not, however, distinguish between facilities the applicant proposes to install and the facilities the city plans to install. Also, the drawing does not show the safety boom, the

security gate, and the informational plaque, or the location of lands reserved for future recreational development, such as for the swimming area and boat dock. Therefore, the licensee should include in the revised Report on Recreational Resources maps or drawings clearly showing the design and location of all existing and proposed recreational facilities, and all lands reserved for future recreational development.

Unavoidable Adverse Impacts: None.

#### B. Alternative of No Action

Under the no-action alternative, electrical power that would be generated by the Ellsworth Project would have to be generated from other available sources or offset by conservation measures. The applicant also could not carry out its proposal to install fish passage facilities and a riverside park.

#### C. Recommended Alternative

The proposed project is preferred over the no-action alternative, because the purpose of the project can be achieved without significant environmental impacts.

### VI. FINDING OF NO SIGNIFICANT IMPACT

Continued operation of the project would result in some injury and mortality of resident and anadromous fish, caused by passage through the turbines. There would be minor, long-term erosion and turbidity from wave and ice action on the shores of Graham Lake.

This environmental assessment was prepared in accordance with the National Environmental Policy Act of 1969. On the basis of the staff's independent environmental analysis, issuance of a license for the Ellsworth Hydroelectric Project would not constitute a major federal action significantly affecting the quality of the human environment.

### VII. LITERATURE CITED

Bangor Hydro-Electric Company. 1984. Application for license for the Ellsworth Project, FERC No. 2727, Maine. Bangor, Maine.

Baum, E.T. 1982. The Union River: an Atlantic salmon river management report. Maine Atlantic Sea-Run Salmon Commission. Bangor, Maine. 60 pp.

Beland, K.F. 1984. Management of Atlantic salmon in the state of Maine: a strategic plan. Maine Atlantic Sea-Run Salmon Commission. 71 pp.

Bourque, B.J., and D.R. Kopec. 1984. An evaluation of the dam pool impact on sites 58.1 and 58.10, Ellsworth, Maine. Maine State Museum. June 8, 1984. 40 pp.



Federal Power Commission. 1965. Planning status report: New England coastal areas. Washington, D.C. 12 pp.

VIII. LIST OF PREPARERS

Dianne Rodman--EA Coordinator; Geology and Soils, Terrestrial Resources, and Threatened and Endangered Species (Ecologist; M.S., Biology).

Robert Kirby--Recreation (Environmental Protection Specialist; M.S., Geography, City and Regional Planning).

Frank Miller--Purpose, Need for Power, and Alternatives to the Proposed Project (Electrical Engineer; D.E., Electrical Engineering).

John Mitchell--EA Editor (Writer-editor; B.S., Social Sciences).

William Perry--Water and Fishery Resources (Fishery Biologist; Ph.D., Biology).

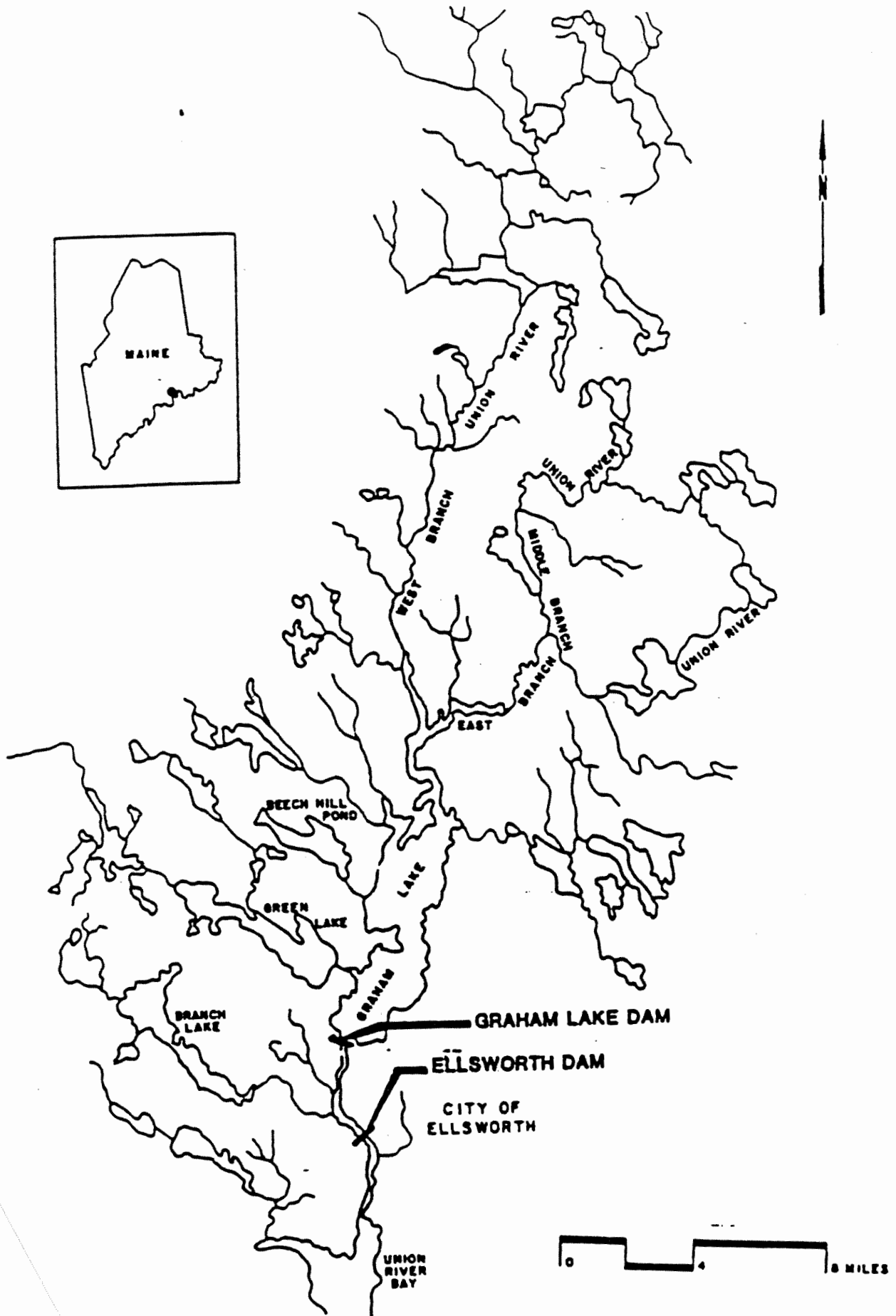


Figure 1. Location of the Ellsworth Project, FERC No. 2727, Maine (Source: the staff, modified from Bangor Hydro-Electric Company, 1984).

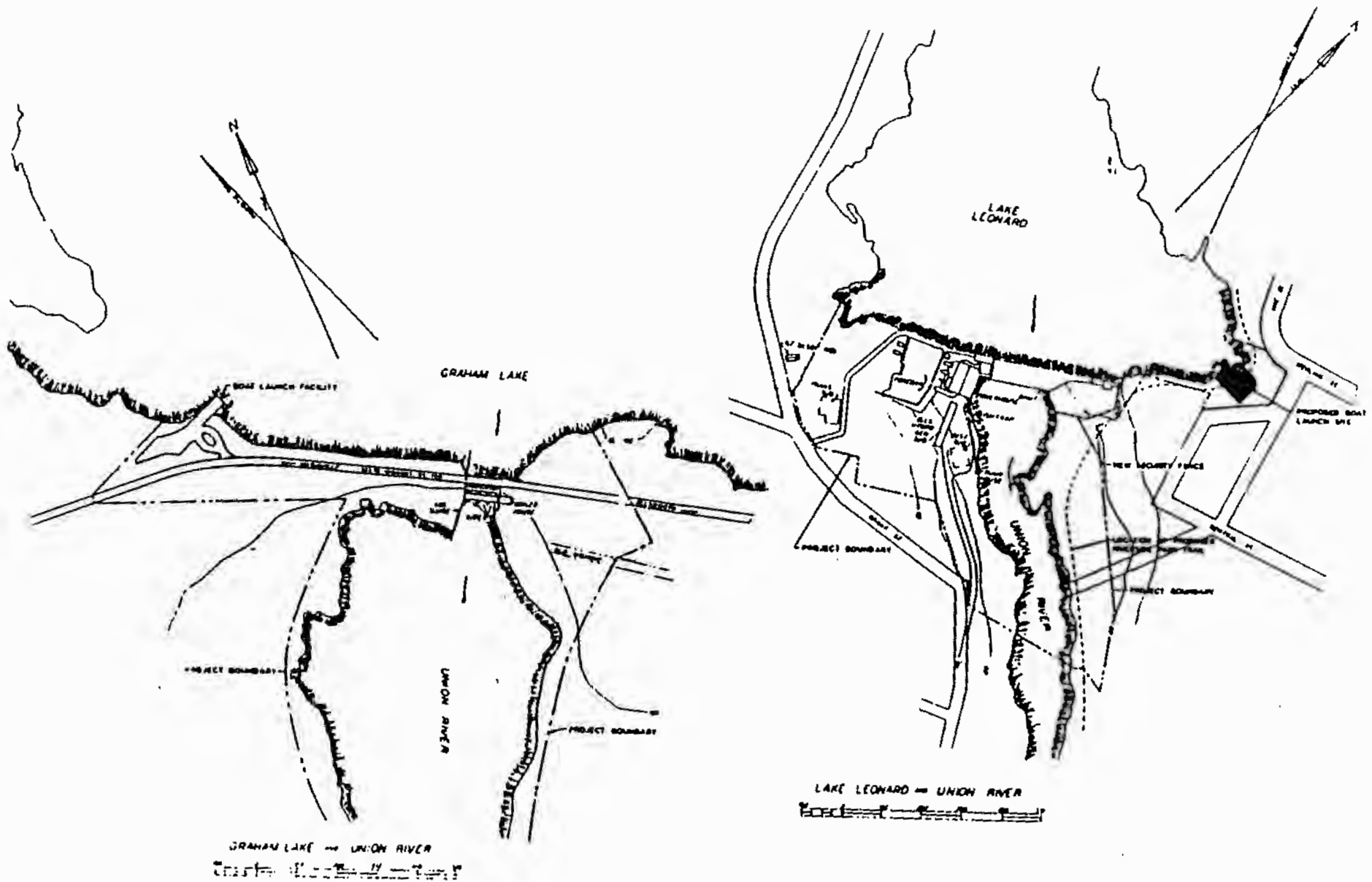


Figure 2. Features of the Ellsworth Project, FERC No. 2727, Maine (Source: the staff, modified from Bangor Hydro-Electric Company, 1984).

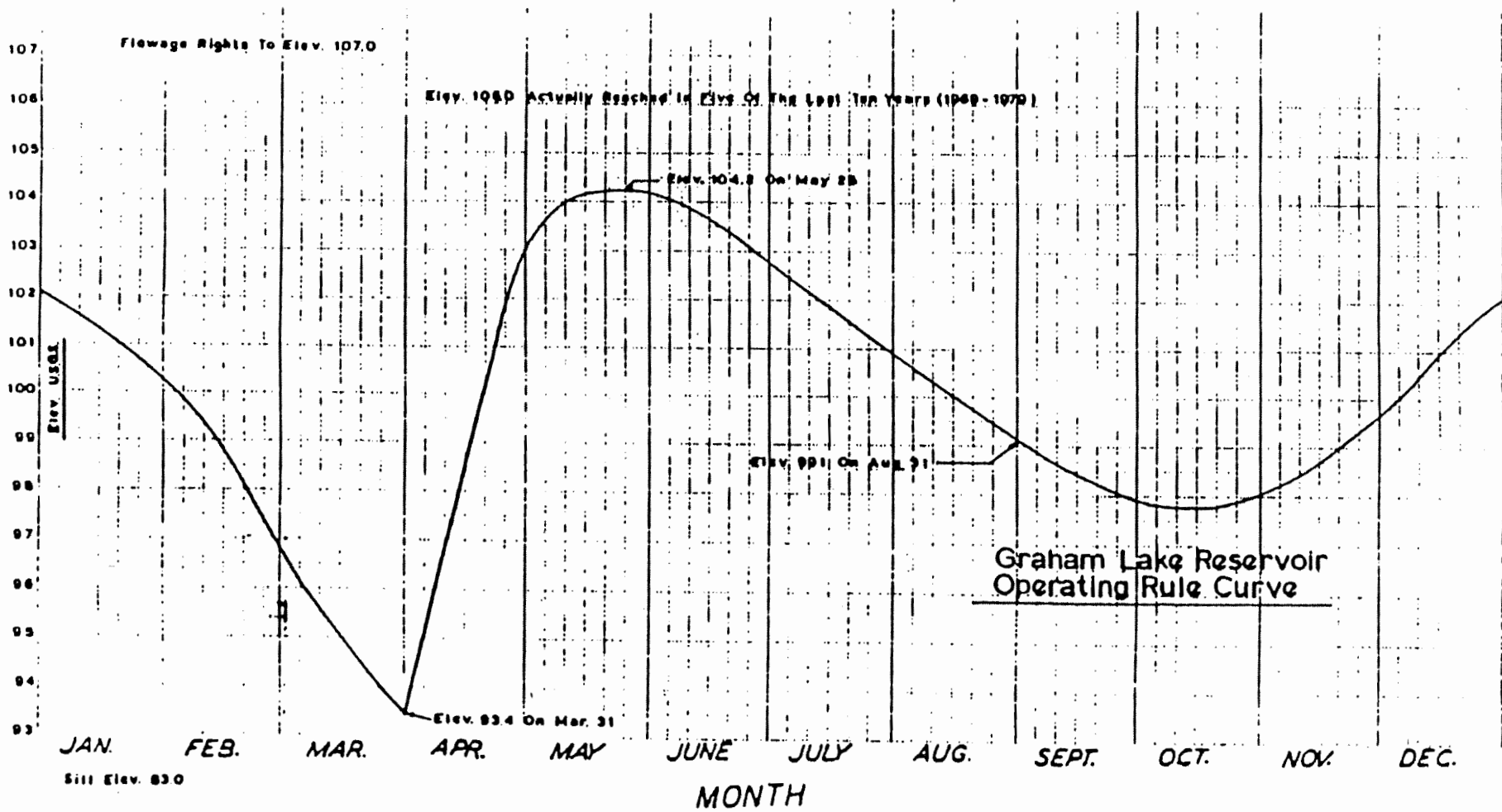









Figure 3. Proposed rule curve for operation of the Ellsworth Project, FERC No. 2727, Maine (Source: the staff, modified from Bangor Hydro-Electric Company, 1984).

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LEGEND

- |   |   |
|---|---|
|  SMALL PINE / HARDWOOD FOREST |  BOREAL FOREST       |
|  MATURE HARDWOOD FOREST       |  BOG                 |
|  BARRENS                      |  TRANSITIONAL FOREST |
|  MARSH                       |   |

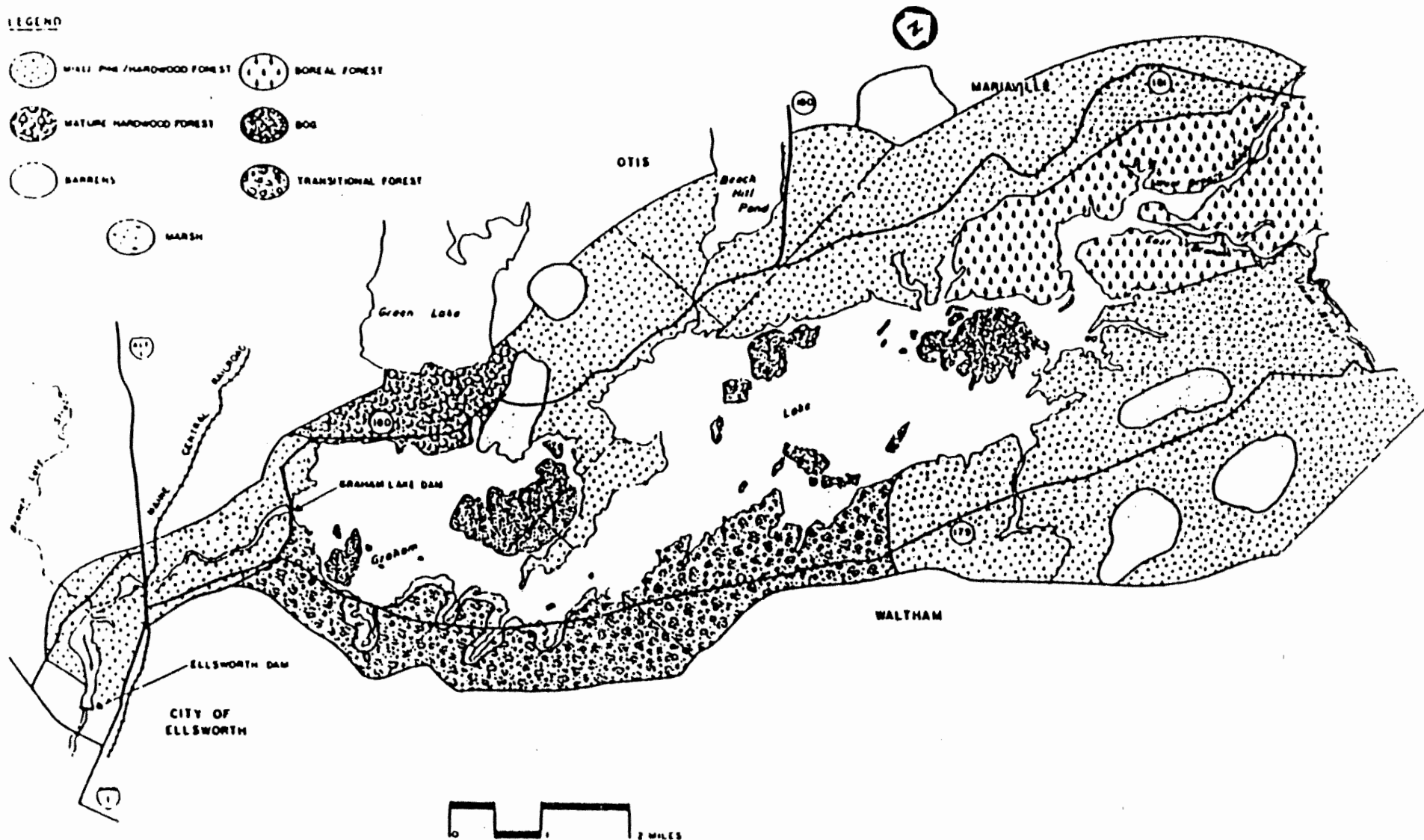


Figure 4. Vegetation types in the vicinity of the Ellsworth Project, FERC No. 2727, Maine (Source: the staff, modified from Bangor Hydro-Electric Company, 1984).

SAFETY AND DESIGN ASSESSMENT  
ELLSWORTH HYDROELECTRIC PROJECT  
FERC NO. 2727-003 - ME  
(RELICENSING)

DAM SAFETY

The Ellsworth Hydroelectric Project is located on the Union River, in the City of Ellsworth, Hancock County, Maine.

The initial license was issued in 1977, with an effective date of January 1, 1938 and expiration date of December 31, 1987. The Bangor Hydro-Electric Company (Bangor) filed the application for a new license for the continued operation of the project on December 19, 1984.

The Ellsworth Hydroelectric Plant and its two dams, the lower Ellsworth Dam and the upper Graham Dam, which are owned by the applicant, were inspected by the Commission's New York Regional Office (NYRO) on May 7, 1987. The Regional Director reported that both dams are classified as high hazard. The Ellsworth Dam is an Ambursen reinforced concrete dam, and would be overtopped by 19 feet of water during a Probable Maximum Flood (PMF) of 252,900 cfs. Field inspection and stability analysis made by the applicant indicates that the forebay wall would fail during the early stages of dam overtopping. The Graham Dam is an earthen structure, and would be overtopped by 8.5 feet of water during a PMF of 252,000 cfs. The applicant is assuming that the Graham Dam would also fail due to overtopping by the PMF.

The second consultant's safety inspection report filed on March 21, 1984, is currently under review by staff. Several questions regarding the safety of the project have been addressed. The consultant has determined that failure of Graham Lake Dam under PMF flows would not cause a hazard downstream. However, the appropriate inflow design flood for this development has not yet been determined. In addition, the consultant has identified the need for field explorations to define the embankment strength parameters. If the spillway of the Graham Lake Dam cannot accommodate the inflow design flood, or if revised stability analyses based on the actual embankment strength parameters indicate the embankment does not have adequate safety factors under all credible loading conditions, the licensee will be required to propose and construct appropriate remedial measures. With regard to Ellsworth Dam, the consultant determined that the forebay walls would be unstable if overtopped and recommended that the walls be post-tensioned. The post-tensioning proposal is considered acceptable and the final design and plans and specifications are forthcoming. With the resolution of these dam safety concerns and the implementation of the necessary remedial measures the project would continue to be safe and adequate.

The Regional Director also reported that the project's impoundment structures appear to be in fair condition.

The basic design of the project would remain unchanged.

#### WATER RESOURCE PLANNING

The project is operated as a peaking plant. The applicant does not plan to modify the existing project facilities or change the operation of the project.

There are no current contracts or constraints which affect the manner in which the project is operated. A minimum flow of 90 cfs is released from the project to dilute the discharge from the Ellsworth municipal waste water treatment plant. The leakage flow from the Ellsworth Dam is 33 cfs, and is 22 cfs from the Graham Dam.

The hydraulic capacity of 2,300 cfs corresponds to the flow equalled or exceeded 4% of the time on the flow duration curve for the Union River. No additional increase of capacity is planned.

No specific State or Federal agency comments or recommendations were made addressing flood control, navigation, water supply, or irrigation requirements in the basin.

The New England Coastal Area Planning Status Report includes no projects, either proposed or constructed on the Union River that this project would impact. The project would not conflict with any pending applications for exemption, license, or preliminary permit.

Based on the above, Staff concludes that the Ellsworth Project adequately utilizes the available flow and head at the site and would not conflict with any existing or planned water resource developments in the basin.

#### CONSUMPTION EFFICIENCY IMPROVEMENT PROGRAM - Section 10(a)(2)(C)

Bangor Hydro-Electric Company first formed its Energy Conservation Department in 1980; and in 1985 reorganized this Department as the Energy Management Department, with broadened responsibilities which included procedures and programs designed to reduce peak demands for capacity as well as end-use conservation of energy. The goal of the Energy Management Department is to maintain existing conservation programs while working to find ways to actively manage the electricity consumption patterns for the utility's customers. The objective of this effort is to make more efficient use of existing generating capacity, to reduce or eliminate the need to increase costly generating capacity, and improve the value of the product to the customer.

The applicant has on-going and planned programs which include a comprehensive list of those programs which have been found to be cost-effective by many utilities. Thirteen of the applicant's conservation and demand-reduction programs are described in applicant's response to staff request for information on Applicant's Electricity Consumption Efficiency Improvement Program. The response is entitled "Bangor Hydro-Electric Company Energy Management Report," and is dated April 1987.

Based on a review of the above cited Report and a review of Section 6 (at page 45) of the "Annual Report of the Maine Public Utilities Commission" (dated February 2, 1987), Staff concludes that the applicant has made an acceptable good-faith effort to conserve electric energy, reduce the demand for new generating capacity and to comply with the objectives of Section 10(a)(2)(C).

EXHIBITS

The following portion of Exhibit A and the following Exhibit F drawings should be included in the new license:

Exhibit A. Pages A-2, A-4 through A-6 and Appendix A-1 consisting of 15 pages from A-7 through A-21, describing the mechanical, electrical and transmission equipment filed December 19, 1984.

<u>Exhibit F Drawings</u>	<u>FERC No. 2727-</u>	<u>Description</u>
1	1	Ellsworth Powerhouse and Dam Plan and Sections
2	2	Ellsworth Powerhouse and Dam Sections
3	3	Graham Lake Dam Plan and Sections



FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR CONSTRUCTED  
MAJOR PROJECT AFFECTING NAVIGABLE  
WATERS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project area and project works shall be in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Article 4. The project, including its operation and maintenance and any work incidental to additions or alterations authorized by the Commission, whether or not conducted upon lands of the United States, shall be subject to the inspection and supervision of the Regional Engineer, Federal Power Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him such information as he may require concerning the operation and maintenance of the project, and any such alterations thereto, and shall notify him of the date upon which work with respect to any alteration will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall submit to said representative a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of any such alterations to the project. Construction of said alterations or any feature thereof shall not be initiated until the program of inspection for the alterations or any feature thereof has been approved by said representative. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant

to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location

of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits

provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 13. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and

opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be

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reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. All clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. Material may be dredged or excavated from, or placed as fill in, project lands and/or waters only in the prosecution of work specifically authorized under the license; in the maintenance of the project; or after obtaining Commission approval, as appropriate. Any such material shall be removed and/or deposited in such manner as to reasonably preserve the environmental values of the project and so as not to interfere with traffic on land or water. Dredging and filling in a navigable water of the United States shall also be done to the satisfaction of the District Engineer, Department of the Army, in charge of the locality.

Article 22. Whenever the United States shall desire to construct, complete, or improve navigation facilities in connection with the project, the Licensee shall convey to the United States, free of cost, such of its lands and rights-of-way and such rights of passage through its dams or other structures, and shall permit such control of its pools, as may be required to complete and maintain such navigation facilities.

Article 23. The operation of any navigation facilities which may be constructed as a part of, or in connection with, any dam or diversion structure constituting a part of the project works shall at all times be controlled by such reasonable rules and regulations in the interest of navigation, including control of the level of the pool caused by such dam or diversion structure, as may be made from time to time by the Secretary of the Army.



Article 24. The Licensee shall furnish power free of cost to the United States for the operation and maintenance of navigation facilities in the vicinity of the project at the voltage and frequency required by such facilities and at a point adjacent thereto, whether said facilities are constructed by the Licensee or by the United States.

Article 25. The Licensee shall construct, maintain, and operate at its own expense such lights and other signals for the protection of navigation as may be directed by the Secretary of the Department in which the Coast Guard is operating.

Article 26. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 27. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 28. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.