

UNITED STATES OF AMERICA 58 FERC 62, 014
FEDERAL ENERGY REGULATORY COMMISSION

Bangor Hydro-Electric Company
Maine

Project No. 2727-024

ORDER AMENDING LICENSE
(ISSUED JANUARY 8, 1992)

On February 25, 1991, and amended on August 5, 1991, the licensee, Bangor Hydro-Electric Company, filed a request to revise the authorized project boundary of the Ellsworth Project, FERC No. 2727.

The licensee proposes to modify the authorized project boundary to include an additional 2 acres of land located downstream of the existing Graham Lake Dam. The change in the project boundary, which is shown on the revised exhibit G drawing filed on August 5, 1991, is necessary due to the required reconstruction of the Graham Lake Dam. The revised exhibit G drawing conforms to the Commission's rules and regulations.

Remedial repairs at the Graham Lake Dam are required to resolve instability problems in the western embankment and spillway section. The licensee proposes to extend the existing dam by constructing a concrete flood control structure along the downstream toe of the existing embankment and west of the existing gate structure. The proposed structure will act as an emergency spillway to back-up the existing unstable western embankment if the embankment is overtopped by flood waters in Graham Lake. The downstream extension would consist of a 300-foot-long overflow spillway, a 100 foot-long non-overflow spillway section, and a 450-foot-long embankment connecting the spillway to the west bank. The concrete flood control structure would be connected to the existing Graham Lake outlet gates by a wing wall extension and a permanent cofferdam cell, and to the existing embankment by an earthen berm and fill.

The licensee's construction of the proposed extension of Graham Lake Dam would require a 4.5-acre site (2.5 acres of land within the existing project boundary and 2 acres of adjacent private land) to accommodate the structure. The licensee's proposed project boundary revision would include the 2-acres of

private land. To accomplish the remedial repairs, the licensee also requires the temporary use of a construction laydown site, up to 11 acres in size. The licensee initially proposed to use a site adjacent to Graham Lake Dam, but is investigating other sites within a 2-mile radius of the dam. The temporary construction laydown site will not be incorporated into the project boundary.

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Public notice of the filing was issued on March 22, 1991, with May 10, 1991, as the last day to file comments or motions to intervene. The U.S. Department of the Interior (Interior) and the Maine Historic Preservation Commission (SHPO) filed comments on May 17, 1991 and April 12, 1991, respectively. Kenneth J. LaFlamme and Corda W. LaFlamme (LaFlammes) filed a timely motion to intervene on May 9, 1991. No protests or other motions to intervene were filed in this proceeding.

Intervention

The LaFlammes intervened because of their concern that the Commission's action on the licensee's proposed project boundary amendment would directly affect their interests. The LaFlammes own the 2-acre area proposed for inclusion in the project boundary, and the adjacent land area proposed for a construction laydown site. Specifically, the LaFlammes indicate that if the amendment is necessary for public safety reasons and a loss of property to the project is inevitable, they wish the development to go forward with a loss of as little land as possible. They also state that the proposed structure should be designed and built to have the least effect on the surrounding environment. Further, the LaFlammes indicate that the taking of 14 acres of their land for construction laydown would have a severe adverse environmental impact, diminish the value of their remaining land, and is not essential but merely a convenience.¹

The proposed remedial measures at Graham Lake Dam have been designed to limit the amount of additional land needed to the 2 acres proposed in this amendment. The licensee's proposed measures to restore the site following construction, and wetland mitigative measures being required herein, will minimize the environmental effects of constructing remedial measures. The proposed laydown site is no longer included in the amendment of project boundary.

1 The Laflamme's intervention states that the licensee needs 14 acres for construction related activities (i.e., a construction laydown site). The licensee, in its initial application filed on February 25, 1991, included an additional 14-acre adjacent area within its proposed revised project boundary. On August 5, 1991, the licensee amended its application to exclude the laydown site, and also revised the size of the laydown area to 11 acres. The laydown area is proposed to be located within 2 miles of the project site.

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Summary of Findings

After considering the environmental information in the application for amendment of license, the staff's independent environmental assessment (EA)², and other public comments, I find that issuance of this amendment is not a major federal action significantly affecting the quality of the human environment. The EA contains background information, analysis of impacts, support for related license articles, and the basis for a finding of no significant impact on the environment.

The Director orders:

(A) The following exhibit G drawing is approved and made a part of the license.

Exhibit	FERC No.	Title	Superseding
G-4	2727-23	Project Boundary Map	2727-21

(B) The superseded exhibit G drawing is eliminated from the license.

(C) The erosion and sedimentation control plan and measures for restoration of disturbed areas for the amendment of the Ellsworth Project, included in the licensee's filing dated September 26, 1991, are approved.

(D) The following article is added to and made a part of the project license:

Article 410. Within one year from the date of issuance of this order amending license, the licensee shall file with the Commission for approval, a wetlands mitigation plan to restore and replace wetland habitat disturbed and lost as a result of construction of the flood control structure.

The plan shall include, at a minimum:

- (a) details of the final plan to restore and replace the wetlands affected by the project;
- (b) a plan for monitoring the effectiveness of restoration and replacement measures, which

2 Environmental Assessment, Ellsworth Hydroelectric Project, Amendment of License, FERC Project No. 2727-024, Federal Energy Regulatory Commission, dated December 4, 1991. This document is available in the Commission's public files associated with this proceeding and is attached to this order.

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include steps to be taken in the event the measures are not effective, such as, but not necessarily limited to, modifying the techniques used for restoration and replacement, or establishing or enhancing additional wetlands; and

- (c) schedules for the proposed restoration and replacement of wetlands, for filing the results of the monitoring program, and for filing recommendations for alternative wetland mitigation.

The licensee shall prepare the plan after consultation with the U.S. Fish and Wildlife Service and the Maine Department of Environmental Protection. The licensee shall include with the plan documentation of consultation with the agencies before preparing the plan, copies of agency comments or recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how all the agency comments were accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations prior to filing plans with the Commission. If the

licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee shall implement the plan, including any changes required by the Commission.

(E) Within 90 days of the date of issuance of this order, the licensee shall file an original of the approved exhibit G drawing reproduced on silver or gelatin 35mm microfilm mounted on a Type D (3 1/4" x 7 3/8") aperture card. In addition, the licensee shall file two duplicate Diazo-type aperture cards. The original and one duplicate aperture card should be filed with the Secretary of the Commission. The remaining duplicate aperture card should be filed with Commission's New York Regional Office. The FERC drawing number (2727-23) shall be shown in the margin below the title block of the microfilmed drawing and also in the upper right corner of each aperture card. The top line(s) of the aperture cards shall show the FERC exhibit (e.g., F-1, G-1, L-1), Project Number, Drawing Title, and date of this order.

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(F) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. 385.713.

J. Mark Robinson
Director, Division of Project
Compliance and Administration

ENVIRONMENTAL ASSESSMENT

APPLICATION FOR AMENDMENT OF LICENSE

Ellsworth Hydroelectric Project

FERC Project No. 2727-024

Maine

Federal Energy Regulatory Commission
Office of Hydropower Licensing
Division of Project Compliance and Administration
825 N. Capitol Street, NE
Washington, D.C. 20426

December 4, 1991

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ENVIRONMENTAL ASSESSMENT

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF HYDROPOWER LICENSING
DIVISION OF PROJECT COMPLIANCE AND ADMINISTRATION

Project Name: Ellsworth Hydroelectric Project

FERC No. 2727-024

A. APPLICATION

1. Application type: Amendment of License
2. Date filed: February 25, 1991; revised on August 5, 1991, and supplemented on September 26, 1991
3. Applicant: Bangor Hydro-Electric Company (licensee)
4. Water body: Union River
5. County and state: Hancock County, Maine

B. PURPOSE AND NEED FOR ACTION

Field observations, investigative programs, and engineering analyses conducted at the Ellsworth Hydroelectric Project's Graham Lake Dam show that the western embankment and spillway have several instability problems. The spillway has inadequate capacity, could potentially liquefy during seismic loading, and has uncontrolled localized seepage at the downstream toe.

A report entitled "Inflow Flood Determination for Graham Dam" submitted to the Commission on November 30, 1989, indicated that a hypothetical breaching of the embankment structure at Graham Lake during the Probable Maximum Flood (PMF) event would pose a hazard to 110 structures in the downstream area.

Subsequent to the aforementioned investigations and determinations, the licensee developed remedial measures for the dam. The Commission, in a February 7, 1991 letter, directed the licensee to file an amendment of license to revise the project boundary to include the necessary land needed to undertake the remedial work on the dam. In response, the licensee submitted a February 25, 1991 filing showing a revision of the project boundary (i.e., revised exhibit G drawing) to add 16 acres to the project, 2 acres for a new dam site and 14 acres for a temporary construction laydown site.

At the request of the Commission in a letter dated July 12, 1991, the licensee on July 26, 1991 revised the project boundary to exclude the laydown area, since it did not conform to the

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Commission's regulations 3 for lands to be included in the project boundary. The Commission also advised the licensee in the July 12, 1991 letter that it believed the 14-acre laydown area was excessive, and requested the licensee to file a report on the minimum area needed for construction laydown and to provide alternative laydown sites. The licensee responded that, until it could access the site to conduct soil/rock borings, it could not calculate the minimum size of the laydown area. The licensee believes, however, that a maximum of 11 acres would be needed. Further, the licensee was not able to locate any alternative laydown sites within the existing project boundary, and is investigating several parcels within a 2-mile radius of the dam site. However, no specific alternative sites have been identified.

C. PROPOSED ACTION AND ALTERNATIVES

1. Description of the proposed action

The licensee proposes to extend the existing dam by constructing a concrete flood control structure along the downstream toe of the existing embankment and west of the existing gate structure. The proposed structure would function as an emergency spillway to back-up the existing unstable western embankment if overtopped by flood waters in Graham Lake. The

downstream extension would consist of an overflow spillway about 300 feet long, about a 100-foot-long non-overflow spillway section, and a 450-foot-long embankment connecting the spillway to the west bank. The concrete flood control structure would be connected to the existing Graham Lake outlet gates by a wing wall extension and a permanent cofferdam cell, and to the existing embankment by an earthen berm and fill.

Construction of the proposed structure would require about 4.5 acres plus a maximum of 11 acres adjacent to the site for a temporary construction laydown area. The 11-acre laydown site and 2 acres of the new dam site are privately owned by one individual. The remaining 2.5 acres of the dam site are on project lands.

Because of the opposition of the landowner to the use of its lands for the proposed development, the licensee has not been able to access the site to conduct soil and bedrock borings. The

3 The Commission regulations at 4.51(h)(2) of 18 C.F.R. states that "the boundary must enclose only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources."

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results of such explorations are needed to identify the depth to bedrock at the proposed construction site for determining the amount of spoil to remove and stockpile during construction. This information would dictate the exact size of the construction laydown area, which would vary from a minimum of about 8 acres to a maximum of 11 acres. Therefore, the worst-case scenario, that of an 11-acre site, will be evaluated.

Mitigation

In its September 26, 1991 filing, the licensee submitted a plan for erosion and sedimentation control and restoration of disturbed areas. The plan contains non-structural and structural measures to control erosion during the construction period, which is expected to take approximately one year. Measures to restore disturbed areas after construction are also described in the plan.

The licensee has minimized impacts on wetlands by designing the new structure to the minimum size allowable by federal safety standards and sound engineering practices. The wetlands impacted by the temporary cofferdam would be restored after completion of construction.

2. Alternatives to the proposed action

Licensee

Because of the landowner's opposition to the use of its land for the proposed construction laydown, the licensee has been investigating offsite parcels within a 2-mile radius of the proposed site. Although no specific alternative offsite parcels have been located, the licensee is expected to select a site similar to the proposed onsite parcel (i.e., an 8- to 10-acre, upland, nonforested site).

Agencies

In a letter dated May 13, 1991, the U.S. Department of the Interior (Interior) recommended that the licensee examine the alternative of replacing the existing dam in its present location, modifying the existing drawdown of Graham Lake, and permanently maintaining the lake at a lower level.

3. The no action alternative

The no action alternative is to retain the existing dam in its present unstable condition.

If proposed remedial measures are not implemented at Graham Lake Dam, the instability problems would persist and likely

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increase. The dam could fail if subjected to high floods, which would pose a hazard to 110 structures located downstream. Failure of the dam would also dewater the 9,025-acre Graham Lake causing significant adverse environmental effects and loss of the project's electric power production. Because of safety and environmental problems posed by the instability of the dam, the no action alternative is not considered a reasonable alternative requiring further analysis.

D. CONSULTATION

After the Commission issued a public notice of the

application on March 22, 1991, the following entities commented on the application.

Commenting entity	Date of letter
Maine Historic Preservation Commission	April 8, 1991
U.S. Department of the Interior	May 13, 1991

Kenneth J. LaFlamme and Corda W. LaFlamme filed a motion to intervene dated May 6, 1991. The licensee responded to Interior's letter on June 18, 1991.

E. AFFECTED ENVIRONMENT

The licensee estimates that a maximum of 15.5 acres is needed for constructing the new flood control dam. The flood control dam would occupy about 4.5 acres, and the construction laydown area would require up to 11 acres. Construction and construction laydown are proposed in an area west of and adjacent to the existing Graham Lake Dam outlet works.

Bedrock in the project area consists of a wide zone of schist and gneiss intruded by great masses of granite. Soils consist mainly of clays in the low-lying areas and glacial tills in the upland areas.

The proposed construction site is characterized by about a 1-acre back water section of the Union River and about a 2-acre emergent wetland of sedges and grasses along the shoreline of the Union River, bordered by a narrow, shrub wetland of alder and willow. Emergent wetlands bordered by shrub wetlands are common along the eastern shorelines of Graham Lake and the downstream Leonard Lake. The construction site also includes about a 1.5-acre upland area of project lands characterized by an existing access road bordered by shrub and herbaceous vegetation. Most of the area being considered for construction laydown is an open

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field vegetated by grasses, shrubs, and a few scattered trees. A wild blueberry field occurs along the eastern portion of the proposed construction laydown site.

Wildlife species of the area are generally those that occur in forest-edge and shrub-wetland type habitat. Typical species include the white-tailed deer, raccoon, red fox, and a variety of songbirds and amphibians.

The back water area is flooded during periods when water is released from Graham Dam for peaking operation, which occurs daily for 2 to 4 hours during the summer, 6 to 8 hours in winter, and up to 24 hours during high flows in the spring and fall. Because of the daily fluctuating water levels in the back water area, this area provides minimal habitat for aquatic biota, waterfowl, and shorebirds.

According to the Maine Historic Preservation Commission (SHPO) in an April 8, 1991 letter to the Commission, there are no known structures of historic or archeological significance within the project area. But because the project area has not been surveyed by a professional archaeologist, and the general topographic setting is likely to have attracted prehistoric settlement, the SHPO is recommending that an archeological survey be conducted.

Anadromous Fish

The Union River is included in plans for restoration of the Atlantic salmon under direction of the Atlantic Sea Run Salmon Commission (ASRSC). Until recently, the ASRSC managed the Union River with a goal to produce up to 250 adult salmon broodstock a year and to support a limited sport fishery below Ellsworth Dam. The ASRSC owns a fish-trapping facility at the base of Ellsworth Dam. Adult salmon trapped at the facility were used as broodstock at the Green Lake and Craig Brook National Fish Hatcheries. Because of the low rate of return of salmon at Ellsworth Dam and budget constraints, the ASRSC announced in September 1991 that it has discontinued active involvement in the Union River program.

The Maine Department of Marine Resources (DMR), the ASRSC, and the City of Ellsworth conduct an alewife trapping and trucking operation at the Ellsworth Project. Alewife are trapped below the Ellsworth Dam and trucked upstream to Graham Lake, the 9,025-acre impoundment formed by Graham Lake Dam. Graham Lake is located 4 miles upstream of Ellsworth Dam. Alewife produced in Graham Lake migrate downstream during May and June through the outlet gates at Graham Lake Dam, into Leonard Lake, the 125-acre lake formed by Ellsworth Dam, and through the outlet gates at Ellsworth Dam into the tidal portion of the Union River.

The DMR's goal is to maximize alewife production in Graham Lake to support a commercial harvest. During the 1980's, harvest

numbers below Ellsworth Dam ranged from a low of 4,700 in 1983 to a high of 1,026,200 in 1986. Numbers of trucked alewife ranged from a low of 4,560 in 1983 to a high of 22,200 in 1981.

Threatened and Endangered Species

Bald eagles, a federally listed endangered species, nest at two locations on Graham Lake, 3.5 and 6.5 miles from Graham Dam. During field investigations at Graham Lake and along the Union River from Graham Dam to the Union River estuary, eagles have been observed flying along the river, but not feeding. Eagles have been observed feeding in the estuary, about 4 miles downstream of the Graham Lake Dam. No observations of eagles feeding immediately below Graham Dam have been made.

F. ENVIRONMENTAL IMPACTS

The instream activities associated with installation and removal of cofferdams proposed for the construction of the new flood control structure would cause short-term turbidity in the Union River. Proposed construction would also cause the permanent removal of about 1.4 acres of wetlands, about 1 acre of intermittent back-water habitat, and 1.5 acres of predominately disturbed land.

Construction laydown of the area adjacent to the construction site would cause a minor short-term adverse effect on the limited vegetation and wildlife resources. Construction effects on alternative laydown sites are expected to be similar to those for the proposed site since similar sites (i.e., open fields with limited shrubs and trees) would likely be selected. The construction laydown site would be restored immediately following completion of construction. A minor short-term adverse visual effect on the area residents that use the adjacent state Route 180 for access would occur during construction.

G. ISSUES AND RECOMMENDATIONS

Alternatives to the proposed action

Interior, in a May 13, 1991 letter, comments that structural and operational alternatives to the proposed action should have been considered. Interior's suggested alternatives include replacing the existing dam in its present location; modifying the existing drawdown of Graham Lake; and permanently maintaining the lake at a lower level to increase the ability to capture runoff and prevent overtopping of the dam.

The licensee indicates that its final selection of remedial measures to upgrade the dam to safely pass the inflow design flood was based on a detailed comparison of various options. It maintains that its proposal was the best option for addressing the dam safety concerns. The licensee states that replacing the dam in its present location would have greater environmental effects and would cost over \$3 million more than its proposal.

The licensee states that modifying the existing drawdown would provide additional reservoir capacity to accommodate smaller inflow events but not necessarily larger inflows that are likely to occur periodically at the project. Because the existing outlet gates allow limited discharge capacity, large inflow events would result in rapid filling of the lake, overtopping of the dam, and possible dam failure. The suggested changes to Graham Lake's operating mode would adversely impact the storage capacity of the lake, reducing the value of the project as a peaking source of energy to the licensee's system and customers.

The licensee's proposal to construct a flood control structure immediately downstream of the existing structure is environmentally, economically, and engineeringly superior to the alternative suggested by Interior. Replacing the existing dam at the present location has environmental impact at least as great as the licensee's proposal and would be significantly more costly. Modifying the existing drawdown of Graham Lake or permanently maintaining the lake at a lower level would not provide the necessary protection during high flows. Further, permanent maintenance of the lake at a lower level and the resultant reduction in project operation would be contrary to the finding in the project's license order of December 28, 1987 (41 FERC 62,304) that the project would be best adapted to comprehensive development of the waterway for beneficial public uses.

Fish Passage and Migration

Interior recommends that the Commission not take final action on the amendment until resolution of the fish passage plan required by article 406 of the license. Further, Interior suggests seasonal construction restrictions and other measures to limit erosion, sedimentation, and high levels of turbidity during peak periods of fish migration.

The licensee objects to Interior's recommendation to withhold action on the amendment pending resolution of the fish passage plan. Also, the licensee responds that construction work would not adversely affect downstream passage of alewives since alewives approach the Graham Lake Dam from upstream and construction activities would not affect waters upstream of the dam.

Implementation of remedial measures at the Graham Lake Dam would not preclude resolution of fish passage measures, if required. Any required fish passage facility would be installed at the existing outlet structure, which is separate from the proposed new facility. Further, by letter dated November 6, 1991, the Commission requested that the licensee revise its fish passage plan and schedule with consideration given to the subject amendment and recent fishery management developments in the basin with respect to Atlantic salmon. A response is due in May 1992. Although the fish passage plan has not been revised, implementation of proposed remedial measures with this amendment would not preclude the installation of fish passage facilities concurrent with construction of the new flood control structure or at a later date.

Construction of the proposed flood control structure would occur in the dry, generally precluding sedimentation and turbidity effects on Graham Lake and the downstream Union River. The construction site will be separated from the Union River by a series of temporary cofferdams to be installed along the western shore prior to construction. The cofferdams will consist of about 100 feet of braced sheetpile, 200 feet of sheetpile cells, and 400 feet of riprapped earthen embankment. The sheetpile cofferdams will extend downstream and parallel to the river to protect the construction site from the erosive flows downstream of the Graham Lake outlet gates. The sheetpile cofferdams will be constructed within the Union River; the riprapped embankment will be located partially in a backwater area of the Union River, and will connect the sheetpile cellular cofferdams to the above-water western shore at about the 90-foot mean sea level elevation. The embankment cofferdam will be riprapped to protect the cofferdam from up to a 10-year flood.

In addition to the cofferdams, a series of drainage control measures and sedimentation basins will be installed within the construction site to control seepage waters and rainfall. These facilities will be designed to handle the 10-year frequency, 24-hour duration storm. Sedimentation basins will be designed to provide an overall detention period of at least 24 hours, and will be equipped with an outlet pipe to discharge clarified water directly to the river.

While the proposed cofferdams would protect water quality during construction, installation and later removal of the

cofferdams, however, would increase turbidity levels in the Union River downstream of Graham Lake Dam. Adams and Fawcett (1989) found that migration of juvenile alewives occurs during periods of increased flow rates and relative decreases in water temperature and that increases in turbidity may act as a visual or chemical stimulus to initiate migratory activity. They also

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found the majority of juveniles migrate prior to the end of July. While there is no information available relating turbidity levels with migratory behavior of juvenile alewives, it is not expected that short term turbidity spikes that may result from cofferdam installation or removal would have a noticeable effect on outmigration of juvenile alewives in the short reach of the Union River below the construction site. The licensee's erosion and sedimentation control plan is adequate to minimize construction-related turbidity events and eliminate any possible effects toward outmigrating juvenile alewives.

Bald eagles

Interior comments that there is active bald eagle nesting on Graham Lake in the project area, and that bald eagles use the area below Graham Lake, particularly for feeding. Interior also states that project construction could affect eagles and that possible seasonal restrictions in construction activities may be needed to avoid adverse effects on eagles.

The licensee responds that the bald eagle nesting territory nearest to the project dam site is 3.5 miles away; a second nest is located 6.5 miles away. Further, the licensee states that a preliminary review by the Maine Department of Inland Fisheries (MDIF) did not identify the immediate Graham Lake Dam area as a feeding area for bald eagles. Eagles have been observed flying along the Union River below the dam, but not feeding. The only observed eagle feeding has been in the Union River estuary, several miles downstream of the dam.

The noise produced by equipment and other construction-related activities at the proposed development site adjacent to Graham Lake Dam would not have an adverse effect on bald eagles. The eagle nest, located 3.5 miles from the site, and eagle feeding area, located 4 miles downstream, are located at sufficient distances to protect the eagles from the effects of construction.

Wetlands

Interior states that the proposed development would cause the removal and disturbance of several acres of wetlands. Because of the wetland effects, Interior expressed concern that no precise calculation of loss had been made, and that mitigation had not been addressed. Further, Interior states that in order to satisfy the President's policy calling for "no net loss in wetlands", the U.S. Army Corps of Engineers and the Commission must strive to minimize impacts and provide full compensation for unavoidable losses.

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The licensee responds that, although it has not been able to access the site, it has calculated from aerial photos that approximately 1.4 acres of wetlands would be permanently impacted, and another 1 acre would be temporarily impacted during construction. To minimize the amount of wetland removal, the licensee has reduced the size of the flood control structure and cofferdams to the extent allowable by federal safety standards and sound engineering practices. Further, the licensee proposes to restore the wetlands impacted by the cofferdam, but does not propose to develop final mitigation plans until after it obtains access to the area. The licensee does not propose additional mitigation of wetland impacts through compensation.

Wetlands provide habitat valuable to fish and wildlife resources. Impacts to wetlands should be avoided or minimized if possible, and unavoidable impacts mitigated. The licensee's attempts to minimize the removal of wetlands to the extent possible, and its proposal to restore impacted wetlands after completion of construction are acceptable. Although the licensee does not propose to compensate for the 1.4-acre loss of wetlands, the licensee should be required to compensate for the loss of this wetland area. The licensee should, therefore, develop a restoration and compensation plan to mitigate for impacts to wetlands from construction of the proposed flood control structure.

Archeological resources

The SHPO has recommended that the project area be surveyed by a professional archaeologist, since the area has not been surveyed and the topographic setting is likely to have attracted prehistoric settlement.

Article 407 of the license requires that the licensee, before starting any land-clearing or land-disturbing activities

within the project boundaries, other than those activities specifically authorized in the license, consult with the SHPO and file a cultural resources management plan, prepared by a qualified cultural resource specialist. In order to provide protection for any undiscovered archeological resources in the project area, the licensee should have the proposed construction site and laydown area surveyed by a professional archaeologist and should prepare a cultural resources management plan if significant archeological resources are found. Further, if any new historic or archeological properties are found during the course of construction, article 407 requires that the licensee stop all land-clearing and land-disturbing activities in the vicinity of the properties, consult with the SHPO, and file with the Commission a cultural resource management plan, prepared by a qualified cultural resource specialist.

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H. CONCLUSIONS

The licensee should be authorized to make the proposed remedial modifications to safeguard human life and property downstream of Graham Lake Dam. Approval of the proposed amendment, with the mitigative measures proposed by the licensee and staff, would not constitute a major federal action significantly affecting the quality of the human environment.

I. LITERATURE CITED

Adams, D. and R. Fawcett. 1989. The timing of seaward migration by juvenile alewives (*Alosa pseudoharengus*) in coastal New Concord, NH.

Prepared by Patrick K. Murphy, Wildlife Biologist
Robert Grieve, Fishery Biologist