

1980

Federal Water Pollution Control Act Section "404" Evaluation for Dickey-Lincoln School Lakes

New England Division

United States Army Engineer Division

United States Army Corps of Engineers

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*FEDERAL WATER POLLUTION
CONTROL ACT
SECTION "404" EVALUATION
FOR*

DICKEY-LINCOLN SCHOOL LAKES



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

SEPTEMBER 1980

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THE FEDERAL WATER POLLUTION CONTROL ACT
SECTION 404 EVALUATION

FOR

DICKEY-LINCOLN SCHOOL LAKES

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS 02154

PREFACE

The purpose of this report is to relate various aspects of the proposed Dickey-Lincoln School Lakes Hydroelectric Project to appropriate considerations defined by Section 404 of the Federal Water Pollution Control Act of 1972.

Throughout this report, a specific format is followed to include appropriate information on an array of issues. Most of the major principles and concepts are described by generalizations and provide primarily a superstructure of information to show how the proposed project relates to 404 guidelines. This report adheres to such oversimplification to reduce redundancy. Information providing a more complete understanding of specific concepts, when desired, is available in other sources and are referenced throughout this report.

This evaluation was first released for public review on August 9, 1978. Copies were sent to all Federal, State, local agencies and private organizations who have an expressed and/or legal interest in the project. Comments were received until September 11, 1978. The public notice of this release, and all comments received are included at the end of this report as Attachment 4.

In 1978, a proposed Final Environmental Impact Statement (FEIS) was forwarded to the Office of the Chief of Engineers (OCE). Upon review, it was concluded that the lack of a recommended fish and wildlife mitigation plan in the proposed FEIS was a major deficiency in light of the President's water policy message of 6 June 1978, and subsequent directives from the President, dated 12 July 1978. Consequently, as directed by OCE, the proposed FEIS was issued as a REVISED DRAFT EIS for public review and comment, and did not contain the Final Federal

Water Pollution Control Act Section "404" Evaluation. This Final "404" Evaluation is now being released and accompanies the Final EIS.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
II. DESCRIPTION OF PROPOSED PROJECT AND ITS SETTING	3
III. GENERAL EVALUATION	5
IV. SECTION 230.4-1 A TECHNICAL EVALUATION	9
Physical Effects	9
Effects on Wetlands	9
Effects on the Water Column	12
Effects on Benthos	12
Chemical-biological Interactive Effects	12
Evaluation of the Potential of Chemical-biological Interactive Effects	13
Water Column Effects	13
Effects on Benthos	15
Comparison of Sites	15
V. SECTION 230.4-2 WATER QUALITY CONSIDERATIONS	16
VI. SECTION 230.5 SELECTION OF DISPOSAL SITE AND CONDITIONING OF DISCHARGE OF DREDGED OR FILL MATERIAL	19
General Considerations and Objectives	19
Considerations Relating to Degradation of Water Uses at Proposed Disposal Site	21
Applicable Considerations in Determining the Site and Disposal Conditions to Minimize the Possibility of Harmful Effects	24
Contaminated Fill Material Restrictions	25
Mixing Zone Determination	25
VII. CONCLUSION	27
DEFINITIONS OF TERMS	30
REFERENCES	31
ATTACHMENTS	33

Chapter 1

INTRODUCTION

This report is intended to provide an evaluation of the proposed Dickey-Lincoln School Lakes Project in conformance with Section 404 of the Federal Water Pollution Control Act of 1972, amended as the Clean Water Act, December 27, 1977. The purpose of this Act is to provide a means of protecting vital national water resources from despoilation through irresponsible and irreversible decisions and actions. This evaluation should therefore provide information sufficient to determine whether unacceptable degradation of such values would result from project implementation.

Application and administration of the 404 requirements are assigned to the Administrator of the Environmental Protection Agency (EPA) and the Secretary of the Army. Guidelines for the evaluation were published by the EPA in the Federal Register, September 5, 1975 (40 CFR 230). Pursuant to a Corps of Engineers regulation (ER 1105-2-XXX draft, dated October 1, 1977), these guidelines are to be applied in the evaluation and processing of all Corps of Engineers activities involving discharge of dredged or fill material in navigable waters. The Dickey-Lincoln project does involve "discharge of fill material" (the dams) in "navigable waters" (the St. John River)* Any impacts

*See pgs. 29-30 for specific definitions per EPA guidelines.

to the specific items addressed by the EPA guidelines that would result from construction of the Dickey-Lincoln School Lakes Dams are therefore addressed in this report.

The EPA guidelines are applicable, particularly in relation to wetlands, water supply, fishery resources, and wildlife and recreational values. The intent of the guidelines is to provide an evaluation of such aspects (section 230.4) and relevant consideration and conditioning of the discharge (section 230.5) to minimize or prevent unnecessary degradation. ER 1105-2-XXX specifies that evaluation analysis and findings shall be presented so that reviewers may clearly find each of the points listed in section 230.4 and 230.5. Chapters 4, 5, and 6 are intended to fulfill this requisite.

Because of the technical nature of such points, these chapters can best be comprehended by familiarity with the EPA guidelines. Chapter 3 summarizes, in a less specific and technical nature, the most significant relevant impacts. Related information is available in much more comprehensive detail in the Dickey-Lincoln Final Environmental Impact Statement (FEIS), Appendices thereto, and General Design Memoranda (hereafter referred to as FEIS, App., and GDM, respectively). Reference to these publications may be desirable to fully understand certain impacts only superficially covered by this evaluation.

Chapter 2

DESCRIPTION OF PROPOSED PROJECT AND ITS SETTING

Dickey-Lincoln School Lakes is a proposed multipurpose (combined hydro power and flood control) reservoir system located on the upper reaches of the St. John River in Aroostook County, Maine. The proposed installation would consist of two 335-foot high Dickey Dams with a total length of 10,200 feet, located immediately above the confluence of the St. John and Allagash Rivers, creating an 86,000± acre highly dendritic impoundment at 910 feet above mean sea level at maximum pool elevation (see figure 1). A smaller 2,100 foot long, 90 foot high, Lincoln School Dam 11 miles downstream would inundate an additional 2,600 ± acres to provide regulation to downstream discharges and supply additional energy for electrical power generation.

Concomitant power transmission lines would stretch approximately 365 miles to tie the project into the New England Power Pool System requiring clearing of approximately 6,000 acres of forest. These lines would cross 352 rivers and streams and 80 wetland areas. Due to presumable water resource related impacts, a 404 evaluation would be required for the transmission facility when more specifics are available. Although a proposed ½ mile wide route has been studied extensively, final determination of the exact centerline location (150 ft. wide) and related support structures has yet to be determined. This determination should consider environmental concerns related to 404 considerations and objectives as outlined in Section 230.5.

The proposed reservoir project area is within the largest stretch of relatively uninhabited forest land in the northeastern United States. The watershed farthest upstream of the dams is of relatively mild topographic relief, with broad, poorly drained plains. Nearer the dam sites, the relief becomes increasingly complex and steep narrow valleys dominate the landscape.

Existing use of the area consists of extensive activities such as logging, hunting, fishing, canoeing, and camping. Although the presence of logging activity precludes the area being considered a true "wilderness", it has the potential for remaining an informal "semi-wilderness" under proper management. The remoteness and relatively undisturbed character of vast portions of the region have so far discouraged intensive development for any purposes.

A more detailed description of the project and its setting is provided in the FEIS, Chapters 1 and 2, and GDM 4a.

Chapter 3

GENERAL EVALUATION

The most obvious and direct impact of the proposed Dickey-Lincoln School Lakes on the environment would be the irreversible transformation of an existing stream-forest ecosystem to one of standing water. Some 278 miles of stream habitat (8 percent of the 3,450 miles in the St. John basin above Lincoln School Dam) would be displaced; 30 identified and numerous small unidentified beaver ponds would be inundated; 80,455 acres of terrestrial habitat, including 76,173 acres of commercial forest and 1,713 acres of wetlands would be lost.

These components of the existing ecosystem would be replaced by the 88,600 acre Dickey-Lincoln School Lakes Reservoir system. As a consequence, various wildlife, fishery, aesthetic, recreation, and botanical values would be affected - some displaced, some created.

The conversion of 80,455 acres of terrestrial habitat into aquatic habitat would displace all wildlife species existing within the area proposed for inundation, as well as impact those which utilize the area during part of their lives; wildlife in nearby regions would also be affected by increased immigration of those animals utilizing the habitat that would be impounded. Of particular concern to hunters, it has been estimated that approximately 3,000-4,000 whitetail deer may be directly affected. More details on wildlife impacts are available in the FEIS and throughout Appendix F and Supplement (CE, 1977, 1978).

The U.S. Fish and Wildlife Service and the Corps of Engineers.

have prepared fish and wildlife mitigation plans; both are presented for consideration with the Final EIS.

In addition to forestry resources lost by inundation, many acres of non-commercially important, yet more ecologically critical wetland and riparian habitats would be lost. Although only representing about 2% of the area that would be inundated, the 1,714 ± acres of wetlands lost should be considered as a major environmental loss. Of singular importance are the several rare and unusual plants found in such areas that would be inundated. In particular, one endangered species, thought extinct until discovered by Corps' investigations, the Furbish lousewort (Pedicularis furbishiae) is known to exist in riparian habitats within the project area (see Attachment 3). Because of the significance of wetlands, a more detailed report of wetland resources, impacts, and plausible future management has been provided as Attachment 1 to this evaluation as a source of additional information.

An existing stream fishery setting would be replaced by a lake fishery. Much concern has developed about the future of the existing desirable brook trout fishery. However, as shown in the table on page 42 of App. E, the most significant brook trout spawning and nursery areas of the project area were found above maximum pool elevation. The above pool elevation areas (910 msl) would not be adversely affected, but would enhance the future lake fishery by providing spawning area; while the impoundment would provide suitable adult holding for the brook trout reared in those unaffected streams. In this respect, an increase in overall fishery productivity may result.

In addition to brook trout, a total of 20 other fish species are

known to inhabit the area to be inundated. Generally, these species are capable of maintaining viable populations in the proposed impoundment. Some would adapt more favorably than others. Also, some new species (lake trout and forage species) may be introduced as augmentation thus generating a more diverse sports fishery than now exists. The major foreseeable shortcoming of the reservoir in providing a productive fishery would be the operational weekly and annual drawdown of the lake. This would deter from optimum development of a littoral zone - the area of a lake of most value as spawning, nursery and feeding areas for many fish species. A recommended fishery mitigation and management plan has been developed by the Corps of Engineers for appropriate consideration and has been incorporated into the Final EIS. Additional information on the existing and predicted future fisheries resources is also available in App. E and Supplement (CE, 1977, 1978).

Project implementation would produce a significant change in recreational use of the region. In addition to alteration of fishing and hunting opportunities, areas of white water canoeing, primitive camping, and related activities would be displaced by the reservoir. New recreational opportunities based on the lake environment, primarily day-use activities such as swimming, boating, and sightseeing, would replace those types of recreation in many areas.

The existing visual quality of the river valleys and forest-stream landscape would be lost within the area of inundation. Some would consider this to be the most significant impact. This type of impact is very controversial however, simply because every individual has

developed a unique set of aesthetic values. An appreciation of the new setting -- numerous scenic coves, with water-forest backdrops -- could be considered a positive aspect. Some may even feel the physical structure of the dams and appurtenant facilities themselves (particularly when of a size such as those proposed for the Dickey-Lincoln Dams) are beautiful as monuments to man's ability -- others may consider them only as unnatural obtrusive structures, adding to the man induced visual blight of natural resources.

Many other water resource related impacts adjunct to the proposed project would also occur. But in comparison to those values displaced (which are noticeably, irreversibly profound), short-term construction and operational off-site effects seem less significant. Downstream sedimentation during construction, a modified downstream flow regime and various biological stresses subsequently created, are definitely detrimental to the downstream ecosystem; but, these effects should not be regarded as seriously, nor with the same sense of totality, as the values that would be displaced within the proposed inundation area.

Chapter 4

SECTION 230.4-1

A TECHNICAL ECOLOGICAL EVALUATION

230.4-1 (a) Physical Effects

Physical effects on the aquatic environment primarily include destruction of wetlands, impairment of the water column, and covering of benthic communities. Evaluation of the significance of physical effects are based on the extent of the discharge area and items of the environment that are displaced, or affected by the proposed discharge. Following is a short explanation of how such physical effects are related to the Dickey-Lincoln School Lakes Project, as outlined per the EPA guidelines.

230.4-1 (a-1) Effects on Wetlands: According to the EPA guidelines, from a national perspective, the degradation or destruction of wetlands is the most severe environmental impact covered by the 404 guidelines. Such destruction is regarded as an irreversible loss of a valuable aquatic resource. Because of the implied categorical significance of wetland destruction, a special report supplying a detailed technical discussion of wetlands in relation to this project has been prepared and attached at the end of this evaluation. This attachment emphasizes the value of loss in relation to ecological functions. Briefly, such functions, as specified in the EPA guidelines (quotations hereinafter), would apply to the Dickey-Lincoln School Lakes project as follows:

- (i) "wetlands that serve important natural biological functions, including food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species...".

Many such wetlands exist within the proposed inundation area.

Attachment 1, at the end of this report, expounds upon such values.

In particular, four areas within the project that possess significant wetland values in these respects would be destroyed by project implementation. Included in Attachment 1 is information on existing wetland values, types, projected impacts, and proposals for mitigation of detrimental ecological effects thereof.

- (ii) "wetlands set aside for study of the aquatic environment or as sanctuaries or refuges...".

No such areas are found within the project area.

- (iii) "wetlands contiguous to areas listed in (a)(i) and (ii) of this section, the destruction of which would affect detrimentally the natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics of the above area...".

The significance of such wetlands and their relationship to the project is discussed in Attachment 1 and is the prime consideration used in delineation of the four particularly significant wetland areas discussed therein.

- (iv) "wetlands that are significant in shielding other areas from wave action, erosion or storm damage. Such wetlands often include barrier beaches, islands, reefs and bars...".

The magnitude of hydrologic effects of the reservoir itself can be considered as replacement for the loss of this function. The reservoir will either displace the "other areas" or act as shielding against erosion, flooding, etc.

- (v) "wetlands that serve as valuable storage areas for storm and flood waters...".

The flood storage capability of the reservoir would more than preclude the loss of this function.

- (vi) "wetlands that are prime natural recharge areas... where surface and ground water are directly interconnected...".

Again, the recharge potential of the reservoir would more than compensate for such losses.

In summary, the ecological significance of wetland losses due to project implementation would be primarily related to biological functions. It is therefore the objective of management strategies to mitigate primarily for lost biological functions as discussed in 230.4-1 (a-1(i)) (see Attachment 1, Section VI).

The creation of the reservoirs would alter the hydrography of the area in such a way as to create the potential for new wetland areas. The lakeside morphology, hydrology, and management would determine the

value of such areas. The potential and value of this future setting is explained in Attachment 1, Section IV.

230.4-1 (a-2) Effects on the Water Column:

Inundated areas would change from a stream to a lake environment. Specific physical changes include: a dampened temperature regime; a "sink" effect on incoming suspended sediments; a shift in planktonic populations from lotic to lentic species; and aesthetically, the landscape would change from a flowing water setting to a lake. More specific and detailed information in regard to these changes has been included in the EIS, Sections 4.02 through 4.06. Specific information on plankton and nekton is discussed in Section 4.10 in the EIS and in App. E, CE, 1977, pp. 44-104.

Also, the downstream water column will be affected by increased suspended sediment loads during the construction period; related impacts are discussed in App. E, CE, 1977, pp. 105-122.

230.4-1 (a-3) Effects on Benthos: Existing stream species within the impounded area would be replaced by new lake species. An estimated evaluation of this change is provided in Section 4.10 in the EIS. Also, construction-related and operational stresses on the downstream benthic communities are expected. These impacts are discussed in App. E, CE, 1977, pp. 114-118.

230.4-1 (b) Chemical-biological Interactive Effects

Ecological perturbation caused by chemical-biological interactive effects relate primarily to the release of contaminants (in the case of Dickey-Lincoln) from the inundated soils and, earlier, from soils disturbed during forest cutting and dam construction. The principal

concern is the potential effect on the water column or on benthic communities.

230.4-1 (b-1) Evaluation of the Potential of Chemical-biological Interactive Effects:

Potentially detrimental chemical constituents that may be present in existing soil in sufficient quantities to leach into and affect the lake's waters primarily include nutrients, trace metals, and organic material. The potential effects of such contamination is discussed in the following subsections.

230.4-1 (b-2) Water Column Effects:

The procedures recommended by the EPA to predict water column effects, although suitable for the effects of dredged material disposal, are not appropriate in this situation. However, qualitative inferences as to water quality effects can be made based on past studies and samples of the project area.

Based on these inferences, it appears that nutrients are not sufficient to produce water quality problems. Predictions of total phosphorous and chlorophyll-a concentrations for the lake (GDM #5), indicate that nuisance algae conditions should not occur once the lake is stabilized.

During the clearing-construction period, low flows and higher temperatures combined with introduced excessive quantities of nutrients could create algal blooms in downstream areas; however, turbidity would also increase, perhaps enough to depress photosynthetic activity and preclude algal blooms. The subsequent increase of organic

material from either algal blooms, or directly introduced with erosion may however increase the Biological Oxygen Demand (BOD) enough to create oxygen deficient conditions, thus placing stress on downstream aquatic biota. The extent of these potential effects is as yet unpredictable. It could range from no noticeable effect, to conditions resulting in fish kills.

Control conditions should be established to preclude the possibility of the latter situation. Feasible control methods are explained in Attachment 2 at the end of this report.

In addition to such "organic" contamination, possible release of heavy metals (mercury and/or selenium in particular) from the soils and bedrock of the area has been indicated as a potential occurrence. Although at low levels, selenium was found in some fish samples in an early sampling period; further investigations yielded no such findings, either in fish or in the water column. Mercury was found at higher levels, both in fish and water samples. It may be concluded that both elements are naturally present in the basin as trace substances, and during certain hydrologic conditions (inundation may provide such conditions) are released in detectable quantities. Contamination of the reservoirs could therefore occur to a degree that, through biomagnification, some species of fish may accumulate concentrations unacceptable (according to FDA requirements) for human consumption. This factor is discussed more thoroughly in Appendix E, CE, 1977, pp. 95-96.

Other trace elements and compounds would likely be found for similar reasons. Iron, phosphorus, sulphur, nitrates, etc., will un-

doubtedly be present in the lake; however, predictions indicate that no problems should result. A more complete discussion of such water quality parameters is found in GDM #5, pp. 68-73.

230.4-1 (b-3) Effects on Benthos:

Concentrations of contaminants are not expected to be sufficient to impair benthic productivity although it is primarily through benthic organisms that biomagnification of such constituents as mercury and selenium is possible.

230.4-1 (c) Comparison of Sites

This item is not applicable to this evaluation; it applies to disposal of dredged sediments.

Chapter 5

SECTION 230.4-2

WATER QUALITY CONSIDERATIONS

Creation of the 88,600 ± acre Dickey-Lincoln School Lakes impoundments would preclude existing water quality standards for streams within the impounded areas; such standards would be inappropriate for a reservoir. The predicted water quality of the reservoirs is explained in considerable detail in the EIS, and GDM #5. The results of these predictions indicates that the reservoirs should present no water quality problems. The lake is predicted to be "... a deep, dimictic, oligotrophic impoundment characterized by a relatively shallow thermocline, low nutrient levels, and comparatively high dissolved oxygen levels throughout the year" (Appendix E, CE, 1977). The State of Maine will presumably establish water quality standards for the reservoirs once stabilized.

Downstream water quality considerations are however necessary. The "mixing zone" as described in EPA guidelines, Section 230.5 (e), (forthcoming) as applicable to such considerations would include the Saint John River from the Lincoln School Dam, downstream to Edmundston, Canada (see figure 1). Below this, pollution from pulp and paper mill effluents would obscure adverse water quality effects from construction of the dam.

As presented in Section 230.4-1 (b-1), chemical constituents that could influence water quality within the reservoir, and thus possibly downstream, include heavy metals, nutrients, and organic material. Water quality impacts also relate physically to the turbidity and sedimentation caused by erosion at construction and clearing sites.

Once the reservoir has stabilized, it is expected that all of these constituents would decrease to levels below existing conditions. Average water quality should therefore improve after reservoir stabilization because of the capacity of the reservoirs as a "sink" for such chemical and physical contaminants. The U. S. Fish and Wildlife Service has predicted that "the downstream area will have the potential to support a fishery that is expected to be better than without-the-project." (F.W.S., 1978).

During construction, increased releases of such contaminants would accompany erosion into the river. However, it is expected that the physical effects of turbidity would be of most concern. Other contaminants would be associated with this turbidity, but probably not in sufficient concentrations to cause significantly negative impacts. Because of the potential of erosion related impacts, extensive erosion and siltation control methods have been proposed (Attachment 2). These methods could be employed during the construction phase to minimize adverse downstream effects. They include: clearing, excavating, and grading practices; diversion, disposal and land stabilization structures; and, mulching and vegetal control measures. All are ex-

plained in detail in Attachment 2 at the end of this report.

In spite of utilization of such methods (should they be implemented), siltation to some degree would unavoidably occur during periods of heavy rainfall, the extent of which cannot be predicted. However, the river could be continuously monitored during construction. Water quality criteria can be established with the intent of preventing any unacceptable impacts -- if exceeded, special measures, including temporary construction abatement if necessary, could be employed. These measures would be regulated in accordance with State and Federal concerns with the intent of not exceeding downstream water quality standards at magnitudes unacceptably greater than natural conditions.

Chapter 6

SECTION 230.5

SELECTION OF DISPOSAL SITE AND CONDITIONING OF DISCHARGE OF DREDGED OR FILL MATERIAL

230.5(a) General Considerations and Objectives:

"In evaluating whether to permit a proposed discharge of dredged or fill material into navigable waters, consideration shall be given to the need for the proposed activity, the availability of alternative sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by Law."

(EPA Guidelines)

In planning the Dickey-Lincoln School Lakes facility, many power alternatives were considered. These are addressed in considerable detail in the EIS, App. I and supplement thereto. Alternatives such as conventional thermal steam cycle, gas turbine, nuclear steam cycle and other hydroelectric facility sites have been reviewed -- all produce adverse environmental impacts.

Thermal power plants (fossil fuel or nuclear) predominantly cause air or thermal pollution and the resources used are limited; hydroelectric facilities disrupt natural lands and water resources. In all cases the extent of impact is generally a function of the size of the facility. It is the urgency of the need for power that must be balanced against environmental impacts. Assuming that the predicted need for peaking power (the prime purpose of Dickey-Lincoln School Lakes project) is to be met with presently practicable technology, the most reasonable alternatives to a project such as Dickey-Lincoln School Lakes are pumped

hydro-storage and gas turbine. The benefits when compared to the impacts of such alternatives do not allow a determination that they are better alternatives than Dickey-Lincoln School Lakes project.

However, the need for additional power does not have to be a limiting assumption. This need can be altered by various degrees of conservation implementation or demand control; both of which are theoretically practicable. This has been so indicated in the FEIS, Chap. 6. Environmental impacts, although complicated, would be decidedly less than with other known practicable alternatives of power generation -- hydro-power included. However, such measures would entail changes in consumer habits and would undoubtedly require further Governmental inducements and/or statutory controls. It is presently not within the Federal authority to pursue such a solution. Therefore, we are unable to consider such a program as a viable alternative to Dickey-Lincoln School Lakes project until such legislation as required is provided to allow appropriate involvement, thus increasing the feasibility of implementation of such a program.

The following impact summary (as outlined in conformance with EPA Guidelines, Section 230.5(a)) would result from implementation of the proposed Dickey-Lincoln School Lakes project. Many are unavoidably objectionable and have been considered in the determination of recommendations regarding the proposed project under the authority of these Guidelines:

- (1) significant disruption of the chemical, physical and biological integrity of the aquatic ecosystem of which aquatic biota, the substrate and the normal fluctuations of water level are integral components would occur;

- (2) significant disruption of the food chain, including alteration

or decrease in diversity of plant and animal species, would occur;

(3) inhibition of movement of fauna, including movement into and out of feeding, spawning, breeding and nursery areas, would occur;

(4) destruction of wetlands having significant functions in maintenance of water quality would occur;

(5) the impoundment would inundate areas presently serving to retain natural high or flood waters (but, the reservoir itself would provide even more flood control than presently exists);

(6) adverse turbidity levels would result from construction activities, but, wherever practical, such effects could be minimized (see Attachment 2);

(7) existing aesthetic, recreational and economic values would be displaced (and replaced by new values); and

(8) as was indicated in Section 230.4, water quality degradation during construction and filling, would result.

230.5(b) Considerations Relating to Degradation of Water Uses at Proposed Disposal Site:

Many existing water uses would be affected through implementation of Dickey-Lincoln School Lakes project. Consideration of such values is made in accordance with the EPA guidelines covering this section as follows:

(1) Municipal Water Supply Intakes - No known public water supplies would be adversely affected by the Dickey-Lincoln School Lakes project.

(2) Shellfish - No areas of important shellfish populations would be affected.

(3) Fisheries - The Dickey-Lincoln School Lakes project would completely change the existing fishery habitat. This change is discussed in more detail in the EIS and App. E. The change is significant but not

considered unacceptable because the lake fishery afforded by the project is predicted as viable; and, many areas affording stream fisheries at least as good as the existing fishery would remain and are presently underutilized.

(4) Wildlife - The habitat, food chain and community structure of existing wildlife within and nearby the proposed impoundment would be affected. The EIS and App. F discuss this aspect in detail.

(5) Recreation Activities - App. G discusses recreational impacts in detail. In relation to this evaluation, concerned factors apply as follows:

(i) reasonable methods to minimize adverse turbidity can be employed (see Section 230.4-2);

(ii) the release of nutrients is not expected to significantly increase eutrophication, and thusly degrade aesthetic values, nor impair recreation uses of water resources (see Section 230.4(b-2));

(iii) no material that would result in unacceptable levels of pathogenic organisms would be discharged in areas to be used for recreation;

(iv) no material shall be discharged which would release oil or grease in harmful quantities.

(6) Threatened and Endangered Species - The project area was seen to offer suitable habitat for a number of uncommon floral and faunal species. This is discussed in the EIS, 2-58 and 2-59, and 5-3. The Corps was concerned about the project's impact on four species in particular: the Eastern Cougar, Peregrine Falcon, Northern Bald Eagle, and the Furbish lousewort -- all are on the U.S. Engandered Species List. The U.S. Fish and Wildlife Service was contacted to provide expertise through consultation regarding the probable impact of the proposed Dickey-Lincoln

School Lakes project on these species. The results of the consultation are provided in Attachment 3.

(7) Benthic Life - Existing benthic communities within the impounded areas would be displaced and a new benthic habitat would result in establishment of new community structures. Also, benthic life below the impoundment would be stressed and diversity would be reduced. More details are available in the EIS and App. E.

(8) Wetlands - The effects of Dickey-Lincoln on wetlands were discussed in Section 230.4-1 and in Attachment 1. Any hydropower facility of a magnitude similar to Dickey-Lincoln in the Northeastern United States would undoubtedly have such effects -- alternative sites would only affect wetlands at other sites. As was stated in Section 230.4(c-1) the primary detrimental impact of this project on wetlands is related to biological systems.

In the case of Dickey-Lincoln School Lakes, the wetland impacts, according to EPA Guidelines, may be permitted if:

"(a) the activity associated with the fill must have direct access or proximity to, or be located in, the water resource in order to fulfill its basic purpose, or that other site or construction alternatives are not practicable; and

(b) that the proposed fill and the activity associated with it will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected ecosystem, or that the discharge is part of an approved Federal program which will protect or enhance the value of the wetlands to the ecosystem."

An examination of these factors as related to the Dickey-Lincoln

School Lakes project allows determination that the project can be permitted through these requirements because: (1) a dam ("the activity associated with the fill") must be located in the water resource in order to create an impoundment for the basic purpose of creating electrical power; (2) other dam sites to provide the same purpose have been considered and determined not as practicable; (3) construction alternatives to provide an impoundment for hydropower do not exist; and (4) the major beneficial water quality uses of the affected ecosystem have been found to be limited to recreation uses such as fishing and canoeing. Disruption thereof is not considered unacceptable because of the presence of similar underutilized resources in the region having higher quality.

(9) Submerged Vegetation - All wetlands (as defined here) contain submerged vegetation. Such areas within the project area and the significance of biological productivity thereof can be derived from Attachment 1.

(10) Size of Disposal Site - In consideration of alternative reservoir sizes (and sites), it was found that impacts would be qualitatively similar for any hydroelectric installation in the Northeast. The selected level for Dickey-Lincoln School Lakes project was based on optimization of economic and power production with limitation by environment, site and marketing. The size of the proposed Dickey-Lincoln School Lakes project has been limited (the physiography of the area would permit a much larger impoundment) by consideration of unacceptable backwater effects on both the Allagash National Wild and Scenic River and areas within the Province of Quebec, Canada. Further reduction of the size to a degree sufficient to realize meaningful environmental advantages, would also defer feasibility of the site. Such a reduction would most likely create the need for other alternative energy sources, as were discussed in Section

230.5-a, and in more detail in the EIS and App. I.

230.5(c) Applicable Considerations in Determining the Site and Disposal Conditions to Minimize the Possibility of Harmful Effects:

(1) Appropriate scientific literature has been consulted for all aspects of the project to find mitigation measures for impacts to fisheries, wildlife, wetlands, downstream water quality and reservoir management;

(2) alternatives to the method of inundation are not feasible;

(3) not applicable - refers to disposal of waste material;

(4) not applicable - refers to ocean disposal of waste material;

(5) not applicable - refers to covering contaminated waste material;

(6) conditions to minimize the effect of runoff from construction areas have been established (see Attachment 2); and

(7) monitoring conditions in accordance with the Regional Administrator (EPA), would be established as necessary to control and minimize water quality degradation (see Section 230.4-2).

230.5(d) Contaminated Fill Material Restrictions:

The material that would be discharged is not expected to contain unacceptable quantities, concentrations or forms of the constituents deemed potentially critical by the analysis presented in Section 230.4.

230.5(e) Mixing Zone Determination:

Methods specified (40 CFR 230) in this section to be used in determining the mixing zone are only vaguely appropriate to show dispersion of constituents for discharged material in this project. The area of inundation was, of course, arrived at by other engineering methods. The downstream mixing zone of constituents identified in Section 230.4-2, however, is related to factors outlined in EPA guidelines as follows:

- (1) surface area, shape and volume of the discharge site;
- (2) current velocity, direction and consistency at the discharge site;
- (3) degree of turbulence;
- (4) stratification attributable to causes which include, but are not limited to, salinity, obstructions and specific gravity;
- (5) any on-site studies or mathematical models which have been developed with respect to mixing patterns at the discharge site; and
- (6) other factors prevailing at the discharge site that affect rates and patterns of mixing.

Consideration of such factors indicate that the construction of the Dickey-Lincoln School Lakes Dams would affect water resources a considerable distance downstream. Item (6) above is however the most appropriate consideration in this instance. Although some effects of the reservoir may occur much farther away, the Edmunston-Madawaska region (see map) has been designated as the downstream boundary of ecological effects because of existing water quality degradation below this area resulting from pulp and paper effluents (App. E, p. 105). The downstream area is discussed in detail in App. E, pp. 34-38; the most important effects are discussed on pp. 105-122.

Chapter 7

CONCLUSION

The Saint John River, separating a large section of the northeastern corner of the United States from Canada, is part of the largest remaining semi-wilderness area on the East Coast of the United States. As such, it offers some of the most spectacular hunting, fishing, canoeing and primitive camping opportunities in New England although the major use of the area is commercial logging.

The Saint John River is also perhaps the best remaining site in the Northeast for developing conventional hydroelectric power. This development and its associated hydroelectric operation and transmission requires impoundment of a portion of the Saint John River Basin. It is the responsibility of the Corps of Engineers, in accordance with Congressional directives, to investigate and (if so authorized) construct such facilities to meet the increasing demands for energy.

It is also the responsibility of the Corps, in accordance with the National Environmental Policy Act and the Water Pollution Control Act, to investigate alternatives and present those and any effects associated with the project that impact the human environment and water resources. It is my conclusion, through review of this evaluation, that the water resource concerns outlined by the EPA Guidelines (40 CFR 230) have been clearly identified to arrive at the determinations required by Section 230.3(a) of the Act.

In accordance with this requirement, I have determined that every attempt has been made to provide for, with pertinent consideration of

physical laws and known ecological phenomena, reasonable minimization of and/or mitigation for adverse environmental impacts. Consideration has been given to the need for the project, the availability of alternative sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law.

In this case, it is obvious that the activity associated with the fill (impounding water) must be located in the water resource to provide its basic purpose.

I have determined that no unacceptable disruptions to existing beneficial water quality uses will result from the project. I therefore conclude that the Dickey-Lincoln School Lakes project can be specified through application of the Federal Water Pollution Control Act, amended as the Clean Water Act of 1977.

22 August 1980
(Date)

Max B. Scheider
MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

DEFINITIONS OF TERMS

The following terms are defined in the perspective of this evaluation.

Benthic. Of, relating to, or occurring at the bottom of a body of water.

Biological Oxygen Demand. The oxygen used in meeting the needs of aerobic microorganisms in water rich in organic matter.

Constituents*. Chemical substances, solids, and organisms associated with dredged or fill material.

Contaminant. Something that, when introduced into an environment, creates undesirable reactions.

Discharge of Fill Material*. The addition of fill material into navigable waters for the purposes of creating...(among other things) impoundments of water. The term generally includes...dams and dikes.

Fill Material*. Any pollutant used to create fill in the traditional sense of replacing an aquatic area with dry land or of changing the bottom elevation of a body of water for any purpose.

Mitigate. To cause to become less harsh or hostile; to make less severe or painful; alleviate.

Navigable waters*. Generally, up to the high water mark of any U. S. waters greater than 5 cfs average flow, and any water resources contiguous to such waters including, but not restricted to lakes, ponds, wetlands, and intermittent streams.

Nekton. Free swimming aquatic animals essentially independent of wave and current action.

Plankton. The passively floating or weakly swimming, usually minute animal and plant life of a body of water.

Riparian. Related to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater.

Wetlands*. Those areas that are periodically inundated and that are normally characterized by the prevalence of vegetation that requires saturated soil conditions for growth and reproduction.

* Definitions from 40 CFR 230 (EPA Guidelines App. A).

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ATTACHMENTS

ABSTRACTS

1. Wetlands

A consideration of wetlands within the influence of the proposed Dickey-Lincoln School Lakes project; types, values, extent, impacts, and mitigation are discussed.

This report is derived from a study of wetlands done by Environmental Research & Technology, Inc., in response to Corps of Engineers Contract No. DACW33-76-C-0039.

2. Erosion and Siltation Mitigation

A discussion of methodologies that could be applied during construction of the Dickey-Lincoln School Dams to minimize erosion and siltation and prevent unnecessary unacceptable downstream water quality degradation.

3. Rare and Endangered Species Consideration

A discussion of rare and endangered species found within the Dickey-Lincoln School Lakes impact influence. Extent, impacts, and mitigation are described. A collection of letters from the U. S. Fish & Wildlife Services is attached to provide an outside concern's judgment of such potential impacts.

4. 404 Coordination

A collection of official coordination relating directly to the 404 evaluation. Includes the public notice releasing the 404, and letters received by the Corps regarding this release.

ATTACHMENT 1 - WETLANDS

I. INTRODUCTION

Wetlands are defined for the purposes of this report as: Those areas that are periodically inundated and that are normally characterized by the prevalence of vegetation that requires saturated soil conditions for growth and reproduction.

Wetlands within the St. John watershed serve a wide range of functions depending upon their location, topography, soils, geology, hydrology and vegetative types. One primary function is their value as wildlife habitat. Approximately 1,714 acres of wetlands and 5,989 acres of deep-water habitats including 237 miles of riparian habitat would be inundated by the proposed lakes (EIS and App. F). Evaluation of these losses, surrounding wetland habitats, and the shoreline environments of the proposed lakes is the basis for considering future wetland management alternatives.

II. WETLAND VALUE AND CLASSIFICATION CRITERIA

Vegetation is a key factor in evaluating wetland habitats. It is recognized that wetlands are particularly valuable for their contribution to the botanical diversity of the St. John watershed. Most notably, the St. John River riparian zone provides an important habitat for rare and unusual plant species (App. F, pp. 19-48); it is here that the endangered Furbish lousewort is found. In the heavily forested uplands, bogs represent a contrasting stage of succession with unique botanical associations. Species such as pitcher-plant (Sarracenia purpurea), sundew (Drosera rotundifolia), lady's slippers (Cypripedium spp.) and bog rosemary (Andromeda glaucophylla) are usually restricted to such bogs.

The wildlife values of wetlands are also recognizably important. Such values can be derived from the predominate vegetation class and location in the St. John watershed. Certain values are implied from the general classification criteria of dominant vegetation form, water depth during the growing season, and degree of seasonal flooding. The wildlife value of any wetland type is greatly influenced by topographic and hydrologic position.

Although many vegetative factors contribute to wetland habitat values, overall vegetative diversity within the wetland and surrounding habitat is necessary for wildlife diversity. A variety of plant life-forms (i.e., physical structure or growth habit) is critical for bird and waterfowl diversity. Wildlife habitat is enhanced by the "edge" created by an interspersed of different plant life-forms. Population

density and wildlife species diversity are closely related to the length and number of kinds of edge. Surrounding habitat is important in that species utilizing the wetland often depend upon adjacent upland areas for food or cover. Juxtaposition with other wetlands usually increases wetland values especially if it means a greater interspersion of vegetative life-forms. The interspersion of vegetative cover and water is also a critical habitat feature. In general, a cover-water ratio of 50:50 is considered near optimal for maximum numbers and diversity of marsh birds (Golet and Larson, 1972).

The key vegetative factors emphasize habitat conditions that promote wildlife diversity. Often, wetland values emphasized in the literature pertain to waterfowl habitat. The same criteria can promote a diversity of other wildlife. For instance, structural diversity of vegetation in wooded wetlands encourages a greater diversity of songbirds.

Water depth is important as it influences vegetation types and availability of underwater food. A water depth of 2 meters is considered the boundary between wetland and deep-water habitats. This depth represents the maximum limit for the growth of emergent plants (Sculthorpe, 1967; Cowardin et al., 1977). Generally, wetlands are more valuable when adjacent to deep-water habitats. Open water areas provide resting and feeding areas for waterfowl but their value for other wildlife is limited by the lack of emergents.

Seasonal flooding is a key factor influencing vegetation development and food availability in many wetland areas. Water fluctuations are closely related to hydrologic position. Streamside wetlands usually undergo wide water level fluctuations between early spring and late summer. Severe fluctuation can affect nearly all breeding wildlife. For migrating waterfowl, seasonal water levels is a key factor affecting the abundance of a particular food item (Mendall, 1949). Spring food sources are available to migrating waterfowl in seasonally flooded flats that are not normally available at other times of the year. The seasonal flooding promotes herbaceous and shrub communities which are valuable to upland species.

On a watershed basis, wetland values are often related to physiographic location which determines the geologic substrate and, often, the size and abundance of wetlands. Section III discusses the occurrence of various types of wetlands within the proposed impoundments and surrounding area.

III. EXISTING WETLAND AND DEEP-WATER HABITATS

Wetland types and deep-water habitats such as ponds and major rivers in the Dickey-Lincoln area were mapped during the terrestrial ecosystem analysis (Draft EIS, Appendix F, 1977). Delineation of these types was based upon stereoscopic interpretation of color-infrared photography (scale 1:20,000) with accuracy to 1 hectare delineation (2.5 acre). Although they are often too small to be effectively mapped, beaver impoundments which predominate in the higher elevation contribute to the existing wetland habitats in the heavily forested area.

Descriptions of Wetland Types Found in the Project Area

The classification of wetlands implies certain general characteristics for each type. Wetland delineations on the vegetation cover map (Draft EIS, Appendix F, August, 1977) follow a classification system (McCall, 1972) which was adapted from "Wetlands of the United States" (Martin et al., 1952). Principal components of the system are the dominant form of vegetation, water depth during the growing season, and degree of seasonal flooding.

Each of these types of wetland have different qualities in regard to biological functions, including food chain production; general habitat and nesting, spawning, rearing and resting sites for aquatic and land species. A summary of the different wetland types in the area to be inundated and nearby uplands is presented in Table I. A description of each follows:

Seasonally Flooded Flats

These flats occur along the river where flooding ordinarily occurs in spring or late fall. The soil is covered with water or is waterlogged during variable seasonal periods, but is usually well drained during the growing season. Typical vegetation is grasses, short meadow emergents, and bushy or tall slender shrubs.

In the St. John River Basin, there is considerable seasonal variation in runoff. Seasonal flooding is greatest during the months of April, May, and June. When the water subsides, grasses flourish on many flats adjacent to the rivers. Except for their flood plain location, the seasonally flooded flat appears very similar to the meadow type. Areas subject to only temporary flooding rarely develop any wetland vegetation. Shrub complexes dominated by alder, willow, and silky dogwood also develop on uplands adjacent to the seasonally flooded flats.

Meadow

This type applies to shallow basins without standing water most of the growing season but the soil is waterlogged to within a few inches of the surface. They may also be found on the landward side of shallow marshes. In some cases early succession of former beaver ponds creates typical meadow habitat.

In the St. John River watershed, large shallow basins within the river flood plains best represent this type. They commonly show areas transitional between seasonally flooded flats and shallow marshes. The broad shallow basins adjacent to rivers such as the Little Black show standing surface water during spring runoff, however, they drain early in the growing season. A heavy cover of emergents such as sedges, rushes, and grasses occur in these meadows. Tussocks of emergents are common in wetter areas.

Shallow Marsh

Shallow marshes fill shallow basins or border deep marshes. Soils are usually waterlogged and often covered with 6 inches or more of water. The type may be dominated by robust or marsh emergents. Permanent waters may support submergents and floating-leaved plants. Plant cover is generally more than 50 percent and often more than 90% of the marsh area.

Shallow marshes dominated by narrow-leaved emergents such as bur-reeds, bulrushes, and sedges are the typical subtype in the project area. Scattered shrubs are common associates. Secondary beaver impoundments often create the water regime found in shallow marshes, but the vegetation cover is not well developed. Shallow marshes located in the river flood plains show higher spring water levels similar to deep marshes, but they soon return to shallow marsh conditions during the growing season.

Deep Marsh

Deep marshes occupy shallow lake basins and ponds, or border large open water bodies. The average depth is between 6 inches and 3 feet during the growing season. Emergent marsh vegetation or aquatic shrubs dominate shallow water areas. Surface and submergent plants may occur in the open water areas.

In the Dickey-Lincoln project area deep marshes occur in old oxbow channels or riverside basins. Aquatic shrubs such as speckled alder and silky dogwood will commonly border the type. Beaver impoundments create small deep marsh habitats with standing dead trees and shrubs as the principal form of cover. A general lack of emergent cover is found in the dead woody marshes.

Shrub Swamp

This type applies to wetlands dominated by shrubs where the soil is seasonally or permanently covered with a foot or more of water.

In the Dickey-Lincoln project area, they occur commonly in flood plain basins and along sluggish or diffuse streams. Three subtypes are found in the project area: 1) tall, slender shrubs dominated by mature speckled alder, 2) bushy shrub swamps including silky dogwood, willows and young alders, and, 3) compact shrub swamps dominated by sweet gale, leathleaf and meadowsweet.

Wooded Swamp

This type occurs on flat uplands, shallow lake basins and along sluggish streams. The soil is normally waterlogged but may be seasonally with a foot or more of water.

Coniferous swamps composed of northern white cedar, tamarack, and black spruce dominate the wooded wetlands in the project area. In most cases, northern white cedar swamps are representative of this type. Black spruce and tamarack generally occur as a subtype or late seral stage of bogs in this region. Sphagnum moss is a dominant ground cover of both the wooded swamps and bogs.

Bogs

Bogs occur most often in upland basins with blocked or closed drainage. They are normally saturated but not usually covered with water. A spongy mat of sphagnum mosses usually covers the bog. Woody plants including ericaceous shrubs and coniferous trees may also occur. The substrate contains an accumulation of partly decomposed or disintegrated remains of plants. Open water areas within bogs are invaded by a floating mat, as well as being filled by organic matter.

Most bogs in the project area are covered by the characteristic mat of sphagnum moss with surrounding zones of shrubs and coniferous trees. Common shrubs include bog rosemary, labrador-tea, and sheep laurel. Stunted black spruce is often scattered in these bogs. Mature black spruce commonly surrounds the basins.

River

The major river systems in the project area (St. John, Big Black and Little Black Rivers) are included in this category. The riverine classification includes all wetlands and deep-water habitats within the river channel except islands. Wetlands not within the channel but influenced by the flooding river are classified separately. The

wetland and deep-water habitats of the rivers are strongly influenced by water depth and flow. These habitats show significant seasonal variation due to changing river flows. The interspersions of herbaceous vegetation, shrubs, and trees along the rivers creates a diverse riparian ecotone; it is here that many rare and unusual plant forms, including the Furbish lousewort, are found.

Pond

This category includes ponds and small lakes with permanent open water. Ponds in the project area are generally 3-12' deep (EIS, 1977). Marsh vegetation, shrubs, and conifers border the open water. In shallow-water areas (less than 6 feet) aquatic vegetation develops.

Beaver ponds were not recognized as a distinct wetland class because most were less than 2.5 acres and relatively impermanent. There is considerable beaver activity on most streams within the project area. Food supply is critical to the development of beaver ponds. Hardwoods are preferred food for beavers, but there is also a preference for aspens. When greater than 2.5 acres, the typical beaver pond is classified as a deep marsh. It appears as a dead woody marsh once shrubs and trees have died. Within a few years floating-leaved plants and emergents like burreed and sedges may develop. The longevity of the ponds depends greatly on the food supply available for the beavers.

Acreage summations (Table I) reflect the dominance of the riverine systems in the lower valley. River systems represent 6.6% of the land area and 74% of the existing wetland and deep-water habitats within the proposed impoundment areas. Excluding rivers and ponds, existing wetlands types represent 2% of the lower valley. If the reservoir acreages are excluded from the original study area, the extent of adjacent upland wetlands can be derived. Within this 2-mile border, wetland and deep-water habitats cover 0.5% of the land area. Upland wetlands also cover 0.5% of the adjacent land area between the Dickey Reservoir and the Canadian border.

In the lower valley (i.e., reservoir areas), seasonally flooded flats are the dominant type (27%), however, other wetland types are well represented. In contrast, bogs are the dominant type in the 2-mile upland border (60%) and adjacent study area (47%). When evaluating the existing upland wetland habitat, it must be recognized that beaver ponds less than 2.5 acres were not included in the mapping. Considerable beaver activity occurs on most streams within the project area. The beaver ponds are assumed to be important wetland habitat in upland areas based upon the fact that there are 3,450 miles of intermittent and flowing streams in the upper St. John River basin above the proposed dam sites.

TABLE II.2
SUMMARY OF WETLAND TYPES

Wetlands Types ¹ :	Dickey ² Reservoir <u>acres</u>	Lincoln School ² Reservoir <u>acres</u>	Study Area ³ <u>acres</u>	Adjacent Upland Area ⁴ <u>acres</u>
Type 1 - Seasonally flooded flat	427	158	610	109
2 - Meadow	147		238	
3 - Shallow marsh	216		333	30
4 - Deep marsh	60		83	15
6 - Shrub swamp	385	3	485	79
7 - Wooded swamp			38	
8 - Bog	318		880	438
4110 - River	4,613	1,081	6,063	
4220 - Pond	295		600	253
TOTAL	6,461	1,242	9,330	924

¹Types according to McCall, C. A. 1972. Manual for Maine wetlands inventory. Maine Dept. of Inland Fisheries and Game.

²Reservoir areas cover 83,886 acres for Dickey (913 elev.) and 2,619 acres for Lincoln School (610 elev.).

³Study area total 390,118 acres which includes the reservoir areas and two areas surrounding the project.

⁴Refers to 183,768 acres of land between the U. S. - Canadian boundary and the proposed reservoir as it inundates (913' elevation) along the Big Black River or Shield Branch and along the Little Black River.

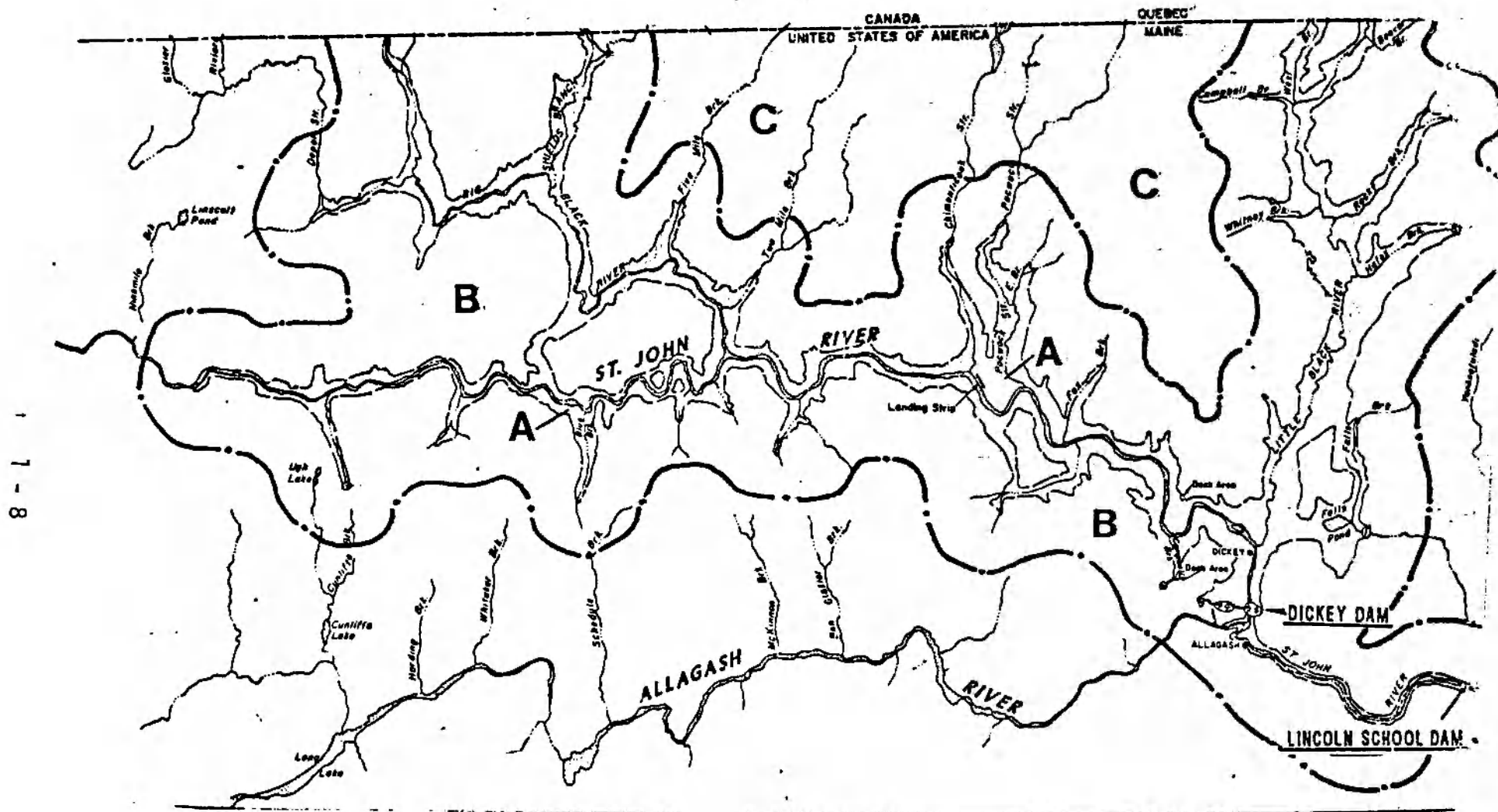


Figure 2.1 (A) Impoundment Areas (B) Study Area (includes impoundments) (C) Adjacent Upland Area

(A) Impoundment Areas

(B) Study Area (includes impoundments)

(C) Adjacent Upland Area

IV. KEY WETLAND AREAS

One key factor in recognizing the value of wetlands within a large area is juxtaposition with other wetland and habitat types. The physiography of a large area usually contains certain areas that favor increased diversity of habitat types as opposed to other areas which are vast expanses of a nearly mono-specific habitat type. A wetland's value is generally higher if located near other wetlands, especially if those wetlands represent themselves different wetland types. Moreover, the value increases even further if these wetlands are interconnected by streams. Such a composite often creates specific areas that, as units, represent the highest value on a regional scale.

The following are the most significant wetland areas that would be inundated by the reservoirs (see map for spatial recognition).

- 1) Portion of Little Black River flood plain
- 2) Nine-mile Deadwater of Big Black River
- 3) Lower stretch of Shields Branch
- 4) Little Falls and Falls Ponds

- 1) Little Black

The Little Black flood plain from the mouth of Johnson Brook upstream to the mouth of Oxbow Brook contains diverse wetland habitats interspersed with shrub, spruce fir, and mixed hardwood-softwood types. Along this 5-mile stretch, the river meanders with many old oxbows. Shrub swamps and meadows are the dominant wetland types categorized on the vegetation map. The broad wetland areas are interspersed with other wetland types including shallow marsh, deep marsh, and seasonally flooded flats. Both the meadow and shrub swamp types occur as broad flood plain basins. Their water regime is influenced by seasonal flooding of the Little Black River and small streams which diffuse through the basins. Old oxbows create deep marsh habitats that were too narrow to be delineated on the vegetation map. Deep marshes are present at Carrie Bogan and are more numerous in the first half-mile downstream from Oxbow Brook.

The Little Black River flood plain exists as an important wetland area due to its extent and interspersion of vegetation types and open water. A diversity of meadow and marsh emergents and shrubs increases the value of the area for upland wildlife species. The shrub swamps are composed of low compact shrubs

including sweet gale (Myrica gale), leather-leaf (Chamaedaphne calyculata), and meadowsweet (Spiraea latifolia). Speckled alder (Alnus rugosa) commonly occurs on the river bank and seasonally flooded flats.

Open water areas are associated with both the meadow and shrub swamps. The river is valuable to waterfowl as a travel way between the wetland complexes. This broad flood plain area is also part of a large winter deer yearling area.

2) Nine-mile Deadwater of the Big Black River

The Big Black River flood plain for approximately five miles downstream from Shields Branch is another example of large flood plain wetland complexes associated with a major riverine system. This wide slow moving portion of the Big Black River provides a larger deep-water habitat than the Little Black River. Shallow marshes, shrub swamps, seasonally flooded flats, and bogs occupy a significant portion of the adjacent flood plain. Shrub types dominated by alder and dogwood are well interspersed with the wetlands. Deep marsh portions are found in the large shallow marsh types.

The flood plain area is also important because of its size and interspersed wetland types. Shallow marshes are a dominant type and offer an important wildlife habitat. Bogs are the least valuable habitat within wetlands of this complex due to their lack of open water. The bottomland location of these wetlands increases their wildlife value.

3) Shields Branch

Shields Branch meanders for approximately 3 miles from its mouth on the Big Black River. Portions of this flood plain are a half mile wide with intermixed deep marsh, shrub swamp, and shrub types. Deep marsh habitats are principally old oxbows. The area is a distinct contrast to the surrounding spruce-fir forests.

Again, the overall value of the area is related to its size and interspersed types. The Shields Branch complex could be considered as a continuation of the Nine-mile Deadwater of the Big Black River. This proximity of the wetland complexes and the interconnected rivers increases the wildlife value of both areas.

4) Little Falls and Falls Pond

Little Falls and Falls Pond, excluding the river systems, are the largest deep habitats (70 and 263 acres) within the proposed reservoirs. These well oxygenated trout ponds have maximum depths of 6-7'. This maximum depth indicates that these ponds are approaching deep marsh habitat. A depth of 6' is considered the maximum for emergents. Little Falls Pond is surrounded by shrub swamp which provides valuable wildlife cover. Falls Pond exists as the largest open water body with adjacent bog habitat. The juxtaposition increases the wildlife value of the bog.

V. FUTURE WETLAND HABITATS WITH THE PROPOSED PROJECT

Surrounding Wetland Habitats

Section II.2 indicates that wetlands are less common in upland areas adjacent to the proposed lakes. Wetland complexes comparable to the key areas associated with existing river systems (Section II.4) do not exist in the surrounding study areas. However, rising water tables, and newly created shoreline areas will create lakeside and deltaic wetlands that do not presently exist. Bogs are the dominant upland wetland type. Also, although their percentage of land cover is less, ponds are more numerous in the surrounding study area than in the proposed impoundments. In addition, the acreages in Table I do not include nearby Charles Pond and Depot Lake. The estimated population of 441 beaver within the 2-mile limit compared with 98 beaver within the impoundment (EIS, Appendix F, 1977) indicates that beaver ponds will continue to be a common wetland type.

Shoreline Habitats of the Proposed Lakes

Wetland habitat values created by the proposed lakes are dependent upon the characteristics of the shoreline and shallow water zones. The newly filled lakes will be subject to inevitable shoreline modifications. Alteration of the shorelines will be determined by the processes of erosion and sediment transport. The lake configuration, shore substrate, magnitude of waves, lake currents, depth of water near shore, and shoreline slopes will influence the lakeside morphology. In addition, the exposed shoreline zone of Dickey Reservoir will change due to annual and seasonal fluctuations of the hydrologic cycle. Lincoln School Reservoir will be subject to daily fluctuations.

Dickey Lake would cover approximately 134 square miles of water surface and have 390 miles of extremely irregular shoreline typical of a highly dendritic lake. The St. John river arm has 31 tributaries where major coves will form in the lake. The Little Black and Big

Black Rivers have 17 and 16 tributaries, respectively, that would form major coves (EIS, 1977). The dendritic configuration means that wave impacts will vary along the shorelines. Prevailing winds will determine the shore exposed to wave impact.

The proposed project construction includes clearing of vegetation from the maximum pool level (910 elevation) to the 913 elevation. Although partially stabilized by the existing vegetation, the 910- to 913-foot elevation zone would be subject to erosion by wave action. Water table changes are expected to occur in this zone. Higher water tables may occur when glacial till is flooded as the reservoir pool rises and the groundwater system adjusts to the new regime. Near the reservoir shoreline, the water table would rise to reach the surface and seepage would emerge at and just above the reservoir level.

Vegetational development along the perimeters of Dickey Lake would range from sparse colonization on coarse eroded shores to possibly stable plant communities on gently sloping or sheltered areas. Colonization of rocky or steep slopes would be restricted or prevented in many cases. The nature of the forest soil in the project area may create problems of vegetation establishment on the shoreline terrace. Glacial tills soils supporting spruce-fir are shallow with a hardpan layer often within 18 inches of the surface. Erosion of surface soils to the hardpan layer would create poor sites for plant development. In addition, fluctuating water levels could create broad terraces and transitional habitats in the littoral zone. Finer material on second terraces may be disrupted by wave-cut action following drawdown. The shoreline of Lincoln School reservoir would be subject to dramatic change. The weekly change of 12 feet would create coarse eroded shores. The severe fluctuating levels would alter development of stable second terraces.

Various species may colonize finer sediments exposed by Dickey Lake drawdowns during the growing season. Areas with 1% slope have a 200-foot width exposed. The presence of specific emergents would depend on the time of year when the area is exposed, the amount of subsequent flooding, and the plants already in the vicinity (McDonald, 1955). Emergents found invading exposed shores include bulrushes (Scirpus spp.), smartweeds (Polygonum spp.), spikerush (Eleocharis spp.), nutgrasses (Cyperus spp.), sedge (Carex spp.), sweet gale (Myrica gale), steptebush (Spirea tomentosa) and grasses (McDonald, 1955; Miner, 1974).

Depending on the duration of maximum water levels, plant community development on nearly level slopes similar to shallow marsh, deep marsh, or shrub swamps would be expected on sites not affected by extreme terrace formation. The late drawdown sequence would create only limited areas typical of seasonally flooded flats or meadows.

There are numerous terrestrial plants known to be able to live for considerable periods completely or partly submerged. Shrub and grass-sedge communities would probably dominate the seasonally flooded areas. Speckled alder, red-osier dogwood and willow are dominant shrub species in the seasonally flooded zone of the onsite river systems. Alders are also primary invaders of denuded areas with saturated soils (Healy and Gill, 1974). Since they are adapted to a variety of soil types, speckled alder, red-osier dogwood, and willow are expected to be significant lakeside species. In other seasonally flooded areas, emergent vegetation such as grasses, sedges, and rushes may form lakeside communities. Tree species associated with seasonally flooded areas include elm and black ash. Seasonal flooding of depressions adjacent to the lakes may create shrub or wooded swamp habitat. Shrub swamp species include alder, dogwood, willow, sweet gale, leatherleaf and spireas. Wooded swamps may be dominated by northern white cedar, black spruce, or tamarack.

In evaluating shoreline habitats surrounding Dickey Lake, the cover configuration offers the greatest potential wildlife value. The hydrologic regime would create an ever-changing continuum of environments intergrading between terrestrial and aquatic systems. However, the water levels would be fairly stable during June-August period. This should allow some vegetation establishment in shallow cove areas. The association of stream and riverways with the coves increases their habitat potential. Rapid vegetational succession in typical hydrospheres does not occur in the absence of inwashed inorganic sediment, even though the accumulation of plant debris may provide organic substrates apparently favorable to succession (Sculthorpe, 1967). Sediment deposition would occur at the mouth of each tributary entering Dickey Lake. Shore and near shore slopes, wave impacts, and lake currents would determine whether delta sites will form. Deposition from major waterways such as the St. John River, Big Black River, Shields Branch, Chimenticook and Pocwock Streams should encourage delta formation. Smaller tributaries including Brown Brook, Campbell Brook, Blue Brook, and Depot Stream will enter the lake where slopes are gentle. Sediment accumulation will promote vegetation development. Initially, emergent species would vegetate the delta sites. As delta sediments build up above the water level, shrub communities would develop. Habitat juxtaposition is especially important in evaluating lakeside sites. Delta sites should offer the closest proximity to the lake environment. Habitats at the mouth of tributaries would have increased values as a result of their connection with the lake cove via the riverways. Due to the changing hydrologic regime, lakeshore habitats below the 913 elevation may have greater value to upland species which utilize the vegetation transition zones. Lakeshore habitats would often be isolated from the open water by coarse terraces or fine sediment flats.

Structures

The use of structures to regulate water levels is critical in establishing productive wetlands. Structures designed to remove surface water as opposed to bottom water promotes greater wetland fertility (Cook and Powers, 1958). Simple weirs or drop inlet ponds can provide the necessary structures for most small marsh development in the upland areas surrounding Dickey-Lincoln. Programmed control of water levels can optimize breeding habitat, food and cover for wild-life species (Cringan, 1971; Mendall; 1949). Water level management has been shown to affect food choice of Maine black ducks (Mendall; 1949). The proper use of structures in conjunction with food plantings can increase wetland productivity. Another structural option is to promote beaver ponds although less desirable for food management programs.

Structures can be used to mitigate the fluctuating level of Dickey Lake. The use of dikes at the mouth of riverways would encourage sediment deposition and control water levels for wetland development. Dikes designed to maintain water levels 1-6 feet deep would create shallow marsh to deep marsh wetland types. The structural specifications would require coarse rock breakwater to prevent soil erosion. Other engineering specifications would depend upon the flow of the incoming stream.

Food Plants

Managed wetland habitats would allow effective food planting programs. Controlled water levels is the key to maintaining optimum growth and seed or tubes production of introduced plants (Mendall, 1949). Local food studies would be necessary in the Dickey Lincoln area before effective planting programs could be carried out. A listing of marsh and aquatic plants in the Northeast Region ranks pondweeds (Potamogeton spp.), bulrushes (Scirpus spp.), smartweeds (Polygonum spp.), and wild rice (Zizania aquatica) as having highest waterfowl usage (Martin et al., 1961). A study in Maine, including the St. John River area showed that water bulrush (Scirpus sub-terminalis) and Torrey's three-square bulrush (S. torreyi) were the principal fall and summer foods for black ducks. Bur reeds (Sparganium) were next in importance. Sedge seeds and bur reed seeds were predominant spring foods (Mendall, 1949). Wetland food plants can be supplied for other specific wildlife such as deer. Water-parsnip (Sium suave), water smartweed (Polygonum amphibium) and arrowhead (Sagittaria latifolia) were common species utilized by deer in the Big Meadows area (New Brunswick) along the St. John River (Skinner and Telfer, 1974).

Possible Impacts to Downstream Wetlands

The reservoirs will significantly modify the flow regime of the St. John River for a considerable distance downstream of the Lincoln-School Dam. Although this modification will not constitute the same totality of displacement as inundation, various effects related to the artificially altered water levels will result.

Existing riverine habitats have evolved through natural selection in response to conditions which exhibit wide variation between seasonal flooding and drought conditions, but with little change on a daily or weekly basis. The reservoirs will eliminate these wide seasonal fluctuations, which affect the entire floodplain, and establish a new flow regime consisting of daily water level fluctuations of only 3-4 feet and up to five feet changes on a weekly basis. This will significantly alter the hydrologic conditions that have established existing riverine wetland systems.

These changes would undoubtedly produce conversion of many wetlands either to new wetland types (see wetland types and descriptions in Chapter III), or in many cases, to upland habitat. Likely examples of such conversions would include the change of a marsh to a meadow, or a seasonally flooded flat to "dry land". In some areas, the condition of daily flooding may result in creation of wetland, or riparian area that exhibits qualities difficult to categorize (or understand) within any natural freshwater wetland criteria. Such areas, hydrologically, may more resemble a tidal marsh--vegetal development will of necessity have adapted to daily inundation and exposure.

In most cases, any change to a new wetland type would not be a rapid process, but would most likely require a transition period of several years. During such a period, the area may be highly unstable--subject to erosion and of little value to fish or wildlife. Any newly created "dry lands" may provide areas desirable for cultivation; in this region, condition would be ideal for production of potatoes or hay.

The significance of such changes to existing wetlands would, as previously emphasized, be related primarily to the effect on biological diversity and productivity. Many fish and wildlife species that rely on existing riverine wetlands for food, reproduction, or other aspects of their life cycle would be adversely affected. The artificial flow regime below Lincoln-School (and associated wetland impacts) would eventually be attenuated farther downstream as water is reregulated by other reservoirs beginning in New Brunswick, Canada.

VI FUTURE WETLAND MANAGEMENT

Wetland management techniques could be applied to mitigate the loss of diverse wetland complexes and enhance the lakeside environment. Site selection, installation of physical structures and food plantings are critical management factors. Proper wetland management could increase wetland values and reduce the acreage replacement required to maintain wildlife populations.

Key areas for wetland management can be presented on the basis of anticipated need for diverse wetland complexes in the study area. Specific site studies would be needed to determine the actual development scheme. Several areas have been selected for their potential as key wetland areas once the reservoir has stabilized (See Figure I).

1) White Pond and associated brooks. White Pond and an associated bog complex exist on wet outwash. Two streams, White Brook and an unnamed stream, flow in outwash channels to the proposed Dickey Lake. The drainage system provides potential for developing diverse interconnected wetlands habitats between the Dickey Lake and White Pond. The two stream drainages would provide approximately four miles of management area. This would enhance that portion of the lake environment and the habitats through the wooded upland.

2) Ed Jones Pond. Ed Jones Pons exists beyond Seven Islands. Billy Jack Brook and an unnamed stream flow from the pond and adjacent upland to the proposed lake. The pond occurs on an alluvial terrace. Approximately 3/4 of a mile the stream length could be enhanced.

3) Blue Pond. Blue Pond and Blue Brook occupy a narrow alluvial terrace that would connect with Dickey Lake. The stream length between the Blue Pond and the lake is less than a mile. This area offers potential for wetland development along Blue Brook.

In general, small streams in surrounding uplands offer potential wetland enhancement areas. Wetland habitats are particularly valuable in the heavily forested uplands. Man-made marshes 5-10 acres in size provide valuable habitat. Many small marshes are effective in supplying the need for nesting sites. Beavers' flowages provide important nesting sites for waterfowl in Maine (Spencer, 1968). Beaver management could provide an effective means of wetland enhancement in the surrounding area. Delta sites provide additional areas for wetland management. The use of physical structures to control sediment deposition or water levels is a desirable wetland management alternative due to the following hydrologic regime of Dickey Lake. Food planting program could increase the value of exposed delta zones.

Conclusion

In conclusion, management techniques could be utilized to maintain valuable wetland habitats in the Dickey-Lincoln area. The loss of wetland acreage could be mitigated by developing contiguous wetland areas in conjunction with small upland wetland development in heavily forested areas.

A detailed wetland mitigation plan has been developed by the Corps of Engineers to be incorporated into the Final EIS. Should pending decisions support continuation of the project, then a decision as to wetland mitigation would be made. All or part(s) of this plan may be considered.

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ATTACHMENT 2

EROSION AND SILTATION MITIGATION

I INTRODUCTION

The first consideration for the prevention of erosion and siltation will come long before the ground is broken. Land use planning and construction planning are by far the least costly methods by which to avoid problems, both economically and environmentally. Planning will encompass methods which will use soils that are suited for the development, leave disturbed areas bare for the shortest period of time, consider runoff onto the construction sites from upland areas, reduce the velocity and control the flow of runoff from the construction sites, detain the flow of runoff on the sites to trap the sediment, and release this detained water at safe rates to downstream areas. In order to accomplish these objectives, various methods, described in more detail in following paragraphs, will be used to prevent erosion from occurring. These methods will include use of proper clearing, excavating and grading practices, diversion and disposal structures, land stabilization structures, mulching, and vegetal control measures. In many cases, even though effective erosion prevention measures will be employed, unavoidable siltation will still occur. In these cases, steps will be taken to trap the sediment on the construction sites before damage results to downstream areas. This will be accomplished by the use of various types of sedimentation traps or basins or vegetal control measures also described in following paragraphs. In many cases, a combination of these erosion and siltation prevention and control measures will be required for particular problem areas.

Many of the methods employed will be of a temporary nature and will be removed as soon as the construction is completed. In many cases, however, because of the changed topography caused by the construction developments, permanent control measures will be required. In these cases, proper maintenance will be provided in order to continue to protect land and water resources.

An overall plan will be made prior to construction showing existing and final locations, slopes, and elevations of areas to be disturbed. This will enable planners to see where and at what time during the construction period erosion will be most likely to occur and will also be helpful in making decisions as to which types of control measures will be needed for each particular situation. Various methods which will be used to prevent and control erosion and siltation are described in general terms in Section II while specific

measures to be taken for particular affected areas at the Dickey-Lincoln School Lakes project area are described in Section III.

II METHODS OF PREVENTION AND CONTROL OF EROSION AND SILTATION

A. CLEARING, EXCAVATING AND GRADING - Clearing, excavating, and grading in all instances will be kept to a minimum and all healthy vegetation will be saved when possible in areas where these operations are not necessary. Some areas will, of course, require much more disturbance than others; however, construction plans will include provisions for activities which will allow only those areas under immediate construction to be exposed. As those areas are completed, the next areas can be cleared, excavated, and graded. At the same time, the first areas can be restabilized with either protective vegetation or other land stabilization materials described in part D of this section. In this way, only those areas which must be left exposed will be subject to erosion. When this practice is not practical, then those areas which must be exposed for long periods of time will be protected by methods as described in parts B through E of this section. In all cases, stripped topsoil will be saved by stockpiling and then protected by reseeding or covering with a mulch such as hay or wood chips. In areas where long or steep cuts and fills are required, care will be taken to assure that all slopes are of a steepness and length which will be less prone to erosion from rain and runoff. In these areas other erosion and siltation measures, described in parts B through F of this section may be required to either prevent erosion or catch the sediment.

B. DIVERSION AND DISPOSAL MEASURES

Diversion and disposal measures will be used to intercept runoff and carry it to other more stabilized locations. Diversion will be accomplished by means of small earth dikes, interceptor dikes, ditches, and benches. Small earth dikes, not more than a few feet in height, and interceptor dikes, usually not more than a foot in height, will be constructed such that cross-sectional dimensions, proper dike materials, prevention of seepage, accessibility, and slope protection will be considered. Where necessary spillways will be provided over which outflow may drain safely. Benches, horizontal step-like cuts made at intervals down a slope, will be constructed so that their surfaces, over which water will flow, will be protected with vegetation or adequate mulching materials.

After the runoff has been intercepted by these methods, the water will then be released directly onto stabilized areas close by or will be carried to such areas at greater distances by disposal structures such as flumes, natural or man-made waterways, pipes, or rock lined channels. Flumes, man-made open channels of concrete, wood, metal or asphalt, pipes, either of flexible or rigid design, waterways, and

lined channels will be provided by first considering such factors as predicted quantities of runoff, hydraulic configurations of structures, protection of inlet and outlet areas, accessibility for maintenance, and maximum allowable velocities.

When permanent diversion and disposal measures are required, the aid of other structural, vegetal, or non-vegetal stabilizing measures described in parts C through E of this section will be considered.

C. STABILIZATION STRUCTURES

Stabilization structures will be used to protect or alter the ground surface where runoff velocities or turbulence are so great that the existing surface conditions would not prohibit significant erosion. Stabilization structures will be used to supplement diversion and disposal measures and will also be used as primary erosion control measures themselves in some cases. Stabilization structures which will be used are stone riprap, grade stabilization structures and energy dissipators, consisting of randomly placed stone, will be constructed such that water velocities are slowed to non-erodable speeds. Grade stabilization structures, which decrease steep slope gradients by providing steps over and through which water may flow, will be constructed of stone.

D. MULCHING

Mulching, the application of non-living material to the soil surface, will aid in the control of erosion by providing protection against raindrop impact and overland or channel flow. Mulches which will be used are hay, wood chips and gravel. Mulches will be used for both temporary and permanent protection, and where steep slopes are encountered, anchoring techniques will also be used.

E. VEGETAL CONTROL

Vegetal control will provide similar protection to erodable areas as compared to mulch except that the use of live vegetation will be employed primarily as a permanent control and beautification feature. Vegetation will also be used as sediment traps through which runoff may flow where velocities are not excessive. Vegetal control will be accomplished by use of natural existing vegetation and by the planting of grasses, legumes, trees, and shrubs. The consideration of basic planting principles will be adhered to where new vegetation is involved and includes preparation of planting areas, use of adaptable species, use of proper planting techniques, mulching where required, and fertilization where needed.

F. SEDIMENT RETENTION STRUCTURES

Sediment retention structures will be used to collect sediment resulting from unavoidable erosion. This will be accomplished by the use of sediment traps, such as hay bales, rocks, sand bags and small earth dikes and large sediment basins. Hay bales, rocks and sand bags, used to detail larger sized soil particles, will be stacked in a staggered pattern where low volumes of runoff are anticipated and will be keyed into the ground surface. Anchoring techniques will be used where required. Small earth dikes will be employed for similar runoff and sediment load conditions and will be constructed using criteria similar to that outlined in part B of this section. Dikes will also use emergency drains and energy dissipation materials where needed. Sediment basins, either natural or man made, using existing ground depressions or surrounding dikes, will be used to settle both coarse and fine grained sediments. Design and construction will require a proper engineering analysis and will include consideration of proper detention times so that turbidity level, a measure of the cloudiness of water caused by sediment, will be adequate. Turbidity levels will be checked frequently during construction and will conform to construction specifications established by the Corps of Engineers before water is discharged to downstream areas.

III EROSION AND SILTATION MITIGATION AT DICKEY-LINCOLN SCHOOL LAKES

A. DAM AND DIKE FOUNDATION AREAS AND EMBANKMENTS

1. Upstream and downstream cofferdams will be constructed prior to the start of embankment construction for the North Dam. Interceptor dikes and sediment basins will be constructed near the upstream and downstream toes of the South Dam Embankment. In addition, flow emanating from the drainage area upstream of the south dam will be diverted in a northwesterly direction to an established channel of an existing brook which flows down the slope to the north of the south damsite. The diversion ditch will be lined with stone to prevent erosion. All Stripping, excavation and fill operations will be made within these cofferdams and dikes.

2. Sediment basins will be located adjacent to the dikes. The cofferdams will be designed to contain sediment laden runoff during periods of heavy precipitation. Discharge water from these basins will not be permitted to enter the rivers until turbidity levels meet established specifications.

3. To minimize erosion of the earthen embankment materials, stone protection materials required to be placed on the outer slopes of the embankment, as part of the permanent works, will be constructed concurrently with adjacent earth materials.

B. IMPERVIOUS BORROW AREAS

1. Impervious earth fill materials for the dams will be obtained from glacial till deposits located upstream of the damsites. From an environmental standpoint, the impact will be less for these areas than for any areas located outside the reservoir. These borrow areas require shorter length of haul roads, less area to be cleared, leave only some final excavation slopes that could be seen from a public road, and reduce the deleterious effects of sedimentation on downstream fisheries.

2. Prior to stripping the impervious borrow areas, interceptor ditches and dikes will be constructed along the downhill toe of the borrow areas. These ditches will be designed to adequately drain all subsurface seepage and surface runoff from these areas. The ditches will be designed with a slight gradient and lined with non-erodible material to prevent erosion and will lead the flow to sediment retention basins located at the toe of the borrow area. Lined channels, flumes or pipes provided with energy dissipators will lead the flow down the slope where additional sediment basins will be constructed adjacent to the river. Discharge water from the sediment basins will not be permitted to enter the river until the turbidity levels meet levels established by the Corps of Engineers.

3. The borrow areas will be separated into 2 to 4 parts, each part containing only enough material needs for one construction season. Clearing, stripping and borrow excavations for each season will be restricted to the part of each borrow area containing the material needs for that particular season. During the planting seasons (May-June and August-September), completed final excavation slopes will be topsoiled, seeded or hydro-mulched to minimize erosion.

4. The borrow areas will be designed to leave excavated portions with side slopes of 1 vertical on 3 horizontal or flatter and a large nearly flat bottom. The final bottoms will slope downward and toward the interceptor ditches with a grade of approximately one percent. The surface areas of any bedrock exposed in the bottom of the excavation will be cleaned and not recovered. The final bottom and side slopes of the borrow areas will be topsoiled and seeded as soon as practicable after the excavation is complete.

C. RANDOM AND PERVIOUS BORROW AREAS

1. Natural random and pervious materials for the dam will be obtained from outwash, kame, and alluvial terraces located along the Saint John and Little Black Rivers within the reservoir area. These areas are located within a haul distance of 3.5 miles. From an environmental standpoint, the damages will be less for these areas than any areas located outside the reservoir. All final excavation slopes will

be hidden from view as they will be totally inundated by the power pool.

2. Prior to stripping these borrow areas, interceptor ditches will be adequate to drain away surface runoff from the borrow areas. These ditches will also be designed with a slight gradient and lined to prevent erosion and to lead the flow to sediment basins located adjacent to the river. Sediment basins will be designed and constructed to maintain a minimum freeboard of 3 feet above the anticipated maximum water elevation of the wash water to be contained during heavy precipitation. The plans and specifications shall include the requirements for care and maintenance of interceptor ditches, sedimentation ponds and check dams as well as design of such facilities. To avoid discharge of excessively turbid waters into the rivers, a sprinkler system will be provided. The water pumped from the sedimentation ponds will be sprayed on to vegetated areas and/or areas of high permeable soils.

3. The borrow areas will be designed and constructed to minimize erosion using similar methods as for impervious borrow areas except that a strip of land will be left between the river and the borrow areas to form a dike and sediment trap.

4. The area will be graded in a similar manner as the impervious borrow areas except that some of the lower areas adjacent to the river will not require protection as the reservoir will commence filling during the fifth year of construction.

D. HAUL ROADS

1. Haul roads will be designed, located and constructed to maintain the intended traffic and to be free draining and will be maintained in good condition throughout the contract period. Control of dust will be accomplished by watering, palliatives or other approved methods. Side slopes will be topsoiled and seeded, hydro-mulched or covered with wood chips to minimize erosion. The limits of clearing for all haul roads will be kept to a minimum. When not needed as permanent access roads, haul roads located above permanent pool will be removed, topsoiled and seeded.

E. TURBIDITY CRITERIA

The Saint John River within the entire project and downstream to the International Bridge at Fort Kent is classified as Class B1 by the State of Maine. Class B1 waters are acceptable for recreational usage including water contact, water supply after adequate treatment, and fish and wildlife habitat. The standard for turbidity states that its presence caused by disposal of any matter or substance should not

impair the usages ascribed to the classification. Turbidity criteria will be established by the Corps of Engineers and will be responsive to the intent of the state water quality standards. These criteria will be incorporated into the contract plans and specifications and will be used as a control for construction activities.

ATTACHMENT 3

RARE AND ENDANGERED SPECIES CONSIDERATION

Early investigations of the plants and animals found within the upper St. John valley revealed the area to be suitable habitat (largely because of the remote, relatively undisturbed character of the area) for many unique, rare and endangered species. Special attention in subsequent investigation was directed toward these species. For discussion of such considerations, see App. F., pp. 39-48 (flora), 67-68 (mammals), 74-81 (birds).

Further investigations regarding the possible impacts of the proposed Dickey-Lincoln School Lakes project upon such species were undertaken in coordination with the U.S. Fish and Wildlife Service. As a result of such coordination and concurrent research, four species were given continued attention: the Eastern Cougar, Peregrine Falcon, Bald Eagle, and the Furbish lousewort.

Fish and Wildlife expertise with endangered species revealed that the habitat that would be impacted by the Dickey-Lincoln School Lakes project is not critical to the survival or continued existence of the first three (as listed above) of these species (see attached letters dated April 15, 1977, July 28, 1977, and March 2, 1978).

Less was known of the previously thought extinct, Furbish lousewort. A special team was organized by U.S. Fish & Wildlife Service to study the Furbish lousewort, with special reference to the effect of the proposed Dickey-Lincoln School Lakes project, as presently planned, would likely jeopardize the continued existence of the Furbish lousewort. However, a conservation program was developed to preclude such an event.

The U.S. Fish & Wildlife Service further concluded, that if their recommended conservation program was initiated, in conjunction with the Dickey-Lincoln School Lakes project, the continued existence of this endangered species is not likely to be jeopardized by the proposed project.

The Corps is recommending and persuing a plan consistent with these recommendations.



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

One Gateway Center, Suite 700

NEWTON CORNER, MASSACHUSETTS 02158

REPLY REFER TO:

APR 15 1977

Colonel John P. Chandler, Division Engineer
Corps of Engineers
Department of the Army
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

In response to your request for consultation about the effects of Dickey-Lincoln School Lakes Project on the Eastern Cougar (*Felis concolor* cougar), our biological opinions are:

1. The proposed project will not affect either the existence or the continued survival of the Eastern Cougar.
2. Obviously the habitat will be impacted, but measuring the extent of impact other than by indicating acres lost would be impossible. The key question here is, "To what extent do cougars inhabit and use the area?" In our judgement the area is used little, if at all, by them; thus they would not be impacted if it were modified.
3. The habitat is not now considered critical to the survival of the Eastern Cougar, nor is it likely to be so designated within the foreseeable future.

I believe these opinions satisfy the consultation requirements under Section 7. If we can be of further service, please let us know.

Sincerely yours,

ACTING Regional Director



IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
One Gateway Center, Suite 700
NEWTON CORNER, MASSACHUSETTS 02158

JUL 28 1977

Colonel John P. Chandler, Division Engineer
Corps of Engineers
Department of the Army
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

In response to your letter of 14 July 1977 requesting consultation about the effects of the proposed Dickey-Lincoln School Lakes Project on the Peregrine falcon, (Falco peregrinus), our biological opinions are:

1. The proposed project will not affect either the existence or the continued survival of the Peregrine falcon.
2. Although the area to be impacted is within the Peregrine falcon's flyway, to our knowledge there is no historical record of this species nesting within the project area.
3. The habitat in the project area is not now considered critical to the survival of the Peregrine falcon, nor is it likely to be so designated within the foreseeable future.

I believe these opinions satisfy the consultation requirements under Section 7. If we can be of further assistance, please let us know.

Sincerely yours,

Regional Director

ACTING



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

One Gateway Center, Suite 700

NEWTON CORNER, MASSACHUSETTS 02158

IN REPLY REFER TO:

NEDPL-R

March 2, 1978

Colonel John P. Chandler
Division Engineer
U.S. Army Engineer Division
New England
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

In response to your letter of 22 February 1978 requesting formal consultation on the effects of the proposed Dickey-Lincoln School Lakes project on the Northern Bald Eagle (Haliaeetus leucocephalus alascanus) we offer the following information.

As a clarification, the 14 February 1978 rulemaking (copy attached) lists the entire species Haliaeetus leucocephalus as endangered throughout the conterminous 48 States, except in Washington, Oregon, Minnesota, Wisconsin, and Michigan, where the species is listed as threatened. The arbitrary distinction between southern and northern populations is no longer recognized.

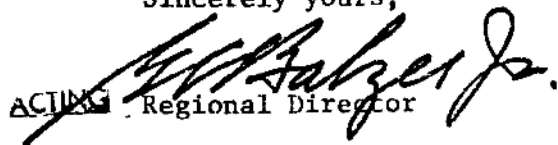
Our biological opinions on the requested consultation are essentially based on our 20 January 1977 report to your office. That report represents the results of our interagency investigations on bald eagle, osprey, peregrine falcon and great blue heron within the project area.

Our biological opinions are:

1. The proposed project will not affect either the continued survival or the existence of the bald eagle.
2. The habitat in the project area is not now considered critical to the survival of the bald eagle, nor is it likely to be so designated within the foreseeable future.

I believe these opinions satisfy the consultation requirements under Section 7. If we can be of further assistance, please let us know.

Sincerely yours,


ACTING Regional Director

Attachment



ADDRESS ONLY THE DIRECTOR,
FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

In Reply Refer To:
FWS/OES 375.0

JUN 27 1978

Lieutenant General J.W. Morris
Chief of Engineers
Department of the Army
Washington, D.C. 20314

Dear General Morris:

This responds further to the Corps of Engineers May 5, 1978, request for Section 7 Consultation pursuant to the Endangered Species Act of 1973 on the proposed Dickey-Lincoln School Lakes project and its impacts on the Endangered Furbish lousewort (Pedicularis furbishiae).

The Corps' New England Division Office has previously consulted on the proposed project relative to its impacts on the bald eagle, Eastern cougar and peregrine falcon. These consultations were carried out by our Regional Office in Newton Corner, Massachusetts. The letters from the Corps requesting the consultations and our Regional Director's biological opinions are enclosed for your information.

In response to the Corps' May 5 request, I appointed a consultation team by letter of June 6, 1978 (copy enclosed), to assist me in determining whether the proposed Dickey-Lincoln School Lakes project is likely to jeopardize the continued existence of the Furbish lousewort. The team was comprised of Mr. Robert Jacobsen, Chief of the Management Operations Branch, Office of Endangered Species (OES); Dr. Paul Opler, Acting Chief of the Biological Support Branch, OES; Mr. Ronald Lambertson, Assistant Solicitor, Office of the Solicitor; Mr. Paul Nickerson, Endangered Species Coordinator, Newton Corner, Massachusetts; Mr. Richard Dyer, Endangered Species Botanist, Newton Corner, Massachusetts; Mr. Brian Kinnear, Endangered Species Staff, Newton Corner, Massachusetts; and Mr. Robert Currie, Fisheries Biologist, Concord, New Hampshire.



On June 15, 1978, the consultation team met with your representatives to discuss the proposed project and its anticipated effects on the lousewort. At this meeting, "Mr. Ronald Lambertson was unable to attend but Mr. Donald Barry of the Office of the Solicitor was present in his place. A list of the participants is enclosed".

As you may be aware, your New England Division Office previously requested Section 7 Consultation on this project on November 24, 1976. Because the lousewort was not listed at that time, formal consultation was not possible. However, the Corps and the Service entered into an informal consultation process which continued until final listing of the lousewort as Endangered. In this regard, the Corps is commended for its continuing cooperative efforts in conducting necessary studies and field inventory work to obtain information essential to determining the anticipated effects of the project on the lousewort. This data proved to be extremely useful to the consultation team by providing essential information on which to base the Service's biological opinion.

The consultation team reviewed information contained in the Draft Environmental Impact Statement (DEIS) entitled "Dickey-Lincoln School Lakes, Maine, U.S.A. and Quebec, Canada", and other information provided by the Corps, academic and private sources or available within the Service. Information in the DEIS was carefully evaluated to ascertain the anticipated effects of the proposed project in terms of onsite impacts and impacts downstream from the project on the lousewort. Copies of pertinent reports and documents are included in an administrative record maintained in the Office of Endangered Species and are incorporated by reference.

The proposed project is located in northern Aroostock County, Maine and if implemented would provide a source of electricity to meet the anticipated power needs of New England. The project consists of two dams. The Dickey Dam, located on the upper St. John River immediately above its confluence with the Allagash River, would be an earthfill structure having a total length of 10,300 feet and a maximum height of 335 feet. The Lincoln School Dam would be located 11 miles downstream from the Dickey Dam, and would be 2,200 feet long and 95 feet high. The Lincoln School Dam's principle purposes would be regulate peaking power releases from the Dickey Dam and provide an additional power source. The Dickey-Lincoln School Dam project would inundate approximately 88,000 acres of land and 267 miles of streams including 55 miles of the St. John River.

After careful review of the findings by the consultation team, it is my biological opinion that the Dickey-Lincoln School Lakes project, as presently planned, is likely to jeopardize the continued existence of

the Furbish lousewort unless the conservation program recommended in this opinion is initiated and successfully carried out by the Corps in consultation with and with the assistance of the Service. This biological opinion is based on the information sources cited above concerning possible effects of the proposed project on the lousewort.

A summary of the biological data considered during this consultation is provided below:

The Furbish lousewort (Pedicularis furbishiae) was determined to be Endangered and was added to the U.S. List of Endangered and Threatened Wildlife and Plants on April 26, 1978, (43 FR 17910-17916). Critical Habitat has not yet been determined. Previously thought to be extinct (it had not been collected since 1943), the Furbish lousewort was rediscovered in the course of an environmental study by Dr. C.C. Richards under contract to the Corps. The Furbish lousewort occurs along 160 miles of the main stem of the St. John River from the project area, Aroostook County, Maine downstream to the mouth of the Aroostook River in New Brunswick, Canada. Within this range, approximately 879 plants have been found at 21 stations. The plants almost always are found in a narrow zone just above the river itself. This zone is usually on partially shaded north, northeast, or northwest facing slopes.

In the final rulemaking, prepared by the Service, in which the lousewort was listed as Endangered, the Corps' proposed Dickey-Lincoln School Lakes project, dumping, natural landslides, construction and lumbering were cited as endangering factors. The Dickey-Lincoln School Lakes project, if constructed, would inundate 353 plants at 13 stations over 35 miles of the plant's range. Within the 70 mile zone downstream from the proposed project, 162 plants at five stations are jeopardized by dumping of refuse over river banks, construction and other stream bank modifications. The 364 plants at three stations along 20 river miles in Canada are jeopardized by a proposed impoundment.

Various aspects of the lousewort's reproductive and population biology are of critical importance in the consideration of possible conservation programs for the Furbish lousewort. Of primary concern is the fact that natural establishment of new lousewort colonies may depend upon prior disturbance of river banks, by either flooding or landslides. Artificial establishment of new colonies is dependent upon knowledge of possible hemiparasitic relationships, transplant techniques, and seedling establishment. Furbish lousewort appears to be an obligate outbreeder, hence the presence of appropriate bumblebee (Bombus vagans) populations is necessary to ensure appropriate seed set and genetic variability of progeny. The reports and studies which provided much of the above biological data are a part of the administrative record maintained in the Office of Endangered Species.

Conclusion

Based on my consultation team's review of the above information and other information and data available to the Service, it is my biological opinion that the Dickey-Lincoln School Lakes project, if constructed as planned, is likely to jeopardize the continued existence of the Furbish lousewort. However, if the Corps develops and implements successfully the following conservation program, in consultation with and with the assistance of the Service, the continued existence of this Endangered species is not likely to be jeopardized as defined in Section 402.02 of the Inter-agency Cooperation Regulation published in the Federal Register on January 4, 1978. The Conservation program must include, at a minimum, the following:

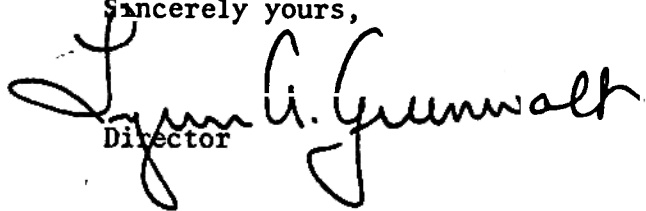
1. Development of information which will lead to a functional understanding of the habitat needs and propagation techniques of the Furbish lousewort.
2. Acquisition and protection of existing habitats below the project impoundment area currently supporting lousewort populations.
3. Acquisition of habitat identified as capable of supporting new populations of louseworts.
4. Establishment of new, self-sustaining colonies through transplantation, seeding or other appropriate techniques.
5. Obtaining better information on what the effects will be of downstream flows, after construction of the project, on the lousewort and its habitat.
6. Development of a monitoring program which will be capable of detecting any changes in lousewort biological status, such as habitat changes, population increases or decreases, and microclimatic conditions.

If as a result of the conservation program, new information is revealed that was not considered during this consultation, or prior to implementation of recommendations 2, 3, or 4 above, the project is modified or a new species is listed in the project area, Section 7 Consultation must be reinitiated. Further, the Corps should not make any irreversible or irretrievable commitment of resources which would foreclose the consideration of modifications or alternatives to the proposed project during the development and successful implementation of the recommended conservation program.

The Corps also asked for a clarification of the Solicitor's opinion dated July 14, 1977, concerning mitigation and Section 7. In particular, the Corps was concerned about the impact of that opinion on the Corps' conservation responsibilities for the Furbish lousewort. The Solicitor's Office has developed such a clarification, and a copy will be forwarded under separate cover.

Again, I want to express the Service's gratitude to the Corps for their efforts to meet responsibilities under the Endangered Species Act of 1973. Should you desire clarification of items in this opinion or desire further assistance, we will be pleased to respond promptly. Also, should the Corps desire to initiate the recommended conservation program, the Service stands ready to assist and provide further Section 7 Consultation.

Sincerely yours,


Director

Enclosures

ATTACHMENT 4

404 COORDINATION

PUBLIC NOTICE
of
WATER POLLUTION CONTROL ACT
404 EVALUATION
for
DICKY-LINCOLN SCHOOL LAKES
PROJECT AT DICKY, MAINE

The Corps of Engineers is presently considering a multi-purpose project in northern Maine along the St. John River. The proposed hydro-electric and flood control project would consist primarily of two earth-filled dams impounding a total of 7.7 million acre feet of water at maximum pool heights. The project was authorized by the 1965 Flood Control Act, Public Law 89-298 dated 27 October 1965. Preconstruction planning was resumed in November, 1974.

Part of the Corps evaluation of this proposed action includes application of EPA Guidelines under authority of Section 404 (b) of the Federal Water Pollution Control Act (40 CFR 230). This "404" evaluation is hereby released for public review. Comments regarding the water quality aspects of the proposed project will be received for a period of 30 days hereafter and appropriately considered in the evaluation.

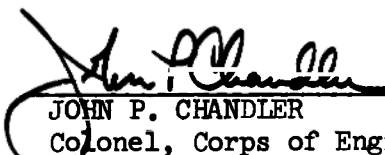
The project files and Federal regulations have been reviewed to properly evaluate the objectives of Section 404. The August 1977

Draft Environmental Impact Statement for the project was the main source of data used in developing this evaluation. Inasmuch as the EIS received wide public review and was addressed at 6 public meetings during the public comment period, the New England Division of the Corps of Engineers proposes no further public meetings or hearings on the 404 evaluation. However, consideration will be given for a public meeting if any person shall specify due reason for such a request.

Written communication regarding this "404" evaluation should be addressed to:

Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA. 02154

28 July 1978
Date


JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer



Seven Islands Land Company

P.O. BOX 116 - 15 COLUMBIA STREET - BANGOR, MAINE 04401
TELEPHONE (207) 945-3022

September 7, 1978

Colonel John Chandler
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Chandler:

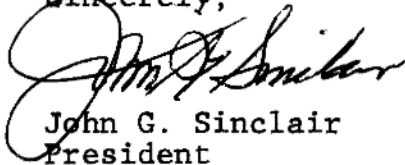
We have received and briefly reviewed the "Federal Water Pollution Control Act, Section '404' Evaluation for Dickey-Lincoln School Lakes," August 1978.

We wish to respond to your description of the use and value of the St. John River Valley area as portrayed in the first paragraph on Page 27 of the Conclusion.

The listed amenities uses are important. However, as managers representing owners in the Valley, we have continually pointed out to the Corps and its consultants that the Northern Maine area is primarily a commercial forest and has been continuously managed for the production of forest products for at least 140 years. These products form the basis of Maine's economy and are essential to stable employment, tax dollars, and quality of life for Maine in the future.

The area, therefore, can in no way be described as semi-wilderness solely for the use of recreationists. We are again stressing this point because of the implications it has on the cost-benefit analysis of the Dickey project.

Sincerely,



John G. Sinclair
President

JGS:jlb

cc White House
Governor Longley
Congressional Delegation



September 11, 1978

Colonel John P. Chandler
Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

Re: Dickey-Lincoln 404 Evaluation

Dear Colonel Chandler:

The Environmental Defense Fund (EDF) has reviewed the draft Section 404 Evaluation for the Dickey-Lincoln School Lakes Project dated 28 July 1978. Our analysis of the Draft Evaluation, and the DEIS and supporting documents upon which it relies, leads us to the conclusion that the project would cause a permanent unacceptable disruption to the beneficial water quality uses of the affected ecosystem, and that feasible alternatives exist. Therefore, recommendation of construction would violate Section 404 of the CWA.

In our December 6th comments on the DEIS, which we hereby incorporate by reference into the 404 record, we identified four major deficiencies in the EIS. Among these were incorrect and misleading economic analysis and the failure to document the impact of direct conservation investment as an alternative to the proposed project. As we will discuss below, these failures are particularly relevant to the evaluation of the proposal under Section 404 of the Clean Water Act. We are assuming that these deficiencies will be corrected in the final EIS, but since that document is not yet complete, we can rely only upon what we have seen to date, and our concerns have not been met.

The particular importance of a thorough analysis of alternatives under Section 404 derives from the requirement in the regulations that activities which result in the destruction of wetlands will only be permitted if (1) the activity associated with the fill must have direct access or proximity to, or be located in, the water resources in order to fulfill its basic purpose, or that other sites of construction alternatives are not practicable, and (2) that the proposed fill and the activity associated with it will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected aquatic ecosystem (40 CFR 230.5(b)(8)). As is implicitly recognized by the Draft 404 Evaluation, the generation of electric power is decidedly not a "water dependent" activity. For this reason alone, the Corps should not recommend construction of the project.

Furthermore, the tentative conclusion in the Draft Evaluation that the impacts of the proposed project are "not unacceptable" is based on the judgment that the alternatives to the proposed project, though not water dependent, would have adverse environmental and economic impacts of their own, and that these impacts serve to make the disruption which would result from Dickey-Lincoln "acceptable." Thus, the Draft Evaluation (correctly) recognizes the need to define the purpose of the project broadly in order to determine the relevant alternatives. Yet, even if other alternatives would have adverse environmental and economic impacts, the Corps' analysis does not indicate that these alternatives would lead to violations of any substantive standards issued under the Clean Air Act or other laws, whereas the disruption produced by Dickey-Lincoln is clearly contrary to the mandate of the Clean Water Act. Thus, for this second reason, the Corps should not recommend construction.

Moreover, the tentative conclusion that Dickey-Lincoln is less unacceptable than the alternatives ignores the fact, demonstrated in our December EIS comments, that Dickey-Lincoln is less economical than the alternatives, based on the data in Appendix I of the EIS. Appendix I estimated the impact of demand controls "which may realistically be implemented in New England through the year 2000." As shown in Table Two of our DEIS comments, the total annual costs of the entire NEPOOL system with Dickey-Lincoln would exceed the annual costs of the system without Dickey-Lincoln by between \$3.1 million and \$20.8 million (depending on the interest rate used to calculate the annual cost of capital investments) if such demand controls are assumed to be implemented. Since the DEIS concluded that "Such [demand control] measures cannot be considered alternatives to the proposed project, but rather supplementing measures taken to conserve energy and resources in keeping with national goals," the analysis of Dickey-Lincoln for decision purposes should assume the implementation of such measures.

In addition, NEPA and §404 require the Corps to go beyond consideration of demand controls that can be expected to be implemented based on current assumptions about utility and customer actions. As we stated in our DEIS comments, the Corps should analyze the possibility of a direct conservation investment program as an alternative to Dickey-Lincoln. If the dollars to be invested in Dickey-Lincoln were instead spent on insulation, storm windows, solar hot water heaters, cogeneration, and other measures, what would be the yield?

An analysis of the proposed investments of Arkansas electric utility companies by EDF staff economist Dr. Wayne Willey, undertaken on behalf of the Attorney General of Arkansas (attached), found that the projected electricity demand for which new conventional facilities

were proposed to be built in Arkansas could be met more economically through investment in such existing, proven technologies. Dr. Willey concluded, based on the utilities' own data and published reports, that the customers and stockholders of the Arkansas utilities, as well as the federal taxpayers, would all be better off if the utilities undertook the conservation investments rather than the proposed new facilities. A similar conclusion is likely with respect to Dickey-Lincoln.

Because of the admitted destructive effects the construction of the Dickey-Lincoln project would entail, it is incumbent upon the Corps to perform this sort of analysis before concluding that no acceptable alternatives to the project exist. In our view, any favorable conclusion regarding this project under Section 404 which is made before the undertaking of such an analysis would be improper and illegal.

In summary, the generation of electricity is not a water dependent activity; the non-water dependent alternatives considered in the DEIS are more economical and, though they would have some adverse environmental impacts, have not been shown to result in any violation of environmental laws; and direct conservation investment which has minimal environmental impacts and is probably the most economical approach as well, has not been considered. Therefore, recommendation of construction of this project would be in direct violation of §404 and the relevant guidelines.

Finally, we note that the DEIS and 404 evaluation suggest that some adverse water quality impacts would occur downstream of Dickey-Lincoln construction, although maximum efforts would be made to minimize the impact. Before construction begins, certification should be obtained from the State of Maine (pursuant to §401 of the CWA) that construction will not lead to violation of water quality standards, and that the resulting impoundment will meet Maine standards for natural lakes.

We appreciate the opportunity to comment and the extension of time for such comments which we were granted. If you have any questions regarding Dr. Willey's analysis, please do not hesitate to contact us.

cc: Mr William R. Adams
Mr. Howard N. Larsen

Very truly yours,

Adam B Jaffe

Adam B. Jaffe
Science Monitor

James T. B. Tripp

James T. B. Tripp, Counsel

Enclosure



IN REPLY REFER TO:

ER-78/775

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

One Gateway Center, Suite 700

NEWTON CORNER, MASSACHUSETTS 02158

SEP 6 1978

Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Sir:

This responds to your request for the U.S. Department of the Interior's comments concerning the Section 404 Evaluation for the Dickey-Lincoln Project, Aroostook County, Maine. This supplements previous reports of the Fish and Wildlife Service and the Department of the Interior on this project submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

In general, the Evaluation does not adequately describe resource losses. In fact, the document draws an array of erroneous conclusions regarding the severity of project impacts. The word "displace" is frequently used when "destroyed" would be more appropriate.

The discussion on potential productivity of the reservoir fishery needs clarification. There are numerous lakes in the project area which are under-utilized. Expanding fishing opportunities on those lakes appears to be a more reasonable alternative than speculating on a fishery in a new impoundment.

In the discussion of wetlands, the Evaluation implies that the reservoir would create "potential" for new wetland areas without making it clear as to when, where, and how this "potential" may be realized.

For clarification, the Service is not preparing a detailed wetland mitigation plan at this time. Opportunities for mitigation of wetland losses will be explored when management plans are developed for specific lands. At that time, the details of mitigation plans for terrestrial habitat as well as wetland habitat will be pursued with your staff.

Sincerely yours,

Regional Director



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

September 8, 1978

Colonel John P. Chandler
Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Chandler:

At your request, we have reviewed the Corps of Engineers "Section '404' Evaluation" for the proposed Dickey-Lincoln School Lakes project to determine its consistency with EPA's Guidelines issued under Section 404 (b) of the Clean Water Act.

It is our understanding that the Corps has prepared this Evaluation in order to comply with Section 404(r), which provides that this project would not be subject to federal regulation under Section 404 if the Corps submits to the Congress a Final EIS which contains information on the effects of the discharges of fill material, including consideration of the 404(b) Guidelines. Although no procedures for implementing Section 404(r) have been published, we understand that the Corps, CEO, OMB, and EPA agree that our responsibility includes evaluating not only whether the information to be presented to Congress in the 404 document (or "404" portion of the EIS) is adequate, but also whether the project's impacts are consistent with the 404(b) Guidelines. We recognize, however, that the final decision on the acceptability of the project will require a balancing by Congress of national energy policy, environmental impacts, and regional economic benefits.

Our summary finding, based on our review of the information contained in the Draft EIS and the 404 Evaluation, is that the project, when measured by the specific focus of the Guidelines, is inconsistent with those Guidelines. We also believe the 404 Evaluation contains inadequate information to support an informed judgement on the acceptability of the project's impacts on water quality, fisheries, wetlands, wildlife and recreation. These findings are based on the following factors:

1. Section 230.5(a) of the EPA Guidelines requires consideration of the availability of alternatives that are less damaging to the environment.

We find that the 404 Evaluation contains insufficient information to support the statement on page 28 of the Evaluation that other alternatives are considered proportionately "unacceptable".

2. Section 230.5(a)(1) states that significant disruption of the chemical, physical, and biological integrity of an aquatic ecosystem should be avoided.

The inundation of 287 miles of the Upper St. John River and its tributaries would create a lake having lower water quality and a fishery which, from the information in the EIS, would appear to be marginal.

3. Section 230.4-2 states that if a discharge would cause a violation of water quality standards, the discharge shall be prohibited. In addition, Section 230.5(a)(8) states that degradation of water quality should be avoided.

On page 16, the Evaluation indicates that the State of Maine will have to change the water quality classification of those portions of Upper St. John which are converted to lakes. We agree that the present water quality standards protect very high quality streams and do not envision the ecosystem, hydrologic, and quality changes associated with lake creation. The 404 Evaluation contains no indication of assurances from the State that this reclassification, which is a legislative responsibility, will be acceptable to the State.

In addition, it is probable that there will be violations of water quality standards downstream due to sedimentation during construction and low dissolved oxygen discharges during the early operation stages of the project.

4. Section 230.5(a)(2) states that significant disruptions of the food chain, including alterations or decrease in diversity of plant and animal species, should be avoided. In addition, Section 230.5(a)(3) states that discharge activities should avoid inhibiting movement of fauna, especially their movement into and out of feeding, spawning, breeding and nursery areas. Furthermore, Section 230.5(b)(3) states that significant disruption of fish spawning and nursery areas should be avoided.

The project will significantly disrupt the existing brook trout fishery by inundating 287 miles of habitat, including many important spawning areas. On page 6, the Evaluation states that the brook trout lake fishery will be enhanced because important spawning areas will not be adversely affected by the project. We believe that this statement is not supported by data provided in Appendix E, which indicate that the lake fishery in Dickey Lake will be of marginal quality due to limited access of spawning areas, an unproductive littoral zone, interference of standing timber, and overall conditions which will favor less desirable species at the expense of brook trout and other game species.

5. Section 230.5(b)(4) states that disposal sites will be designated so as to minimize the impact on habitat, food chain, and community structures of wildlife.

The project, as evaluated in Appendix F of the Draft EIS, will significantly disrupt wildlife habitat, including 36,900 acres of deer wintering habitat, resulting in the permanent loss of 50 percent of all deer which live in the 684,500 acres encompassing the St. John Region.

6. Section 230.4-1(a)(1) states that from a national perspective, the degradation or destruction of aquatic resources by filling operations in wetlands is considered the most severe environmental impact covered by the 404 Guidelines. In addition, Section 230.5(b)(8) states that destruction of wetlands may be permitted only if other less environmentally damaging alternatives are not available or practicable or if the project will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected aquatic ecosystem.

The project will eliminate more than 1,714 acres of wetlands, many of which are identified in the 404 Evaluation as serving valuable biological and habitat functions. Further, this analysis of wetlands loss is incomplete since it contains no quantification of wetlands of less than 2.5 acres in size. In addition, it appears that wetlands created by the project will be of inferior quality due to fluctuating water levels in the lakes.

7. Section 230.5(a)(7) states that degradation of aesthetic, recreational and economic values should be avoided.

The changes brought about by the project would replace the existing unimpounded, "semi-wild" Upper St. John River, a valued resource, with lakes. In contrast, there are numerous large lakes in Northern Maine and the recreation potential and aesthetic values of Dickey and Lincoln Lakes will be severely limited by the annual drawdown and associated unattractive and unproductive littoral zone. The project's effects on the viable timber industry are also not consistent with the Guidelines.

In addition, we wish to make the following comments:

First, there is no firm commitment in the 404 Evaluation to implement mitigation measures which have been developed during the Draft EIS and 404 Evaluation process. Also, mitigation could add significantly to the cost of the project. In order for the Evaluation to be complete all mitigating measures should be clearly defined and those suggested measures which are included in the EIS and 404 Evaluation, should be firmly committed to and budgeted by the Corps as part of this overall project.

Second, the 404 evaluation, like the EIS, should consider the whole project. There has been no 404 Evaluation of the transmission line

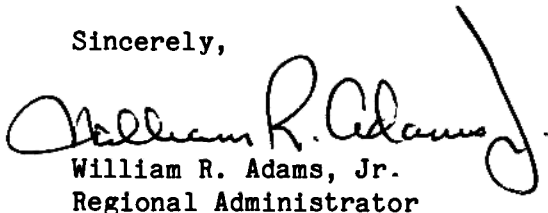
impacts, including those on the White Mountain National Forest. We believe that these impacts are significant enough to warrant an assessment relative to the 404(b) Guidelines.

Third, we believe that the 404 Evaluation should more thoroughly place the project's impacts in perspective by comparing the loss of wetlands, fisheries, aquatic and terrestrial wildlife habitat, and recreational values to those same resources in the study area (Upper St. John Region) which will not be directly impacted by the project. While we realize that much of this information is contained in the appendices to the Draft EIS, we believe it should be condensed and provided in the Final 404 Evaluation.

Fourth, Section 404(t) provides that any federal agency proposing to place fill material in any portion of the waters of the United States within the jurisdiction of a state shall comply with any state requirements (both substantive and procedural) controlling the placing of such material to the same extent any person is subject to such requirements. We understand the State of Maine has such statutory requirements. We note that no state permits have been applied for or received and no state decisions, conditions, limitations or restrictions, imposed as a result of state action, are available to be considered as part of this 404 Evaluation. We believe Section 404(t) mandates that all required state permits be obtained prior to the issuance of the final 404 Evaluation and submittal to the Congress under 404(r).

We would be pleased to meet with you to discuss the issues raised in this letter.

Sincerely,

A handwritten signature in dark ink, appearing to read "William R. Adams, Jr.", with a long, sweeping flourish extending upwards and to the right.

William R. Adams, Jr.
Regional Administrator

COMMENT AND RESPONSE

Department of the Interior, U.S. Fish and Wildlife Service

Comment 1 - In general, the evaluation does not adequately describe resource losses.

Response - As discussed in the preface, this evaluation is intended to supplement the EIS; concentration has been therefore placed in identification of resource losses as related to 404 Guidelines. Expansive descriptions would be redundant, and source information is appropriately referenced to portions of the EIS.

Comment 2 - In fact, the document draws an array of erroneous conclusions regarding the severity of project impacts. The word "displace" is frequently used when "destroyed" would be more appropriate.

Response - We do not agree that the word "displace" leads to any erroneous conclusions. Since the comment is not specific, we cannot show how or why.

Comment 3 - The discussion on potential productivity of the reservoir fishery needs clarification.

Response - See response to Comment 1 above. Also, it is stated on p. 7 that "additional information on the existing and predicted future fisheries is also available in Appendix E."

Comment 4 - There are numerous lakes in the project area which are under-utilized. Expanding fishing opportunities on those lakes appears to be a more reasonable alternative than speculating on a fishery in a new impoundment.

Response - The intent of this comment is not clear. Speculation of the fishery of a new impoundment is meant to inform the reader of condition with and without the project -- not to provide fishing opportunities. This "alternative" was not discussed in the Fish and Wildlife Service Conservation and Development Report (see Supplement to Appendix J, CE, 1978) on the Dickey-Lincoln School Lakes project wherein mitigation measures such as stocking the Dickey Lake with hatchery fish was recommended. However, plans are not yet complete nor firm and we will work with Fish and Wildlife Service to pursue this.

Comment 5 - In the discussion of wetlands, the evaluation implies that the reservoir would create "potential" for new wetland areas without making it clear as to when, where and how this "potential" may be realized.

Response - Attachment 1, Section V, as was referenced on p. 12, provides the best information presently available as to "when, where and how" such potential may be realized.

Environmental Protection Agency

Comment 1 - Section 230.5(a) of the EPA Guidelines requires consideration of the availability of alternatives that are less damaging to the environment.

We find that the 404 Evaluation contains insufficient information to support the statement on page 28 of the Evaluation that other alternatives are considered proportionately "unacceptable."

Response - The Final 404 Evaluation has been revised to reflect the concerns of the commentator. See pp. 19-20.

Comment 2 - Section 230.5(a)(1) states that significant disruption of the chemical, physical and biological integrity of an aquatic ecosystem should be avoided.

The inundation of 287 miles of the upper Saint John River and its tributaries would create a lake having lower water quality and a fishery which, from the information in the EIS, would appear to be marginal.

Response - We stated that the project would have unavoidable significant impacts on the chemical, physical and biological integrity of the affected (278 mi.) aquatic ecosystem (p. 20); and, the resultant lake fishery may be "marginal". We must re-emphasize however that Dickey Lake has been predicted to be a clear, cold oligotrophic body of water (see p. 16) and as such would not constitute "lower" water quality.

Comment 3 - Section 230.4.2 states that if a discharge would cause a violation of water quality standards, the discharge shall be prohibited. In addition, Section 230.5(a)(8) states that degradation of water quality should be avoided.

On page 16, the Evaluation indicates that the State of Maine will have to change the water quality classification of those portions of the Upper Saint John which are converted to lakes. The 404 Evaluation contains no indication of assurances from the State that this reclassification, which is a legislative responsibility, will be acceptable to the State.

Response - First, your comment has left out key wording to arrive at a pointed interpretation of the guidelines. The guidelines state: "In the event that such a discharge would cause a violation of such appropriate and legally applicable standards...discharge shall be prohibited." We find that no "appropriate and legally applicable standards" exist in regard to this project.

Further, the 404 Evaluation does not indicate that the State of Maine will "have to change" water quality standards. On page 19, it states: "The State of Maine will presumably establish water quality Standards". As you indicated, this is a legislative responsibility, as is the acceptability of the change. We have not received an official position statement from the State of Maine, therefore, we must presume that they will establish water quality standards.

Comment 4 - It is probable that there will be violations of water quality standards downstream due to sedimentation during construction and low dissolved oxygen discharges during early operation stages of the project.

Response - Section 230.4-2 (Chap. 5, pp. 16-18 of the Evaluation) discusses this aspect of the project in some detail. In this discussion, such a probability was never denied. Therefore, we do not understand the purpose of this comment. See also Section 4.06.2 of the EIS.

Comment 5 - Section 230.5(a)(2) states that significant disruptions of the food chain, including alterations or decrease in diversity of plant and animal species, should be avoided. In addition, Section 230.5(a)(3) states that significant disruption of fish spawning and nursery areas should be avoided.

The project will significantly disrupt the existing brook trout fishery by inundating 287 miles of habitat, including many important spawning areas. On page 6, the Evaluation states that the brook trout lake fishery will be enhanced because important spawning areas will not be adversely affected by the project. We believe that this statement is not supported by data provided in Appendix E, which indicate that the lake fishery in Dickey Lake will be of marginal quality due to limited access of spawning areas, an unproductive littoral zone, interference of standing timber, and overall conditions which will favor less desirable species at the expense of brook trout and other game species.

Response - The statements referred to in the first paragraph of your comment have been addressed by this Evaluation on pp. 20-21.

In the second paragraph of the comment, your reference to the statement made on p. 6 is stated incorrectly which leads to an erroneous conclusion. A correct reading of p. 6 would be: "The brook trout lake fishery would be enhanced by important spawning areas that will not be adversely affected by the project." The words underlined were modified in your interpretation. The meanings of what was stated and your statement are quite different. Our statement is supported by the table on p. 42 of Appendix E (as was so referred on p. 6). Additionally, Appendix E does not indicate that limited spawning areas and interference of standing timber would be a significant fishery problem in Dickey Reservoir. The reservoir would be cleared to the 828-foot msl which is the 50C isotherm. This represents the lower preferred temperature for lake trout.

Comment 6 - Section 230.5(b)(4) states that disposal sites will be designated so as to minimize the impact on habitat, food chain, and community structures of wildlife.

The project, as evaluated in Appendix F of the Draft EIS, will significantly disrupt wildlife habitat, including 36,900 acres of deer wintering habitat, resulting in the permanent loss of 50 percent of all deer which live in the 684,500 acres encompassing the Saint John Region.

Response - Your observation is hereby noted.

Comment 7 - Section 230.4-1(a)(1) states that from a national perspective, the degradation or destruction of aquatic resources by filling operations in wetlands is considered the most severe environmental impact covered by

the 404 Guidelines. In addition, Section 230.5(b)(8) states that destruction of wetlands may be permitted only if other less environmentally damaging alternatives are not available or practicable or if the project will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected aquatic ecosystem.

The project will eliminate more than 1,714 acres of wetlands, many of which are identified in the 404 Evaluation as serving valuable biological and habitat functions. Further, this analysis of wetlands loss is incomplete since it contains no quantification of wetlands of less than 2.5 acres in size. In addition, it appears that wetlands created by the project will be of inferior quality due to fluctuating water levels in the lakes.

Response - Your iteration of Section 230.4-1(a)(1) is noted and we would point to p. 9 of this document which also states it. Your statement regarding Section 230.5(b)(8) is not complete and leads to an erroneous interpretation of the guidelines. The Evaluation fully discusses Section 230.5(b)(8) on p. 23 and clearly shows the Corps' position on this issue.

Regarding your second part of this comment, the precision of our aerial photography interpretation is limited to delineation of covertime to no less than 2.5 acres (1 hectare). An attempt at greater precision in a project of this size would be subject to accuracy criticism. The methodologies utilized in this analysis are the most cost-effective for the intended purpose and is adequate for the purposes intended. Furthermore, this fact does not mean the analysis is "incomplete". There is a substantial difference between the terms "precision" and "completeness".

We do not concur with your categorical statement that wetlands created by the project will be of inferior quality due to fluctuating water levels. Fluctuating water levels are responsible for many types of wetlands that have adapted to such environments. We grant that many would-be wetlands should be regarded as "inferior" -- perhaps in many instances due to fluctuating water levels. This does not mean, however, that high quality wetlands cannot develop, either naturally or with proper management. This issue has been discussed in more detail in Attachment 1, pp. 1-11 through 1-16.

Comment 8 - Section 230.5(a)(7) states that degradation of aesthetic, recreational and economic values should be avoided.

The changes brought about by the project would replace the existing unimpounded, "semi-wild" upper Saint John River, a valued resource, with lakes. In contrast, there are numerous large lakes in Northern Maine and the recreation potential and aesthetic values of Dickey and Lincoln Lakes will be severely limited by the annual drawdown and associated unattractive and unproductive littoral zone. The project's effects on the viable timber industry are also not consistent with the Guidelines.

Response - The paraphrasing of Section 230.5(a)(7) is stated incorrectly. Correctly stated, it would read: "minimize discharge activities that will degrade aesthetic, recreation and economic values". As Attachment 2 shows, such minimization has been provided for.

As stated on p. 24 (230.5(b)(10)), the size of the facility was partially determined through such a consideration. We therefore do not concur with the inferences made in the remaining portions of the comment.

Comment 9 - There is no firm commitment in the 404 Evaluation to implement mitigation measures which have been developed during the Draft EIS and 404 Evaluation process. Also, mitigation could add significantly to the cost of the project. In order for the Evaluation to be complete, all mitigating measures should be clearly defined and those suggested measures which are included in the EIS and 404 Evaluation, should be firmly committed to and budgeted by the Corps as part of this overall project.

Response - The EPA Guidelines do not require a "commitment" to implement any "mitigation" measures. It requires consideration and minimization of various impacts. This has been shown where appropriate throughout this Evaluation (see Attachment 2).

Comment 10 - The 404 Evaluation, like the EIS, should consider the whole project. There has been no 404 Evaluation of the transmission line impacts, including those on the White Mountain National Forest. We believe that these impacts are significant enough to warrant an assessment relative to the 404 (b) guidelines.

Response - This relationship was discussed in the Evaluation on p. 3. We must re-emphasize that such an evaluation is at this time premature since the exact alignment of the transmission lines has yet to be determined. Once the centerline has been determined, an evaluation of those actions covered by the Nationwide Permit can be made and the remaining sites can be assessed.

Comment 11 - We believe that the 404 Evaluation should more thoroughly place the project's impacts in perspective by comparing the loss of wetlands, fisheries, aquatic and terrestrial wildlife habitat, and recreational values to those same resources in the study area which will not be directly impacted by the project.

Response - The description of impacts in the 404 Evaluation follow the format of the EPA Guidelines (40 CFR 230). These Guidelines do not provide nor require such a comparison, nor recommend methods whereby such a comparison could be credibly made. As is pointed out in your letter, this information is contained in the EIS and since this document is a supplement to the EIS, they have been covered adequately.

Comment 12 - We believe Section 404 (t) mandates that all required State permits be obtained prior to the issuance of the Final 404 Evaluation and submittal to the congress under 404 (r).

Response - Section 404(t) is not applicable to construction projects. such as the proposed Dickey-Lincoln School Lakes project.

Environmental Defense Fund

Comment 1 - The particular importance of a thorough analysis of alternatives under Section 404 derives from the requirement in the regulations that activities which result in the destruction of wetlands will only be permitted if (1) the activity associated with the fill must have direct access or proximity to, or be located in, the water resources in order to fulfill its basic purpose, or that other sites of construction alternatives are not practicable, and (2) that the proposed fill and the activity associated with it will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected aquatic ecosystem (40 CFR 230.5(b)(8)). As is implicitly recognized by the Draft 404 Evaluation, the generation of electric power is decidedly not a "water dependent" activity. For this reason alone, the Corps should not recommend construction of the project.

Response - The discussion of Section 230.5 (b)(8) on page 23 of this Evaluation has been expanded to clarify this factor. As such, we must disagree with your conclusion based on the fact that (1) the activity associated with the fill (hydroelectric generating facility) must have direct access or proximity to, or be located in, the water resources in order to fulfill its basic purpose (the generation of electricity); and (2) that the proposed fill and the activity associated with it will not cause a permanent unacceptable disruption to the beneficial water quality uses of the affected aquatic ecosystem because, the beneficial water quality uses appear to be limited to water-based recreation, primarily fishing. It has been demonstrated that the area is underutilized for such purposes as a result of the remoteness of the area and the presence of adequate or better facilities offering similar resources nearer to population centers as well as in proximity to this project.

Comment 2 - Furthermore, the tentative conclusion in the Draft Evaluation that the impacts of the proposed project are "not unacceptable" is based on the judgment that the alternatives to the proposed project, though not water dependent, would have adverse environmental and economic impacts of their own, and that these impacts serve to make the disruption which would result from Dickey-Lincoln "acceptable." Thus, the Draft Evaluation (correctly) recognizes the need to define the purpose of the project broadly in order to determine the relevant alternatives. Yet, even if other alternatives would have adverse environmental and economic impacts, the Corps' analysis does not indicate that these alternatives would lead to violations of any substantive standards issued under the Clean Air Act or other laws, whereas the disruption produced by Dickey-Lincoln is clearly contrary to the mandate of the Clean Water Act. Thus, for this second reason, the Corps should not recommend construction.

Response - We assume this comment is related to Section 230.5(a), General Consideration and Objectives. If so, the appropriate part of this section states: "...consideration shall be given to the need for the proposed activity, the availability of alternative site and methods of

disposal that are less damaging to the environment..."

Nowhere in this section do the Guidelines mandate that the Corps should perform a 404 Evaluation of each of the alternatives to show how many environmental laws it may violate. Alternative dam sites have been considered (GDM 4A, Section G-8) and the method of disposal (dam construction) has been designed to be less damaging to the environment (404 Evaluation, Attachment 2). The need for hydroelectric power is recognized in view of the fact that other energy sources are dwindling; and energy sources other than hydropower that utilize renewable resources have not been shown to be technologically feasible at this time.

Comment 3 - The Corps should analyze, as an alternative, demand control and direct conservation investments before concluding that no acceptable alternatives to the project exist. In our view, any favorable conclusion regarding this project under Section 404 which is made before the undertaking of such an analysis would be improper and illegal.

Response - Demand control and direct conservation investments have been analyzed and presented in the Final EIS, Supplement to Appendix I, CE, 1978. While we recognize that such measures most likely have less of an impact on the natural environment and, in the long run are not significantly less cost-effective than a project such as Dickey-Lincoln, these are not alternatives that the Corps is authorized to pursue as a solution to the need. The implementation of such measures is a complicated issue that is part of a yet to be finalized National Energy Policy (see p. 23).

Comment 4 - Finally, we note that the DEIS and 404 Evaluation suggest that some adverse water quality impacts would occur downstream of Dickey-Lincoln construction, although maximum efforts would be made to minimize the impact. Before construction begins, certification should be obtained from the State of Maine (pursuant to §401 of the CWA) that construction will not lead to violation of water quality standards, and that the resulting impoundment will meet Maine standards for natural lakes.

Response - A certification pursuant to §401 of the CWA is only required as a prerequisite to the issuance of a Section 404 permit. As this project is being reviewed pursuant to Section 404(r), thereby eliminating the need for issuance of a Section 404 permit, no water quality certification is required.

Seven Islands Land Company

Comment 1 - The (project) area can in no way be described as semi-wilderness solely for the use of recreationists.

Response - Nowhere in the 404 Evaluation is this description made. Presumably, you refer to the description of the area on p. 4, where it does say: "Existing use of the area consists of extensive activities such as logging, hunting, fishing, canoeing, and camping. Additionally, the term semi-wilderness refers to the fact (as stated on p. 4) that the

area is remote, and relatively undisturbed by human activity; and, were it not for logging activities, the area would be considered a "wilderness."

FOR REFERENCE

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1425 U.S. Army Engineer Div.,
D5 New England.

U56 Federal water pollution control
1980 act section "202" evaluation for
Dickey-Lincoln School Lakes.

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