1980

Fish and Wildlife Mitigation Report : Dickey-Lincoln School Lakes Project, Maine

New England Division

Corps of Engineers

U. S. Army Engineer Division

DICKEY-LINCOLN SCHOOL LAKES PROJECT

MAINE

FISH AND WILDLIFE MITIGATION REPORT

ATTACHMENT 3

IMPACTS

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

JUNE 1980

ATTACHMENT III

IMPACTS

DICKEY-LINCOLN SCHOOL LAKES PROJECT

AT

DICKEY, MAINE

U.S. ARMY ENGINEER DIVISION
NEW ENGLAND
WALTHAM, MASSACHUSETTS
JUNE 1980

PREFACE

This attachment will address the environmental impacts of the Fish and Wildlife Mitigation Plan proposed in the Report and Attachment 1.

This attachment is supported by the impact statement for the project and its ten appendices. Appendices C, E, F, G, J, and K and their supplements are referenced specifically in this document. Copies of this attachment, and the Report have been distributed throughout the six New England States and may be seen at the following repositories:

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Kingston	University of Rhode Island
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This attachment to the Report has been forwarded to the Board of Engineers for Rivers and Harbors for review. Copies of this attachment may be obtained by written request to:

Colonel Max. B. Scheider
Division Engineer
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

DICKEY-LINCOLN SCHOOL LAKES PROJECT, MAINE

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Section 1.00

Proposed Mitigation Plan Description

Introduction: Purpose and Scope of the Attachment

The Dickey Lincoln School Lakes Project is a proposed multipurpose project located on the upper reaches of the St. John River in Aroostook County, Maine. Development would consist of two dams with associated reservoirs and hydroelectric generating facilities, five dikes and transmission lines. A more detailed description of the proposed project and its associated impacts is contained within the Revised Draft Evironmental Impact Statement for the proposed project.

The purpose of this attachment is to evaluate the environmental impacts of the Fish and Wildlife Mitigation Plan proposed for implementation in conjunction with development of the Dickey-Lincoln School Lakes Project, Maine (Attachment 1 of the Report). Although the mitigation plan is intended to mitigate rather than impose adverse environmental impacts, the mitigation measures proposed do constitute a major Federal action requiring the development of a supplemental environmental impact statement pursuant to the National Environmental Policy Act of 1969. The impact identified herein will be included in the Final EIS for the project.

The scope of this report is limited to an evaluation of the plan proposed to mitigate losses associated with the hydroelectric features of the Dickey Lincoln School Lakes Project, and does not discuss mitigation measures for the proposed transmission route. The attachment is organized according to the format used in the RDEIS, expanding upon the information provided in that document as necessary.

1.00 Proposed Mitigation Plan Description

1.01 Project Purpose

The purpose of the proposed fish and wildlife mitigation plan is to provide the means and measures for mitigating, to the limit of practicability, the fish and wildlife losses attributable to the development of the Dickey-Lincoln School Lakes Project, Aroostook County, Maine.

1.02 Authority

The mitigation of fish and wildlife losses associated with water resource projects is provided for under the Fish and Wildlife Coordination Act (16 U.S.C. 661-666c; P.L. 85-624). With respect to the Dickey-Lincoln project, the act requires the Corps of Engineers to consult with the U.S. Fish & Wildlife Service (USFWS), and the Maine Department of Inland Fisheries and Wildlife (MDIFW) to plan for "...the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof..." in connection with water resource development in the Dickey-Lincoln project area.

Mitigation action pertaining to the Furbish lousewort (Pedicularis furbishiae) is proposed under authority of the Endangered Species Act of 1973. The biological opinion written by the Secretary of the Department of the Interior has provided the basis for the proposed endangered species mitigation plan.

1.03 Need

Significant losses to fish and wildlife resources attributable to the Dickey-Lincoln Project have been identified in the Revised Draft Environmental Impact Statement (RDEIS) and in the Conservation and Development (C&D) Report issued by the USFWS. Many of these losses cannot be avoided or mitigated. Approximately 80,455 acres of terrestrial habitat and 278 miles of free flowing streams and rivers will be lost (see Section 5, RDEIS, 1978).

The fish, wildlife, and endangered species impacts identified as having mitigation potential are as follows:

(a) The loss of wildlife habitat productivity and mature spruce-fir habitat due to inundation of approximately 80,455 acres of terrestrial habitat;

(b) The loss of an estimated 25,921 acres of deer wintering habitat due to inundation, and

(c) The inundation of riparian habitat of the Furbish lousewort.

The fisheries mitigation plan involves management of the brook trout fishery existing in the proposed impoundment and the remaining stream fishery within project lands. The loss of stream and river habitat for native brook trout is deemed unmitigable.

1.04 Selected Mitigation Plan

The proposed plan consists of three major elements. These pertain to terrestrial, fisheries, and endangered species management and mitigation. Each proposed plan and its operation is summarized in this section. A detailed description of each is presented in Attachment I of the Report.

1.04.1 Terrestrial Mitigation Plan

1.04.1.1 Wildlife Resource Management Objectives

Objectives of the terrestrial mitigation plan are:

(1) Ensure the conservation and maintenance of the nine major habitat types impacted by inundation.

  (a) Replace the habitat productivity lost through inundation which is estimated at an average annual loss of 3,222,085 habitat units.

  (b) Perpetuate the habitat value of spruce-fir bottomland in close proximity to the project.

  (c) Replace and compensate for wetland habitat loss in close proximity to and on the project lands.

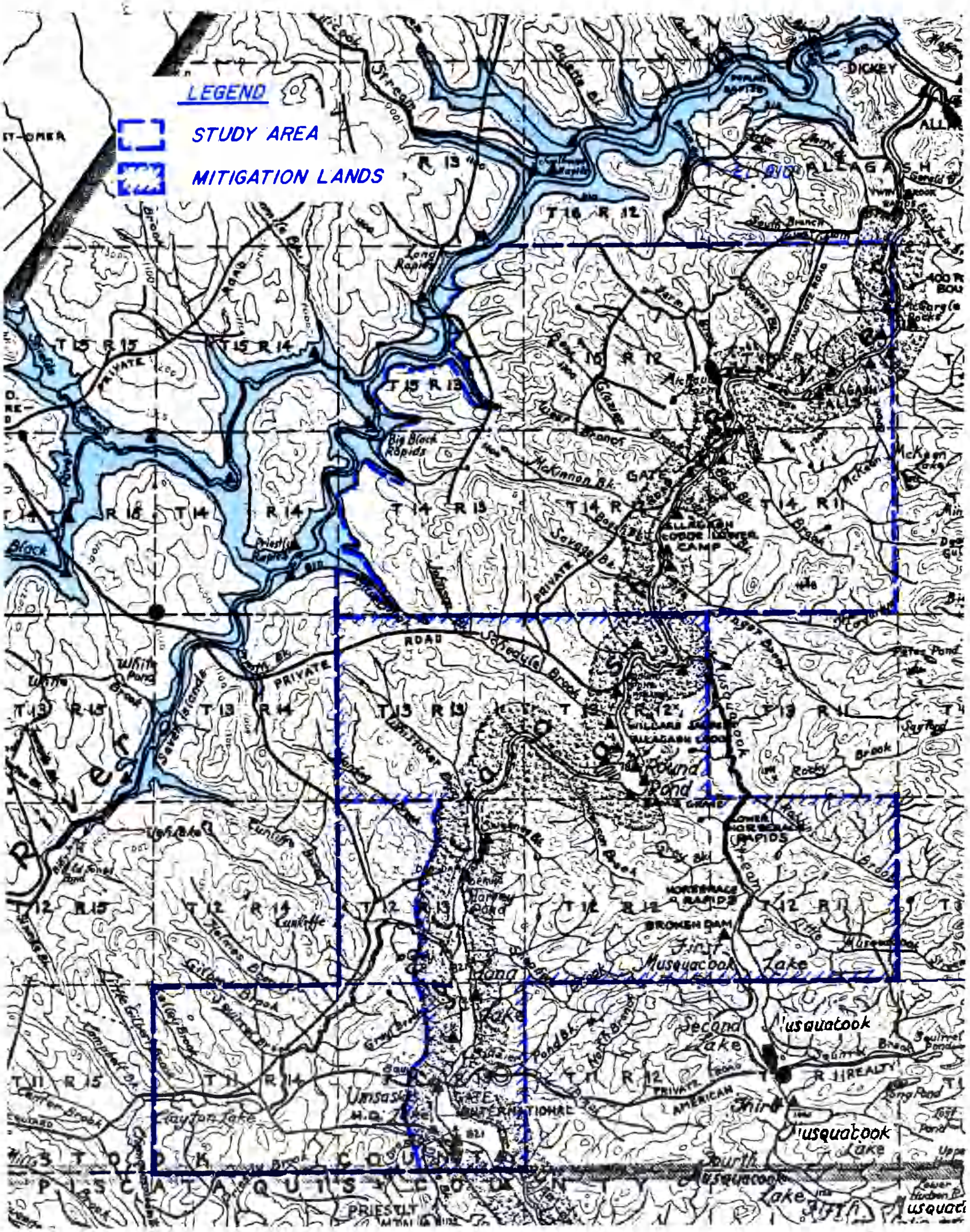
(2) Reduce short term adverse impacts to reservoir shorelines during cleaning and construction.

(3) Reduce average annual loss of deer and associated wildlife community in the 27 townships of the St. John Region.

(4) Reduce the initial impact of the impoundment on the 2,100 displaced deer.

1.04.1.2 Management Site

To accomplish the stated objectives, approximately 112,370 acres have been proposed for acquisition and management along the Allagash River (see map). Management practices will also be conducted on 13,400 acres located on project lands. The Allagash area was recommended as a mitigation site in the USFWS C&D Report due to its similarity to the project area in habitat type composition, its high concentration of deer wintering habitat, its management potential, and its accessibility. The proposed



LEGEND
STUDY AREA
MITIGATION LANDS
T 16 R 12
T 15 R 15
T 15 R 14
T 15 R 13
T 15 R 12
T 14 R 15
T 14 R 14
T 14 R 13
T 14 R 12
T 13 R 15
T 13 R 14
T 13 R 13
T 12 R 15
T 12 R 14
T 12 R 13
T 12 R 12
T 12 R 11
T 11 R 15
T 11 R 14
T 11 R 12
DICKEY
ALLAGASH
Big Black Rapids
Long Rapids
McKinnon Bk.
Savage Bk.
Round Pond
Second Musquacook Lake
First Musquacook Lake
Fourth Musquacook Lake
Umsaskis Lake
Clayton Lake
Long Lake
HORSERACE RAPIDS
BROKEN DAM
McKeen Lake
PRIVATE
ROAD
PISCATAQUIS COUNTY
AROOSTOOK COUNTY

mitigation area encompasses approximately 36,400 acres of Allagash Wilderness Waterway of which 3,700 acres of forested land is owned in fee by the State of Maine and is not proposed for taking. Approximately 14,500 acres of traditional deer wintering habitat are included on the proposed mitigation lands. (See detailed description of mitigation area, Section 2.4.)

1.04.1.3 Summary of Mitigation Measures

The terrestrial mitigation plan would acquire and manage habitat types in such a manner as to effectively increase the wildlife habitat productivity and carrying capacity of the managed unit. The basic management approach involves a 10 to 15 year cutting cycle to convert extensive stands of even-age forest to a variety of age classes, and to maintain a diversity of age classes within and between forest stands (Attachment 1, Section 2.2.2).

Spruce-fir bottom lands to be acquired within the one mile "outer zone" of the Allagash Wilderness Waterway (AWW) and traditional overwintering deer habitat located on the mitigation lands will be managed to insure the maintenance of dense spruce-fir shelter areas while sustaining a moderate level of habitat productivity and food availability to overwintering deer and other species utilizing this cover-type. The habitat requirements of overwintering deer, black bear, marten, and lynx (as indicator species for "deep woods" habitat requirements) would be of particular concern on these lands (Attachment 1, Section 2.2.3).

Wetland management techniques are proposed with the intent of enhancing wildlife habitat on the mitigation lands and encouraging revegetation along the Dickey Lake shoreline (Attachment 1, Section 2.2.5).

In addition to habitat management measures, the proposed terrestrial plan includes specific management plans for such species as deer, moose, bear, bobcat, lynx, fisher, marten, beaver, and several species of avifauna including raptors, waterfowl, passerines, and ground-nesting species (Attachment 1, Section 2.3).

It is recommended that the State of Maine Department of Inland Fisheries and Wildlife (MDIFW) assume overall management responsibility on the terrestrial mitigation area; however, the Federal Government shall maintain a review role to insure that mitigation guidelines and objectives are fulfilled. In addition, where the mitigation area includes lands under jurisdiction by special management authorities (i.e., the Allagash Wilderness Waterway and areas zoned for protection under the State Land Use Regulation Commission [L.U.R.C]), timber harvest and road

construction activities shall be reviewed by, and coordinated with, these authorities. The LURC and the Bureau of Parks and Recreation would retain their authority for approval or denial for timber harvesting and road construction within the mitigation lands.

Personnel required for management in this portion of the plan include a unit manager, one wildlife manager, part time wildlife technicians, a forester and forestry technicians, road engineer, wetlands biologists, equipment operators and a secretary. The total work force would include 26 people.

1.04.2 Fisheries Mitigation Plan

1.04.2.1 Fisheries Resource Management Objectives

Objectives of the fisheries mitigation plan.

(1) Ensure the continual replacement of annual brook trout biomass lost to stream fishery by inundation.

(2) Monitor management and provide research into management goals.

1.04.2.2 Management Site

The project area for the fisheries management plan is that part of the St. John River from the Lincoln School dam site upstream to Nine Mile Bridge and all tributaries between, excluding the Allagash River drainage, that lie within the United States. It also includes the St. John River from the tailwaters of the Lincoln School Reservoir downstream to the confluence of the Fish River.

1.04.2.3 Summary of Mitigation Measures

The proposed fisheries plan consists of:

(1) A stream maintenance program;

(2) The establishment of a 100-foot wide buffer zone along each side of reservoir tributaries within project lands; and

(3) A brook trout management program based on a five year survey to determine the level of success of the proposed management plan, and that which may be necessary to replace a potential deficit in brook trout biomass;

The five year creel census would be initiated when the reservoir brook trout population stabilized--approximately 15 years after construction start. In addition to recommendations

for streamside protection and stream maintenance, recovery techniques such as stocking and improving spawning habitat are proposed in the possibility that a biomass deficit is observed from the creel census results.

Personnel requirements for fishery management would be one full time fishery biologist and two half time technicians.

1.04.3 Endangered Species Mitigation Plan

1.04.3.1 Endangered Species Resource Management Objectives

The objectives of the endangered species management plan are to:

(1) Protect and perpetuate the populations of Pedicularis furbishiae, Furbish lousewort, within the St. John Region.

(2) Monitor and provide scientific knowledge on the Furbish lousewort.

1.04.3.2 Management Site

The mitigation proposal for the endangered Furbish lousewort contains the land acquisition recommendations included in the USFWS biological opinion. The area acquired would amount to a maximum of 500 acres of riparian habitat along the St. John River from the Lincoln School Dam to the point where the banks of the river enter Canada.

1.05 Mitigation Plan Economics

1.05.1 Plan Implementation Costs

The complete proposal would require the acquisition in fee title of approximately 112,870 acres of land at a total first cost of $36,567,700 and a total annualized cost of $1,905,100 at the authorized rate of 3-1/4 percent and $3,279,600 at the current water resource rate of 7-1/8 percent. The mitigation plan would be financed as a project cost of the Dickey-Lincoln School Lakes Project. The costs of each plan are itemized in Table 1-1 below and described in detail in Attachment 1 of the Report.

TABLE 1-1

Cost and Income Summary (1979 Dollars)

	3-1/4%	7-1/8%
Terrestrial Mitigation Cost Summary		
Total Investment		
First Costs:		
Land Acquisition	$17,990,000	$17,990,000
Road Construction	9,000,000	9,000,000
Facilities	250,000	250,000
Capital Equipment	644,700	644,700
Personnel	2,107,200	1,893,700
Total First Costs	29,991,900	29,778,400
Interest during Construction	1,316,000	2,884,925
Total Investment	31,307,900	32,663,300
Capital Recovery Factor	.03388	.07132
Annual Costs		
Interest and Amortorization	1,060,700	2,329,500
Annual Costs (O&M):		
Major Replacements		
Facilities	1,700	600
Capital Equipment	71,400	62,500
Road Maintenance	31,700	31,700
Personnel	392,000	328,300
Operating Costs	50,000	50,000
Research	9,400	9,900
Total Annual Costs (O&M)	556,200	483,000
Total Annual Costs (O&M and interest and amortization)	$1,616,900	$2,812,500
Fisheries Mitigation Cost Summary		
Total Investment		
First Costs:		
Building	$50,000	$50,000
Capital Equipment	40,000	40,000
Personnel	216,400	194,500
Total First Costs	306,400	284,500
Interest during Construction	---	---
Total Investment	306,400	284,500
Capital Recovery Factor	.03388	.07132

Table 1-1 (Cont.)

	3-1/4%	7-1/8%
Annual Costs		
Interest and Amortorization	$10,400	$20,300
Annual Costs (O&M):		
Major Replacements		
Building	340	120
Facilities	7,500	6,900
Personnel	40,300	33,700
Operation and Maintenance Costs	10,000	10,000
Field Survey Equipment	290	310
Total Annual Costs (O&M)	58,400	51,000
Total Annual Costs (O&M and interest and amortization)	$68,800	$71,300
Endangered Species Mitigation Cost Summary		
Total Investment		
First Costs:		
Land Acquisition	$75,000	$75,000
Total First Costs	75,000	75,000
Interest during Construction	---	---
Total Investment	$75,000	$75,000
Annual Costs		
Interest and Amortorization	$2,541	$5,349
Wetlands Mitigation Cost Summary		
Total Investment		
First Costs:		
Dike Construction	$4,541,000	$4,541,000
Capital Equipment	148,800	148,800
Personnel	188,600	169,500
Total First Costs	4,878,400	4,859,300
Interest during Construction	---	---
Total Investment	$4,878,400	$4,859,300
Capital Recovery Factor	.03388	.07132
Annual Costs		
Interest and Amortization	165,300	346,600
Annual Costs (O&M):		
Major Replacements		
Capital Equipment	16,500	14,400
Personnel	35,100	29,400
Total Annual Costs (O&M)	51,600	43,800

Total Annual Costs (O&M and interest and amortization)	$216,900	$390,400
Total Investment Costs		
Terrestrial Mitigation	$31,307,900	$32,663,300
Fisheries Mitigation	306,400	284,500
Endangered Species Mitigation	75,000	75,000
Wetlands Mitigation	4,878,400	4,859,300
Total	$36,567,700	$37,882,100
Capital Recovery Factor	.03388	.07132
Total Annual Costs		
Interest and Amortorization	$1,238,900	$2,701,800
Annual Costs (O&M)		
Terrestrial	556,200	483,000
Fisheries	58,400	51,000
Endangered Species	--	--
Total Annual Cost	$1,905,100	$3,279,600

The major mitigation costs lie in the terrestrial mitigation plan wherein losses in wildlife attributable to the project can be offset to some measurable degree. The estimated annual cost for the terrestrial segment is $1,616,900 at the authorized 3-1/4 percent and $2,812,500 at the current water resources rate of 7-1/8 percent.

Similarly, annual fisheries mitigation costs are $68,800 and $71,300, and endangered species costs are $2,500 and $5,300 for the respective interest rates.

The terrestrial mitigation plan will realize an income both from stumpage and user fees. Conservative estimates for these annual incomes are $248,900 and $8,000, respectively. All revenue derived from project lands will be turned over to the U.S. Treasury.

1.05.2 Relationship to Dickey-Lincoln School Lakes Project Benefit/Cost Ratio

Costs attributed to fish and wildlife mitigation cannot be included in the benefit-to-cost ratio analysis for the authorized project because they are not an authorized portion of the project. However, a sensitivity analysis of benefit to costs can be carried out utilizing the estimated costs of mitigation. Utilizing the above mentioned values the resulting project benefit-to-cost ratios are 2.6 to 1 and 1.4 to 1 at the 3-1/4% and 7-1/8% interest rates, respectively.

Section 2.00

Environmental Setting

2.00 Environmental Setting

This section will summarize the environmental setting of the St. John Region and the Dickey Lincoln Reservoir described in the RDEIS (Section 2.00), providing information directly applicable to the terrestrial mitigation site in the Allagash area as necessary.

2.01 General

The St. John River Basin is located in Maine and the Canadian provinces of Quebec and New Brunswick. The drainage basin covers 21,600 square miles of which approximately 7,400 square miles are within the State of Maine. The St. John River is approximately 415 miles long and forms 100 miles of the international boundary.

Principal tributaries to the St. John in Maine are the Allagash River, Fish River, and the Aroostook River. The Allagash River has a drainage area of approximately 1,260 square miles and is 63 miles in length.

2.02.2 Topography and Geology

2.02.1 Topography

The upper St. John River Basin is a maturely dissected upland region which has been modified by glaciation. Relief in this area approximates 800-1,000 feet with higher hilltops reaching elevations of 1,400-1,700 feet.

Two major rivers, the St. John and the Allagash, flow to the north and east to unite immediately downstream of the Dickey dam site.

2.02.2 Geology

The surface geology of the St. John and Allagash areas has been profoundly modified by glaciation. Soils are typically rocky and often infertile as glaciers wore away the original soil mantle and left a veneer of unsorted clay, sand, and rock fragments called till. Eighty to 90 percent of the St. John River area is covered by till. In other places, bedrock was exposed through glaciation. The third kind of surface deposit in the area is alluvium deposited along the streams, coves and flood plains.

2.03 Hydrology

The average annual runoff from the upper 2,725 square mile St. John River Basin is 23 inches. The average annual runoff from the Allagash River is 20 inches. Approximately two-thirds of this runoff occurs during the spring.

Average monthly flows at the proposed Dickey dam site vary from a low of 960 cfs in February to a high of 17,000 cfs in May. Extremes in flow range from 129 cfs to 82,000 cfs.

2.04 Water Quality

Water temperatures in the St. John River Basin exhibit seasonal variations with highest values occurring in mid-July through mid-August. Temperatures at or below freezing occur in late autumn through winter into mid-spring.

Dissolved oxygen levels ranged from 74 percent to 107.6 percent and are considered high throughout the St. John watershed.

Levels of turbidity were studied in both the St. John and Allagash Rivers, and were found to correlate directly with runoff. Significant increases in turbidity levels were observed during flood events. Apparent color varied with flowrate throughout the watershed. In general, color values are high.

Nutrients such as nitrites, nitrates, nitrate nitrogen, and total phosphorus are low throughout the watershed. All metals tested for, with the exception of mercury, were found in trace levels. The origin of the mercury is unknown at this time. However, the high values monitored suggest that the primary source is of a geologic nature.

A thorough description of water quality conditions in the St. John River Basin above the site is provided in Design Memorandum No. 5, Water Quality (CE, 1977). Further elaboration on the mercury found in selected lakes of Northern Maine is presented in Appendix E, Supplement (CE, 1978).

2.05 Climatology

The project area is in the northern extremity of the continental United States east of the Mississippi. The climate at this latitude (approximately 47^{o} N) is best described as cool. The winters are harsh and snow cover is extensive from November through May.

2.06 Aquatic Ecosystem

The upper St. John River Basin and the Allagash River Basin contain approximately 3,450 miles of intermittent and continuously flowing streams and rivers.

Most streams tributary to the St. John River and Allagash River are characterized as 7 to 33 feet wide, .5 to 3.3 feet deep, of a riffle-pool type configuration and with good stream and fish cover. Summer water temperatures are generally less than 68^{o}F and oxygen levels are greater than 7 parts per million (ppm). Most streams contain beaver activity and provide habitat for adult brook trout.

There are numerous lakes and ponds throughout both watersheds. Standing water within the region also includes many small ponds and beaver impoundments. Important water bodies within the Allagash mitigation area include Umsaskis Lake, Long Lake, Round Pond, and the Musquacook System. Generally the lakes and ponds can be characterized as (1) trout lakes in which a source of cool, well oxygenated water is present throughout the year, and (2) warm water lakes which contain primarily non-trout species including yellow perch and suckers, and, (3) winterkill lakes where most life forms such as fish do not survive the total freezing of the waterbody.

The brook trout is the most popular native sportfish and can be found in most of the available streams and cold water lakes and ponds.

The Dickey Reservoir site itself will be a deep, cold impoundment with a long shoreline, limited littoral development, and an extensive but well oxygenated hypolimnion. Primary productivity in the impoundment will be derived primarily from phytoplankton, and will be comparatively low due to phosphorus limitation. Zooplankton abundance will be relatively low, as well. Water level fluctuations and resulting erosion and freezing will severely limit rooted plant and bottom growth in near shore areas.

Deep water bottom conditions should be nearly ideal for the establishment and maintenance of benthic fauna. Comparatively high insect larvae and worm productivity would be expected as a result of the flooded forest, which would provide both food and substrate for these animals.

A period of initial high benthic productivity would occur during, and for the first few years following filling. In this period, shallow water forms would be comparatively abundant as a result of inundating the surrounding forest. As erosion resulting from several winter's drawdown proceeds, habitat succession and reduced detritus availability would make the shallow water zone progressively less suitable for benthic animals.

Initial fisheries productivity would be largely limited to the near shore and deep water bottom regions of the proposed impoundment once the initial low dissolved oxygen conditions subsided. There are presently no open water fishes other than landlocked salmon within the project area, and these landlocked salmon are not expected to reproduce successfully.

2.07 Terrestrial Ecosystem

2.07.1 Vegetation

Vegetation patterns and habitat type composition in the mitigation area are similar to the St. John River area, and are

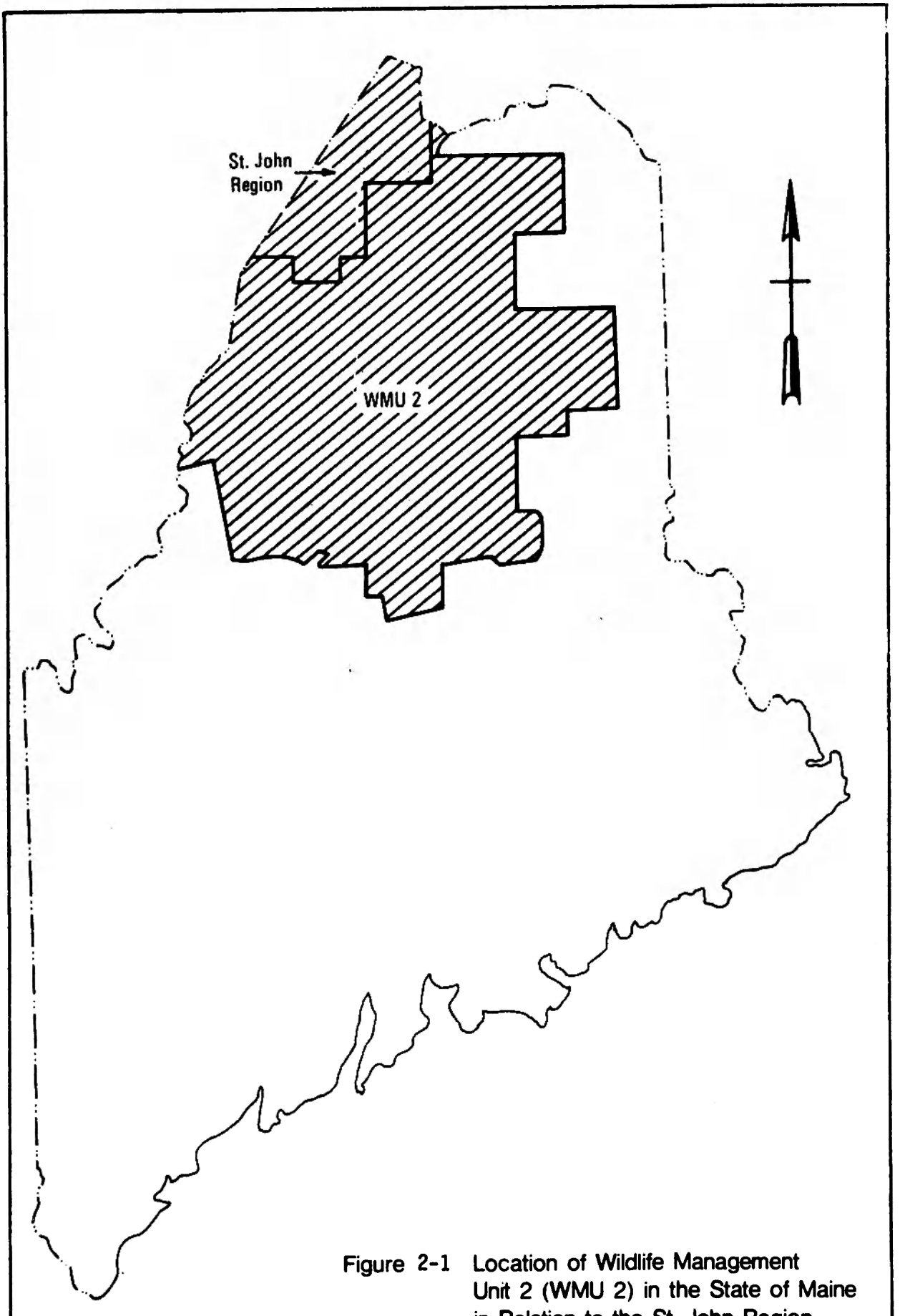


Figure 2-1 Location of Wildlife Management Unit 2 (WMU 2) in the State of Maine in Relation to the St. John Region

There are a total of 14 carnivores which potentially inhabit the area. Among the more significant are the black bear, marten, fisher, bobcat, lynx, and coyote.

The black bear is the largest carnivore inhabiting the area. It is typically associated with remote forested regions where human populations are low or nonexistent. Bear habitat in the St. John and Allagash areas is comprised of spruce-fir bottom lands, combined with the hardwoods on the ridges, in continuous large blocks of land.

Fisher and marten have characteristically exhibited a habitat preference for dense spruce-fir forest. Although the habitat preferences of these related species are similar, the fisher has proven considerably more adaptable to second-growth hardwoods.

The lynx is restricted to northern Maine and is an inhabitant of mature forests with low levels of human interference. It is not common and no density estimates are available for this species. The bobcat is the most common cat in the area. It apparently prefers dense second-growth spruce-fir forest interspersed with openings (logging, farmland, and windthrows) and swamp.

The eastern coyote has recently been expanding its range in the project area. This species is normally found in open or semi-open land, but is most common presently in well-wooded, unpopulated sections of the state.

The project and mitigation areas support a variety of birdlife. Birds often associated with spruce-fir forests include wood warblers, chickadees, woodpeckers, nuthatches, thrushes, sparrows, and finches. The abundance and distribution of several of these species are closely related to the availability of spruce budworm larvae.

Other avifauna characteristic of the area are raptors (e.g., hawks, eagles, and osprey), ruffed and spruce grouse, and various species of waterfowl.

There are three species of wildlife which are known to exist or suspected to exist in the St. John area that are listed as endangered under the Endangered Species Act of 1973. These species are the eastern cougar, peregrine falcon, and bald eagle. Aerial surveys conducted in 1976 resulted in no sightings of peregrine falcons, or active nests of either peregrines or eagles. As mentioned previously, there have been no confirmed observations of eastern cougar in the area.

2.07.3 Forestry

The proposed project area and the mitigation lands are primarily commercial forest. Since 1840, owners in northern Maine have joined together to form a unique land management system wherein much of the forest land is held in undivided and common ownership, particularly in the project area. Under this system, owners have formed organizations or retained firms to manage large tracts of forest land as one ownership. The forest industry owns a significant percentage of the commercial forest in the Allagash Area.

Forest management generally involves selective cutting in spruce-fir stands of economic value on approximately a 25 to 30 year cutting cycle. Northern hardwoods, including poplar and birch, are not managed for harvest except to remove softwoods and highly valued mature hardwoods.

The spruce budworm infestation and other natural events, have required increased salvage clearcutting, with subsequent regeneration of even-aged stands. Spruce budworm damage to the highly valued spruce-fir forests in the St. John area has approached 75 percent of the current year's foliage. Average yearly mortality in 1976 and 1977 was reported to be 0.45 cords per year. (Section 10.0).

Forestry responses to budworm damage have involved selective cutting in larger volume and clear cutting of fir stands. Spruce reproduction is being encouraged over fir due to its lower susceptibility to budworm infestation. Such practices in response to budworm damage are more evident in the Allagash area than in the immediate project area. Forest management practices in the Allagash area are generally less defined and less intensive than in the project area. See Attachment 1, Sections 2.4 and 2.9.2, for a more detailed discussion of forest practices in the mitigation area.

The selection cutting system requires a well developed logging road system which presently exists within both the St. John and Allagash areas.

The average growing stock volume for all species in Aroostook County is 17.5 cords/acre, with softwood stands averaging 19.7 cords/acre.

During 1958 to 1970, annual net growth for spruce-fir in Aroostook County averaged .58 cords/acre/year. The highly productive spruce-fir bottomlands in the project area produce 0.75 to 0.80 cords/acre/year. Average growth rates for spruce-fir in the St. John watershed were estimated at 0.66 cords/acre/year, prior to the current spruce budworm outbreak. Northern hardwood

and aspen-birch stands sustained an average annual net growth of 0.15 and 0.48 cords/acre/year respectively, during the 1958 to 1970 period. Currently, spruce-budworm has significantly reduced net growth in the spruce-fir forest.

The 112,370 acres of land, proposed in the tentatively selected plan, along the Allagash Wilderness Waterway for wildlife mitigation purposes account for roughly 2 percent of the remaining forest lands in Aroostook County. Sawtimber is found on 92,000+ acres of these commercial forest lands and the timber has a maturity of 60 to 70 years. The timber mix is approximately 50 percent softwoods (spruce and fir), which is presently in great demand, and 50 percent mixed spruce hardwoods. There are six major landowner/management companies within the proposed mitigation lands: Great Northern Paper, International Paper, Prentiss and Carlisle, Irving, Sawyer and Seven Islands. The area is now being served by a good road system.

Latest data (1979) indicate that annual volume harvested from the six townships which comprise the proposed mitigation lands amounted to 34,840 cords (see Table 2-1). Nearly all of the timber harvested was spruce-fir (96 percent); cedar accounted for the remainder. Three-quarters of the spruce-fir was used for lumber production and one-quarter was processed for chips. An estimate of income earned by the landowners from the 1979 harvest was $500,000. The stumpage prices employed in the above estimate were obtained from the State of Maine and reflect 1979 Aroostook County values.

Table 2-1

ANNUAL TIMBER HARVEST
FROM PROPOSED MITIGATION LANDS
BY TOWNSHIP (1979)

Township	Annual Volume (in cords)	Average Cords Per Acre	Market Location	Species
T11 R13	5,950	.52	Canada	spruce-fir
T12 R11	3,000	.13	Maine	spruce-fir
T12 R12	2,000	.09	Maine	spruce-fir
T12 R13	3,900	.36	Canada	spurce-fir
T12 R13	490	.04	Canada	cedar
T13 R12	10,500	.51	Maine	spurce-fir
T13 R13	8,000	.35	Canada	spruce-fir
T13 R13	1,000	.04	Canada	cedar
TOTAL	34,840 Cords			

There are no mills located within the six townships, therefore mills outside of the proposed mitigation area were surveyed to trace the processing location of the 34,840 cords harvested. Nearly one-half (46 percent) of the spurce-fir harvested is transported to mills in Maine for processing, while Canadian mills process the remainder of the spurce-fir harvest and all of the cedar. Table 2-2 displays pertinent harvest data relating to the current needs of the three Canadian and three Maine processing plants and the percentages of those needs that would be satisfied by timber harvested from the proposed mitigation lands. Indications are that the six townships supply small amounts of the plants' total yearly capacity.

In terms of employment, based on annual harvest, it is estimated that the two major paper companies employ between 100 to 150 logging personnel on the proposed mitigation lands.

A final consideration in relation to the forestry economic setting is the existence of the spruce budworm. The entire mitigation area has a moderate to severe rating with regard to defoliation. Average yearly mortality in 1976 and 1977 was reported to be 0.45 cords per year.

Table 2-2

PROCESSING LOCATION AND QUANTITY
DRAWN FROM PROPOSED MITIGATION LANDS

Location	Type of Processing	Yearly Capacity	Quantity Drawn from Mitigation Lands	Percentage of Yearly Cap. from Mit. Lands
Maine:				
Masardis	Lumber	60,000 MBF (120,000 CORDS)	1,500 MBF (3,000 CORDS)	2.5%
Portage	Chips	180,000 CORDS	8,500 CORDS	4.7%
Ashland	Lumber	90,000 MBF (180,000 CORDS)	2,000 MBF (4,000 CORDS)	2.2%
SUB-TOTAL		480,000 CORDS	15,500 CORS	3.2%
Canada:				
St. Pamphile	Lumber	45,000 MBF (90,000 CORDS)	8,000 CORDS	8.9%
	Shingles	7,000 MBF (14,000 CORDS)	1,490 CORDS	10.6%
St. Pamphile	Lumber	50,000 MBF (100,000 CORDS)	1,950 MBF (3,900 CORDS)	3.9%
	Chips	100,000 CORDS		
St. Juste	Lumber	30,000 MBF (60,000 CORDS)	5,950 CORDS	9.9%
SUB-TOTAL		364,000 CORDS	19,340 CORDS	5.3%
TOTAL		884,000 CORDS	34,840 CORDS	3.9%

2.08 Socio-Economic Setting

The population density of this remote portion of Maine is low with small population centers distributed along the major waterways. The ethnic origins are primarily French Canadian, Acadian and Scotch-Irish.

The economy of Aroostook County is based in the extraction of resources from the land and the subsequent exportation of these resources. The major sectors that grow or harvest the resources are agriculture and forestry. There is some processing of the raw materials prior to export.

Forestry commands a leading role in the economy of the region although it does not employ large numbers of people. Commercial forest lands occupy 86 percent of Aroostook County. This amounts to 22.2 percent of Maine's commercial forest with 29.2 percent of it in marketable timber. Much of the forest land is held in undivided and common ownership, and owners have formed organizations or retained firms to manage large tracts of land as one ownership, particularly in the project area. The forest industry owns a significant percentage of the land in the Allagash Area.

2.09 Recreation

Both the St. John and Allagash Rivers provide unique wilderness recreational opportunities, particularly for canoeists and fishermen. The St. John River has been designated by the Department of Interior (HCRS) as meeting the criteria for designation as a wild and scenic river, and has been proposed for inclusion in the National Wild and Scenic River System. The Allagash Wilderness Water is already included in the System.

The St. John River is one of the last lengthy segments of free flowing, near wilderness rivers remaining in the Northeast. Difficult access and distance from population centers has and should continue to protect the remote character of this area. The remoteness and relatively undisturbed character coupled with one of the most challenging white water river segments in the Northeast makes the river an excellent canoe trip experience. Canoe usage visitor day figures for 1975 show that 81 percent were accounted for by nonresidents.

The North Maine Woods (NMW), a partnership of landowners, managers, and natural resource agencies, is responsible for managing the private lands in the St. John and Allagash Areas for recreational use. Recreational use within the Waterway is managed by the Maine Bureau of Parks and Recreation.

Other recreational uses offered by the area include camping, fishing, hunting, and hiking. Hunting is the most important

recreational activity in the project area, although pressure is light compared to the rest of the State. The major species hunted in the area are whitetail deer, black bear and ruffed grouse. The woodcock, snowshoe hare, fox, coyote and raccoon receive considerably less hunting pressure. The black bear is a trophy species, and hunting for bear in the project area exceeds 400 man-days annually. Overall, there is opportunity for more hunting.

2.10 Cultural Resources

Utilization of the Allagash-St. John River drainages by prehistoric populations is poorly understood at present. The valley may have been utilized during the early fur trade period. Due to the transient nature of occupation, it is difficult to attach a specific tribal or band name to these travellers. It is probably adequate to refer to them as Abnaki, a group of Algonkian speaking people who occupied much of northern New England and eastern Canada at the time of European contact.

It seems unlikely that the proposed mitigation lands supported a large prehistoric population on an intensive seasonal basis or year-round basis. Agriculture was virtually impossible due to the short growing season. Gathering of wild plants, fresh water fishing, and hunting of moose, caribou, and smaller game were probably the means of subsistence within the Allagash drainage.

The Allagash-St. John drainages were probably utilized primarily as a travel route by prehistoric and contact period populations. This river system would have provided one of the few available means of access between the St Lawrence drainage in Canada and the Penobscot, Kennebec, and lower St. John valleys in Maine.

The distribution and physical characteristics of archaeological sites within the proposed Dickey-Lincoln School Lakes impoundment area gives a fairly good indication of what may be expected in the Allagash drainage. Virtually all sites found in the cultural resource reconnaissance of the impoundment area were located close to the river or its major tributaries. These sites are small, with few diagnostic artifacts. They appear to represent short-term "canoe camps" occupied by travellers moving up or down the drainage system. The "Big Black Site," located between Big Black and Priestly rapids, saw successive short term occupations over a long period of time.

Historic period utilization of the Allagash drainage consisted primarily of logging and recreational hunting and camping activity, dating from the second quarter of the 19th century to the present day. Sites related to such activities are generally near the river or its major tributaries, which provided transportation for men and supplies, as well as enabling transport of timber by log drives. Typical features of early logging activity in the Maine woods are

remains of temporary dams on the rivers, timber sluices on the slopes, and machinery remains of steam or gasoline mills and skidders at sites of base camps.

2.11 Future Environmental Setting Without the Project or Fish and Wildlife Mitigation

Most environmental features in the project and mitigation areas are expected to remain fairly constant in the future. Noteworthy are potential changes in forestry practices which would result in changes to the terrestrial and aquatic ecosystems, cultural resources, and recreational opportunities.

Demand for forest products in Aroostook County is expected to increase rapidly. Historical evidence indicates that as more wood is harvested, there will be a shift to more mechanized operations and whole tree utilization. The spruce-fir demand is projected to equal supply around 1990.

The projected intensification of timber management, including road construction, could increase sedimentation and runoff and otherwise reduce the quantity and quality of cold water stream habitat for brook trout. The implementation of intensive management techniques such as whole tree harvesting and use of herbicides and pesticides may reduce the overall productivity of the aquatic ecosystem.

The intensification of forest management practices is expected to reduce the extent of mature spruce-fir and hardwood forests in the St. John and Allagash areas. In general, wildlife species representative of mature forests will decline whereas edge species will be favored. The decline in the deer population is likely to continue given current climatic trends and current and projected cutting practices.

Whole tree harvesting and the economic use of slash will reduce the long term productivity of the terrestrial ecosystem. Regardless of future forest management practices, the value of forest resources in the area will increase, and restrictions on cutting to protect spruce-fir bottom lands and deer wintering habitat may become increasingly difficult to enforce. Changes in legislation may be brought about which would not favor these areas for wildlife purposes.

Increased forest management activity and associated public access for recreation could adversely impact archeological sites located in the riparian habitat along the St. John and Allagash Rivers.

In general, recreational opportunities, may improve as a result of increased logging road access for recreational users. The North

Maine Woods Association is developing a recreational management plan which emphasizes the maintenance of the unique semi-wilderness recreation experience, concurrent with the timber industry. However, this presumes that timber harvesting and road construction will be conducted to avoid degradation of the unique recreational experience offered, and the overall environmental quality of the area.

Section 3.00

Relationship of the Mitigation Plan to Land Use

3.00 Relationship of the Mitigation Plan to Land Use

3.01 Land Use Characteristics

Commercial forests cover 86 percent of Aroostook County, and most of the Allagash area to be acquired and managed for mitigation. Timber production is the dominant land use in the unorganized townships.

Transportation in the mitigation area is primarily by private logging roads owned and operated by landowners and forest management companies through North Main Woods (NMW). Most of the woodland in the area is available for outdoor recreation. Refer to RDEIS Sections 2.12, Appendix C Supplement 1978; Section 10.0 Attachment 3; and Attachment I, Sections 2.4 and 2.9.2 for further details on forestry land use.

3.02 Land Use with the Proposed Project and the Mitigation Plan

Changes in land use characteristics with implementation of the mitigation plan will be limited primarily to the forestry sector. Timber harvesting will continue on the mitigation lands, but management practices will be conducted to maximize wildlife values, not marketable timber yields. Therefore, yields of saw timber and/or pulpwood products are expected to be changed from those anticipated under private forest management. Ownership patterns would change as the Federal Government acquires the mitigation area in fee simple (Section 10.0, Report).

Section 4.00

Impacts

4.00 Impacts

4.01 General

The environmental impacts of the plan constitute an overall improvement in fish and wildlife habitat conditions in the mitigation lands. Adverse impacts to the natural and man-made environment are, however, incurred in the process. The impacts of the proposed plan are those primarily attributed to the land acquisition and the habitat management plan recommended for wildlife mitigation.

The fish and wildlife mitigation plan is intended to offset to the limits of practicability the fish and and wildlife resource losses (unquantifiable project costs) attributable to the Dickey-Lincoln School Lakes Project. It must be emphasized, therefore, that implementation of the proposed plan will not add quantifiably tangible dollars to the overall Dickey-Lincoln project.

Impacts attributable to mitigation over the 100-year project life cannot, for the most part, be quantified. Impacts associated with the proposed plan which are considered to be beneficial are discussed below.

(1) Reduction in project induced impacts - Recommended mitigation measures are expected to offset losses in wildlife habitat productivity, and to partially mitigate for estimated losses in overwintering deer carrying capacity (42-53%). Losses in mature spruce-fir bottomland due to inundation will be partially offset by measures recommended to maintain the wildlife habitat value of spruce-fir bottomlands and deer wintering habitat in the Allagash area. Fisheries management will replace lost brook trout biomass, but not the lost stream and river brook trout habitat. Land acquisition and successful compliance with the recommendations in the biological opinion for the Furbish lousewort will remove that endangered species from the classification of jeopardy.

(2) Wildlife-oriented recreation - Mitigation efforts to increase wildlife habitat carrying capacity should improve wildlife oriented recreational activities in the Allagash area. Such activities would include hunting, hiking, and photography. Although estimates can be made relating predicted increases in wildlife populations to man-days of recreation use and dollar values for wildlife habitat improvement, such methods do not provide an accurate or realistic assessment of benefits to the wildlife resorce.

(3) Allagash Wilderness Waterway recreation - The Allagash Wilderness Waterway is part of the National Wild and Scenic River System and, as such, is to be protected and managed for the unique "semi-wilderness" experience it provides. Its outer zone (500 ft - 1 mile from the river), however, is under private ownership and subject to private timber harvesting activity under the supervision of the Maine Department of Conservation.

With careful coordination, the proposed acquisition and management of adjacent lands for wildlife mitigation will benefit wildlife by maintaining mature spruce-fir bottomlands and deer wintering habitat while adding an extra measure of protection for the Waterway and complementing the experience the Allagash Wilderness Waterway now provides (Maine Bureau of Parks and Recreation, 1979).

(4) Contribution to knowledge - The monitoring activities and proposed research for the mitigation area will contribute significantly to our working knowledge of the ecological relationships involved in a boreal forest. Implementation of management plans will be carefully monitored and analysed for degree of success. This analysis will undoubtedly point to new areas of scientific interest and need. The proper handling of these needs will provide valuable knowledge to be utilized in future and similar actions.

4.02 Hydrology and Water Quality

The proposed forest habitat management plan calls for individual and group selection cutting on a 10 to 15 year cutting cycle rather than the 25 to 30 year cutting cycle more commonly practiced by private landowners. This more intensive management approach necessitates a well-developed logging road system and more frequent harvests within the same forest stands. Increases in surface runoff, stream velocity, nutrient removal, sedimentation, soil compaction, and soil erosion are often associated with intensive forest practices. Adverse impacts on water quality (e.g., increases in turbidity, water temperature, nutrient content, and sedimentation, and decreases in dissolved oxygen concentration) can occur as well, however, timber removal at the level of intensity proposed in the mitigation plan combined with the extent of the already existing road system is not expected to affect hydrology or water quality adversely (Pritchett, 1979; California State Water Resource Board (CSWRB), 1973). Residual vegetation acts as an effective sink for water and nutrients which might otherwise be removed through heavy selection or clear cutting techniques (Pritchett, 1979). Slash will be left on the ground, contributing to water, soil, and nutrient retention. Buffer zones along streams, required in both the fisheries and terrestrial mitigation plans, are expected to prevent increases in water temperature and turbidity, and reductions in dissolved oxygen content (CSWRB, 1973).

Proper location and construction of new logging roads as proposed on the mitigation lands should prevent significant or long-term impacts on hydrology and water quality, though some sediment transport is unavoidable. Turbidity and sedimentation are usually temporary when roads are located in stable areas away from stream channels and heavy equipment use in streambeds is minimized along with proper culvert placement and vegetative buffer zone usage (Pritchett, 1979; California State Water Resources Board (CSWRB), 1973). Reseeding of roads following harvesting operations will further reduce sediment transport and loss.

The increased frequency of logging operations within forest stands as a result of shorter cutting cycles will result in some soil compaction as skidders transport logs from forest stand to roadside landing. The forest soils of the project area and mitigation lands have high infiltration rates. However, they are typically shallow, and are underlaid by a clay hardpan. As a result, soil compaction effects on infiltration, soil permeability, and runoff can be considerable on heavy use areas. Soil compaction can increase surface runoff and soil erosion and, in turn, increase stream sediment load and nutrient content. Recovery from soil compaction by intensive log skidding operations is slow.

The increased frequency of logging operations and potential soil compaction are not expected to have a significant or long term impact on water quality parameters. This is a result of proper management and lower intensity in forest cutting. The potential impact of more frequent but less intensive soil compaction on surface runoff and drainage characteristics of small management units is not clear. However, the buffer zone will prevent input of turbidity and nutrient.

Wetland management techniques proposed in the mitigation plan will influence, to a degree, the hydrology and water quality of both the Dickey-Lincoln Reservoir and the mitigation lands. The use of water control structures has been proposed in both the fisheries and wildlife plans to create small subimpoundments where streams enter the Dickey Reservoir in more sheltered areas along the shoreline. Such impoundments would provide increased fishery habitat and greater stream productivity, as well as trapping sediment and providing substrate for vegetation establishment along the reservoir shoreline. The use of intensive beaver management on the mitigation lands is proposed to enhance and increase shallow fresh water marsh habitat for wildlife by increasing the acreage of beaver ponds. As a result, implementation of wetland management practices will impact streamflow.

The diking of selected stream channels and the impoundment of water in beaver ponds can be expected to cause small localized increases in water temperature and reductions in dissolved oxygen concentration. As sediment fills in these impoundments, their nutrient content and $_{p}H$ is reduced. These changes, are not expected to significantly affect the overall water quality of the reservoir or the mitigation area due to the characteristic low water temperatures and nutrient contents and high dissolved oxygen concentrations. The use of water control structures is recommended for implementation only on a limited and experimental scale. Unacceptable adverse impacts on hydrology and/or water quality which are attributable to wetland management techniques will result in the modification or elimination of such measures.

4.03 Aquatic Ecosystem

Impacts of the proposed mitigation plan on the aquatic ecosystem are closely tied to those discussed in the previous section on hydrology and water quality. Relatively low water temperature and turbidity, and high dissolved oxygen levels are required to maintain a quality brook trout fishery in the project area and on the mitigation lands. The permeability of streambed gravels is also important to insure proper oxygenation of eggs and, therefore, reproductive success. Further, the availability of adequate spawning habitat and unobstructed access to spawning areas is critical to natural fishery recruitment. The proposed plan ensures through proper management techniques that these requirements will be met and that adverse impacts caused by siltation or increased streambed temperatures will be temporary.

The selection cutting techniques proposed in the mitigation plan, combined with the location and construction of logging roads according to the guidelines outlined above and the use of vegetative buffer zones, will prevent significant or long term changes in water temperature, turbidity, or dissolved oxygen. As long as trees and shrubs within the buffer zone provide shade and stream cover, and the number of stream crossings is limited, insolation will not be a factor. However, some increase in sediment transport due to road construction is unavoidable. This sedimentation should produce minimal adverse impacts on the aquatic communities, including the resident brook trout. Acute sediment introduction will temporarily reduce populations of furbish and benthic macroinvertebrates within the turbidity plume. These impact areas are quickly repopulated after the sedimentation has ceased (Barton, 1977; Reed, 1977). Adult and juvenile salmonids are fairly tolerant of suspended sediments, but their egg and larvae stages are sensitive to sedimentation which reduces intragravel flow and dissolved oxygen concentration (Iwamoto, et al, 1978). Thus, sedimentation is most hazardous to brook trout populations from October through April when the eggs and larvae are within the stream substrate. Road construction during this period of time will require proper placement of roads and careful adherence to mitigation techniques designed to reduce sedimentation. Studies of selective forestry management techniques have indicated no appreciable impact on salmonid fisheries due to changes in water temperatures, dissolved oxygen and reduced permeability of streambed gravels from sedimentation (CSWRB, 1973).

The accumulation of logging debris (e.g., slash, bark, and sawdust) in stream channels can adversely affect the fishery by blocking migratory routes, though moderate levels of debris provide food, substrate, and cover for aquatic insects and fish. In the project area, stream buffer zones and maintenance measures recommended in the fisheries plan will keep tributaries with spawning habitat clear of such debris. In the mitigation area, the accumulation of logging debris will be limited by the buffer zone, in

which only limited maintenance logging will occur. Cutting will be limited and controlled in spruce-fir bottomlands, deer yards, and along streams. In streams on the mitigation lands where spawning runs are identified, initiation of a stream maintenance program will help protect the existing fishery.

The creation of small marsh habitats and subimpoundments will provide at term increases in aquatic ecosystem productivity, thus providing enhanced brook trout habitat for a few years. As silting in and changes in water quality parameters occur, productivity will gradually decline (Smith & Saunders, 1968). Water control structures and beaver ponds, like log debris, have the potential to obstruct access to important spawning tributaries. However, proper planning and effective management action will minimize this impact. These subimpoundments may also provide spawning habitat for competing species such as the yellow perch. Fishery management techniques can minimize this impact.

The proposed plan will manage brook trout such that the resulting lake biomass will be equal to or greater than that currently existing in the project area streams. At year 20 a review of the project fisheries mitigation plan can be made under the authority of Section 216 of the Flood Control Act of 1970 for purposes of recommending appropriate changes to the existing plan.

4.04 Terrestrial Ecosystem

4.04.1 Vegetation

The proposed forest habitat management plan will generally involve selection cutting of timber on a 10 to 15 year cutting cycle to convert extensive stands of even-age forest to a variety of age, height, and dbh (diameter at breast height) classes within and between forest stands. As a result, management to increase habitat productivity will reduce the uniformity and maturity of large expanses of spruce-fir forest. In most cases the proposed management would maintain the same forest types but would alter their structure. This would result in greater biomass production in the understory and herbaceous layers. Some floristic changes would occur in the understory. The herbaceous ground cover associated with the mature forest will be replaced by a more diverse herbaceous community adapted to the more open forest habitat. The high proportion of bryophytes in the mature spruce-fir forests would be partially replaced by annuals, shrubs and intolerant tree regeneration. (See Appendix F, RDEIS, 1977 for detailed discussion of plant ecology).

The management of northern hardwoods and aspen-birch vegetation types will be increased due to their high food and cover values for wildlife. Slow-growing, old growth forest would be converted to vigorous uneven-aged forests. The northern hardwood

forest can be maintained by partial cutting, as sugar maple, yellow birch, and beech regenerate in partial shade. Soil scarification during logging would prepare suitable seedbeds for regeneration. Management of hardwood regeneration will involve frequent cutting to encourage herbaceous growth and sprouting of hardwoods, and to keep browse within reach of grazing wildlife. Although there would be an overall reduction of seed producing trees, partial cutting can be used to maintain beech trees. The management of beech for mast will involve long term rotations to maximize production of mature trees. Beech is relatively immune to deer browsing and therefore future seed trees would develop. Aspen-birch type will be maintained in areas that have been burnt over or clear-cut and scarified. It will also develop along logging road edges. These thin-crowned species allow good understory development. Continued management for aspen-birch stands would require small stand clearcutting.

Climax spruce-fir forest, particularly in spruce-fir bottomlands and deer wintering areas located in stream valleys, will be maintained through selective cutting practices on long rotations. Selection cutting to cull out overmature and diseased wood maintains vigorous trees, encourages shrub and herbaceous growth, and increases overall forest stand productivity (Frank and Bjorkbom, 1973). Cutting methods used in these areas will incorporate silvicultural budworm control strategies to ensure the long term maintenance of an adequate canopy cover as shelter for wildlife. Forest habitat management to maintain climax forest is not expected to result in an increase in budworm damage to softwood species. The uneven-aged spruce-fir forest maintained in other areas would be less susceptible to budworm attack. Over-mature balsam fir, which is highly susceptible to budworm attack, would be reduced. (Section 2.2.4, Attachment 1).

Increased logging road construction for forest habitat management will require the removal of vegetation and the loss of associated productivity. Road access is substantial in much of the spruce-fir portions of the townships. However, uneven-aged management in the northern hardwoods would generally require an increase in permanent hard roads. Skid roads and trails would be constructed to encourage rapid natural closure. Soil erosion, often associated with logging road construction will be minimized through proper road location and construction techniques. The seeding in of secondary access roads with clover or other nutrition-providing vegetation will further reduce erosion due to road construction and will increase the productivity and wildlife food value of roadside edge vegetation (Attachment 1, Section 2.2.2).

The increased frequency of logging operations within stands can adversely affect residual vegetation. Skidding and feling operations in uneven-aged management can damage up to 5% and 12% of the residual stand, respectively (Leak and Filip, 1975). Rerouting

of skid roads to avoid stands of successful regeneration may be necessary. Group selection and falling trees to the center of the opening can reduce damage to the residual stand. Soil compaction by skidders reduces water filtration and porosity, and can retard growth of young trees left in the stand. Soil compaction impacts are increased when logging is conducted on wet soils. Given the shallow glacial till soils characteristic of the region, and their poor drainage capacity, excessive soil compaction on main skid roads used on a 10 to 15 year cutting cycle could have a significant adverse effect on both soil quality and vegetative growth. Proper skidding operations can promote regeneration where scarification exposes mineral soil.

Small marsh creation on the mitigation lands through intensive beaver management would result in the inundation of terrestrial vegetation by impounded water, and replacement with emergent marsh vegetation, shrubs and open water. To improve food sources for beaver, aspen regeneration would be encouraged through cutting and seed-bed preparation in relatively close proximity to streambeds (within 300 feet). However, such practices would not be conducted where they would adversely affect mature spruce-fir travel lanes used by wildlife or critical watershed buffer zones along stream channels.

Wetland management techniques conducted along the reservoir shoreline, will encourage sediment deposition in sheltered areas, and provide substrate for potential revegetation of the periodically inundated zone with emergent plant species. Establishment and maintenance of water-tolerant shrub species (i.e., alder, willow and dogwood) will be encouraged along the reservoir shoreline.

Intensified forest management on the wildlife mitigation lands will produce general changes in nutrient cycling, biomass distribution, and species diversity within the terrestrial ecosystems. Although there will be a decrease in vegetative species specifically associated with mature forests, the mitigation plan will increase vegetative diversity on these lands and thus increase productivity.

4.04.2 Wildlife

The focus of forest habitat management over most of the mitigation area is to increase wildlife habitat productivity by increasing the diversity of age classes within forest stands, interspersing habitat types, and otherwise enhancing the availability of food and other habitat requirements for most species of wildlife (Attachment 1, Section 2.2.2).

The management plan is primarily designed to increase the habitat carrying capacity for wildlife adapted to a diverse, fre-

quently open, forest environment with considerable amounts of "edge" habitat. As a result, species such as moose, snowshoe hare, many small mammals, ruffed grouse, and other species of avifauna will be favored.

Moose populations would benefit from increased availability of preferred winter browse, particularly where aspen-birch and herbaceous growth are encouraged. Food and cover for ruffed grouse would be enhanced through increased interspersion of habitat types, particularly where aspen-birch is encouraged. Increased diversity of age-classes within forest stands will benefit bird life by increasing structural diversity. Food sources for granivorous birds will be enhanced as well.

Wildlife populations which utilize unbroken stands of mature forest for shelter, or which appear to be adversely affected by increases in human access, are not likely to be favored by this form of management, particularly where food availability is not a limiting factor on populations. Some may be adversely impacted through timber management practices which break up the uniformity and reduce the maturity of the forest. Species which utilize mature spruce-fir habitat in part or entirely include black bear, marten, spruce grouse, lynx, and whitetail deer.

Management practices designed to maintain mature spruce-fir habitat, particularly in spruce-fir bottomlands and deer wintering areas, are based upon the habitat requirements of species such as those described above, and are therefore expected to favor these and other species with similar habitat requirements (Attachment 1, Section 2.2.3). Cutting practices prescribed for these areas are generally those used in the management of deer wintering areas to provide an optional mix of spruce-fir shelter and winter food availability (Attachment 1, Section 2.3.1). The maintenance of mature spruce-fir habitat, particularly in spruce-fir bottomlands and deer wintering habitat, is expected to have a positive impact on black bear, marten, spruce grouse, and lynx, as well as on overwintering whitetail deer.

Logging road construction required for forest habitat management will further open up forest vegetation thereby increasing the amount of edge and encouraging shrub and herbaceous vegetation. Seeding in of secondary access roads and trails will increase habitat diversity and food availability for many species of wildlife. Skid roads usually vegetate rapidly to shrubs Rubies sp. and annuals without artificial seeding.

Road development and maintenance associated with the general management plan will increase human access to wildlife habitat. This will adversely impact on wildlife species less tolerant of human interference. Black bear may be particularly affected due to increased hunting pressure associated with access. Lynx may also be adversely impacted by increased human contact.

To minimize such impacts, new road construction will be limited to the degree necessary for management, temporary roads will be cut to facilitate rapid natural closure, and vehicular access on secondary roads will be controlled as warranted to protect wildlife habitat. The design, location, and extent of timber roads and trails will be modified where warranted, based on information available concerning home ranges, habitat requirement, and sensitivity to human interference of specific wildlife populations.

Finally, road development in the spruce-fir bottomlands within the Allagash Wilderness Waterway outer zone (500 ft-1 mile) will be limited to winter roads developed for secondary access. The existing major access roads within the area will provide sufficient access for the less intensive forest management to be applied on these lands. Restricted access on these lands should have a positive impact on black bear, lynx, and other species sensitive to human interference.

The enhancement and creation of marsh habitat on the mitigation lands will increase wildlife habitat value for such species as moose, beaver, ruffed grouse, and waterfowl. Interspersion of highly productive marsh habitat with other habitat types would increase the wildlife habitat value of both areas by increasing the diversity and abundance of available food and cover. Wildlife management techniques such as excavation of potholes, protection and improvement of nesting and cover habitat, and provision of artificial nesting sites would increase habitat value, particularly for waterfowl.

To the extent that emergent and lakeside shrub vegetation would be encouraged through wetland management techniques along the Dickey reservoir shoreline, such practices would provide valuable food and cover for wildlife utilizing aquatic habitat.

Specific species management techniques proposed in the mitigation plan will have positive impacts on some species. The protection of active and potential nesting sites for raptors, waterfowl, and other bird life will benefit these species. Leaving standing snag trees, windthrown spruce, and logging slash will provide cover for many species of wildlife and food sources for insectivorous birds. Protecting active den trees and "wolf trees" with potential for forming future den cavities will benefit bear, fisher, and marten.

Mitigation measures recommended for whitetail deer in the project area include monitoring studies to determine deer response to loss of overwintering habitat, possible techniques for increasing food availability and creating new yards, and a special hunting season to adjust the population to a level commensurate with the carrying capacity in surrounding yards. Implementation of

such measures is expected to reduce the impact on the surrounding deer yard created by the 2,100 deer displaced by the project.

4.04.3 Forestry

The impacts of the mitigation plan on the forest productivity will be positive. The selection cutting plan proposed is expected to increase net growth of forest stands, increase tree vigor, and increase overall forest stand productivity by cutting overmature and diseased wood and by maintaining a diversity of age-classes within forest stands through selection cutting practices (Frank and Bjorkbom, 1973). Timber harvesting and stand improvement will be conducted consistently, throughout the mitigation lands to maintain wildlife habitat productivity.

Overall timber yields are not expected to decline due to mitigation management. The proposed 10-15 year cutting cycle is the recommended operating interval for uneven-aged management on better and accessible spruce-fir sites (Frank and Bjorkbom 1973). A cutting cycle of 12-20 years is recommended for uneven-aged management of northern hardwoods (Leak and Filip 1975). In uneven-aged management the periodic operations would be harvests, intermediate thinnings and timber stand improvements. Although less timber may be taken from individual forest stands, the number of planned timber cuts should result in timber yields at least equivalent to those currently derived from these lands. The marketability and supply of commercial spruce-fir timber, however, will be affected (Section 4.05). Potential yields from northern hardwoods would be enhanced but would require a market. An in depth discussion of the impacts of the proposed mitigation plan on the existing forest resource is presented in Section 10.0 of this Attachment.

4.05 Socio-Economic Impacts

The most significant adverse impacts associated with the proposed plan are those in the economic sector. The acquisition in fee simple of 112,370 acres of timber land will be the most significant impact. Currently, there are timber firms or land managing firms and private owners which would lose ownership to the Federal Government.

Sale of the land will create a long term profits tax impact on the owners for which no tax shelter is available. The acquisition of these active timber lands will reduce land inventory, disrupt production and harvest plans and may require that the timber companies and landowners develop new access roads to continue operations on their remaining holdings.

Timber harvesting will continue on the mitigation lands but management practices will be conducted to maximize wildlife values

and not timber yields. Yields of saw timber and/or pulpwood products may be reduced from those expected under private forest management.

The two major forestry economic impacts which would result from the implementation of the tentatively selected plan would be on the marketability and supply of the forest resource. As previously mentioned, timber harvesting would continue on the mitigation lands, but would be subordinate to management for the benefit of wildlife.

In terms of marketability, the proposed cutting cycle and types of cuts could impact on stumpage prices. The proposed 10-15 year cutting cycles is more intensive than the 20-25 year cycle currently being utilized by the forest industry and land management companies in areas being selectively harvested. In addition, the plan recommends types of cuts which differ in scale from the usual logging operation. It is possible that the more frequent cutting cycle, the smaller scale operation, and the lower allowable yield per acre could affect the economic operability of the harvest. If harvesting costs were to increase, it follows that stumpage prices could be forced downward. Depending on the direction of movement in the above mentioned variables, stumpage income could decrease below the level estimated in Section 2.07.3. In this income estimate a rate of 0.31 cords per acre, which approximates the actual 1979 harvest, was used. A 25-percent reduction in income was also included to account for increased harvesting costs. However, if costs increased to the level which forced harvesting to become economically impractical, the possibility exists that the government would have to offer financial inducement to carry out its forestry harvesting requirements.

A supply related impact results from the change in future emphasis on managing the timberlands for wildlife in light of past investments made for timber production. The land designated for acquisition is presently being managed by professional land management firms or forest industries. The past and present management objectives and expenditures have been made on the assumption that this land would continue to yield financial returns in the future. However, with acquisition, returns from prior expenditures such as planting, spraying and road construction will not be realized by the present owners. In addition, the owners will be affected by the loss of timber from their inventories. Of the 112,370 acres to be acquired, 92,000+ contain mature saw timber. Over half of this acreage is in the form of mature softwood (spruce-fir), which is presently in great demand. An impact of this timber loss from inventory could be increased harvesting pressures on surrounding townships. It is estimated that the annual mitigation land timber harvest of 34,840 cords currently supplies on average 3.2 percent of the yearly capacity of the three Maine mills where it is processed and 5.3 percent of the Canadian mills.

Reference to Table 2-1 in Section 2.07.3 indicates that 34,840 cords were harvested in 1979 from the six townships which comprise

the mitigation lands in the tentatively selected plan. With 75 percent of the harvest used for lumber production and 25 percent used for chips, and approximate stumpage value of $500,000 was estimated. Although the lands would be acquired in fee simple, which includes the value of the standing timber and the value of the forest producing lands, the total financial impact on the forest industry is quite difficult to calculate at present. This is due to uncertainty regarding future harvests from the mitigation lands, the financial arrangements between the government and forest industry under which the timber will be harvested, and the income to be gained from these harvests.

A loss of saw timber production is particularly likely in overwintering deer habitat and other spruce-fir bottomlands. These lands contain a high percentage of saw timber which is increasingly in demand. Timber production under the mitigation plan may be decreased in the short term since previous silvicultural treatments were made for timber production on a long range plan.

There is anticipated a shortage of woodsmen available to work both the private lands and the mitigation lands. Should this occur, there would be direct competition for their services and if the situation does not resolve itself, one or both interests may not be met.

Social impacts associated with the mitigation plan are those related to impacts on economic activity and recreation resources. There are no permanent settlements in the mitigation area.

4.06 Recreation Impacts

The acquisition and management of mitigation lands within the one-mile zone of the Allagash Wilderness Waterway (AWW) will enhance the wildlife habitat value of the area while adding an extra measure of protection for the Waterway and complementing the recreational experience the AWW now provides. Recreational resources in the area, including recreational and sporting camps are expected to be retained for their existing purposes under the proposed mitigation plan.

Wildlife-oriented recreational opportunities should improve on the mitigation lands due to increased wildlife habitat carrying capacity. Such activities include hunting, hiking, and photography.

Increased road access on the mitigation lands could increase recreational opportunities by increasing public access. Road development, however, will adversely affect the "near-wilderness" quality of the recreational experience which is predicated upon the remote, undisturbed character of the area.

4.07 Cultural Resource Impacts

Potential impacts upon archaeological or historic resources in the proposed mitigation lands are anticipated to result primarily from forest management activities, such as construction of permanent haul roads, temporary skid roads, and various forms of timber clearing. These would damage surface features or shallow subsurface features of prehistoric or historic sites in the area. It is anticipated that the relative proportion of sites in the drainage threatened by such activities would be small as the 400-800 foot buffer area along the Allagash Wilderness Waterway and 200 foot buffer on tributary streams would probably contain the majority of late prehistoric and historic sites in the drainage. However, some of the earliest sites in the area may be outside of these buffer zones, and subject to impact.

The location and identification of cultural resources will be integrated into the early planning stages of specific management activties as they arise. Identification of resources in a proposed work area could be performed by contract or through a para-professional training program such as that currently used by the U.S. Forest Service in this region. Review by the Maine Historic Preservation Office would precede finalization of work plans to allow modification to avoid adverse impacts on resources within a proposed cutting area or road corridor.

Section 5.00

Adverse Environmental Effects Which Cannot Be Avoided

5.0 Adverse Environmental Effects Which Cannot Be Avoided

The Federal acquisition of 112,370 acres of commercial forest for wildlife-oriented timber management will have an unavoidable adverse impact on the commercial forest sector of the regional economy. Timber marketability and supply will be affected as yields of various wood products derived from wildlife-oriented forest management will differ from those under commercial forest management. The undivided and common ownership patterns, and the system of land management which is characteristic of the region, will be adversely affected.

Forest management practices to increase wildlife habitat productivity will reduce the uniformity and continuity of large expanses of mature spruce-fir forest as well as mature hardwoods and require expansion of the existing logging road system. As a result, the plan will have some unavoidable impact on wildlife species which utilize unbroken expanses of dense spruce-fir forest and/or are sensitive to increased human access.

The near-wilderness character of the mitigation area, predicated upon its remoteness from human influence, will be reduced to some extent due to road expansion and more intense forestry practices.

Some soil erosion, sediment transport, and sedimentation associated with road construction and maintenance will be unavoidable.

Soil compaction impacts and associated losses in vegetative growth and vigor due to intensive logging operations will, to some extent, be unavoidable.

Section 6.00

Alternatives to the Proposed Mitigation Plan

6.0 Alternatives to the Proposed Mitigation Plan

The proposed mitigation plan is the result of the full consideration and review of the USFWS Conservation and Development Report issued under authority of the Fish and Wildlife Coordination Act, and the biological opinion of the Secretary of Interior (USFWS) issued in accordance with the Endangered Species Act of 1973. Alternatives to the proposed mitigation plan are limited to those of no Federal action, adoption of USFWS recommendations in full, adoption of an alternative, more intensive wildlife mitigation plan and adoption of a mitigation plan for deer wintering habitat.

6.01 No Federal Action

This alternative would leave unmitigated to any extent the loss of 80,455 acres of terrestrial habitat and the wildlife resources associated with that coniferous habitat plus 278 miles of rivers and streams. In addition to this loss, the projected intensification of forest management throughout northern Maine is likely to reduce overall forest productivity and the value of habitat critical to the maintenance of wildlife populations in close proximity to the project. Changes in the faunal populations expected due to a reduction in spruce-fir forest include reductions in the numbers of bear, lynx, bobcat, marten and spruce grouse.

In terms of fisheries resources, a no Federal action would place an undue burden on the resources of the State agency to develop a program for managing the reservoir brook trout population to a biomass replacement level. It is estimated that the management plan development will require some level of effort beyond that which should be done by the State.

A selection in favor of the no Federal action for the endangered species portion of the plan would be contrary to the purpose and intent of the Endangered Species Act of 1973, as amended.

For the various above stated reasons, a no Federal action alternative is not considered desirable.

6.02 U.S. Fish and Wildlife Service Mitigation Plan (Plan B)

The U.S. Fish and Wildlie Service, in keeping with its responsibilities of determining damages to the wildlife resources and recommending measures for fish and wildlife mitigation and compensation, has submitted to the Corps of Engineers its Conservation and Development (C&D) report and three supplements to that report. (See Attachment 2.) Losses identified, mitigation objectives, and recommended mitigation measures are summarized below.

The main objective of the USFWS Plan for mitigation by habitat type is to replace habitat units lost by increasing the carrying

capacity for wildlife. Habitat unit replacement must be accomplished on the nine habitat types lost to inundation, thus conserving and maintaining these types. Wetland management to create, maintain, and enhance wetland habitat is stated as a management policy, as well. The management concepts recommended in the C&D Report to replace lost habitat productivity have been adopted as a basis for the proposed mitigation plan.

The C&D Report recommends the acquisition and management of 302,623 acres in the Allagash area to replace the loss of wildlife habitat productivity in the project area. This recommendation is based upon the use of HEP, including annualization calculations and excluding calculations to adjust for increased interspersion. The 300,000 acre requirement will replace the estimated 4,080,987 habitat units lost due to the project, based upon land use assumptions derived by the USFWS from the Revised Draft Environmental Impact Statement. (A detailed discussion of the USFWS use of habitat evaluation procedures is presented in Attachments 1 and 2 of the Report).

The USFWS Report further recommends the acquisition and management of 35,000 acres of deer wintering habitat to achieve the objective of 100 percent mitigation of the average annual deer resource loss. This recommendation is based on the assumption that overbrowsing will result in a permanent reduction in deer yard carrying capacity, bringing the actual deer resource loss to the estimated upper limit of approximately 2,900 deer. Since the entire Allagash area studied for acquisition (295,100 acres) contains only about 21,000 acres of habitat, the C&D Report recommends the acquisition of additional deer wintering areas outside the proposed mitigation lands.

The report does not discuss objectives or measures for the reduction of initial impacts due to displacement of deer by inundation.

The USFWS C&D Report further recommends the development of a landlocked salmon-lake trout fishery within the project area as mitigation for loss of the stream brook trout fishery. This intensive and maximum level effort would require the construction of a 7.2 million dollar hatchery (1979 dollars) and the necessary staff to operate and maintain both the hatchery and fishery. In addition to the hatchery based fishery, the USFWS would require a total clearcut of the 88,000 acre reservoir.

This alternative has not been accepted in its entirety for several reasons. The acquisition of 300,000 acres to replace lost wildlife habitat productivity is not acceptable because of the assumption used to arrive at this acreage requirement, and its large scale.

First, the 300,00 acre requirement for mitigation is based on the premise that replacement of habitat productivity must be calculated as the increase in productivity over the projected increase in the future without the project. Projections of increased wildlife habitat values without the project are based on limited and variable land use information, and are subject to question given observed timber practices, present and future timber market conditions, and the impact of spruce budworm damage on both timber and wildlife management.

The 300,000 acreage figure is further based upon different assumptions about the rate at which habitat unit values may be increased to full management potential with mitigation. The USFWS methodology assumes a 5-year delay in the initiation of mitigation, and a more gradual increase in habitat value carried out over the full project life (100 years). The Corps methodology assumes immediate implementation of the mitigation plan and an increase in habitat value, which achieves 100 percent of the management potential by year 50.

As a result of these differing assumptions, the management potential unit values (MPUVs) used by the USFWS as a basis for determining mitigation acreage requirements are considerably lower than those used in the proposed plan, causing almost a three-fold increase in the mitigation acreage recommended. (See Appendix A of Attachment 1, Tables 5 and 7 for comparative values.)

Secondly, the acquisition and management of 300,000 acres primarily for wildlife mitigation purposes is not justifiable when socio-economic impacts are considered. The impacts of such a large scale mitigation plan would be similar to those identified for the proposed plan, but compounded at least in proportion to the increase in acreage.

Adoption of the recommendation would result in the removal from private ownership of the entire Allagash Area studied for acquisition (approximately 295,000 acres), and would almost triple the land area proposed for acquisition and management under the Corps plan. Although timber harvesting will be conducted on the mitigation lands, management objectives will maximize wildlife habitat value, not marketable timber yield. As a result, timber marketability and supply will be adversely affected over the entire region. Large capital gains taxes may be assessed to the former property owners unless they reinvest the net money gained. Application of the mitigation plan over such a large area could induce a labor supply shortage in the timber industry, as well.

The social and economic impacts of removing the Allagash area from private ownership must also be considered. The undivided and common ownership patterns, and the system of land management which is characteristic of the region would be seriously disrupted by land

acquisition on such a large scale. Considerable acreage owned by private industry would also need to be acquired.

Finally, the added benefits to wildlife expected from such a plan are not likely to be in proportion to the additional acquisition and management costs; although they will be significant. The Corps plan proposes that acquisition and management of lands within the Allagash area be selected according to specific criteria. The intent of the selection methodology has been to maximize wildlife habitat value, management potential, and management feasibility based on recommendations of the USFWS, MDIFW and the Corps consultants. To expand the acreage selected for mitigation threefold would not increase the overall potential for wildlife mitigation on an acre-for-acre basis.

Management of a 300,000-acre mitigation area according to the USFWS proposed habitat management plan would require a proportional increase in personnel and other project costs. Furthermore, it is the Corps' judgment that to conduct management activity over such a large area would significantly reduce its effectiveness, given the need for close supervision and relatively intensive applications of wildlife-oriented forestry and wildlife management practices. Effective monitoring and control of management would likewise be affected.

Approximately 469 miles of new roads would be required under this plan. As with the proposed plan, this will allow increased human access with adverse impacts on black bear, lynx and other animals less tolerant of human activity. Roads and extensive logging operations will result in some increased stream sedimentation and nutrient loading.

The USFWS recommendation to acquire and manage 35,000 acres of deer wintering areas on the mitigation lands and in outlying areas cannot be accepted in full. The mitigation lands selected by the Corps maximize acreage of deer wintering habitat and stream valley habitat, as recommended by the USFWS. Approximately 14,500 acres of deer wintering habitat area now included on the proposed mitigation area. It is the continued judgment of the Corps that to acquire and manage in outlying areas the additional deer wintering habitat necessary to meet the USFWS requirement would result in considerable losses in management effectiveness, as discussed above.

Costs for implementation of the USFWS recommended plan have been estimated based on cost information provided in Supplement No. 2 of the USFWS C&D Report. Costs have been adjusted to reflect acquisition and management on a 300,000-acre mitigation area. Total annual costs for the wildlife plan are estimated at $3,253,600 at the authorized rate of 3-1/4% and $5,199,600 at the current interest rate of 7-1/8%.

Reasons for rejecting the USFWS fisheries mitigation recommendations reside in two basic areas. One is need and the second is economics.

Careful analysis of what is lost reveals that it is stream and river habitat that is lost. These losses cannot be mitigated. This leaves compensation by substituting a lake trout salmon fishery for the loss as a possible solution. However, an analysis of the usage that such a fishery would receive shows that even with maximum recreational development there would be a maximum of 4,600 user days per year for fishing. This low number did not produce any significant benefits to the project nor was it sufficient to justify full recreational development. It follows that the development of a maximum effort and 7.2 million dollar hatchery (1979 dollars) to sustain that effort would not be justified for the same reasons. Therefore, compensation for the irretrievable loss of a stream type fishery with a maximum effort level lake fishery is not justified.

An analysis of the relative benefits and costs of the USFWS fisheries proposal reveals the following:

	Man days Fishing with the Project	Assigned Water Resources day Value	Total Value of Fishing Benefit
Case 1	4600	$6.00/day	4600 x $6.00=$27,600
Case 2	4600	$9.00 (max)/day	4600 x $9.00=$41,400

Utilizing the currently authorized Water Resources Council's values for recreation day use, the maximum annual benefit that can be derived for fishing is $41,400.

Add to the above, the requirement for total clear cutting of the reservoir at an estimated additional cost of $41,020,000 with the serious environmental impacts attendant to that action, the fact that other lake trout fisheries in northern Maine are underutilized and contained dangerous levels of mercury, we find that there is no justification for the need or high economic cost of such a recommendation. The total annual cost of the fisheries plan recommended by USFWS, including the hatchery and clear cutting, is $2,101,000 at the 3-1/4% interest rate and $4,209,500 at 7-1/8%.

The Endangered Species Plan in the proposed plan is the same for each alternative plan. It will positively impact the Furbish lousewort. The annual cost of the plan is $2,500 at 3-1/4% and $5,300 at 7-1/8%.

The total annual cost of the wildlife, fisheries and endangered components of the USFWS plan are $5,357,100 at the authorized interest rate of 3-1/4% and $9,414,400 at the current 7-1/8% interest rate.

6.03 Consultants Terrestrial Mitigation Plan (Plan C)

This alternative plan is based primarily on a terrestrial mitigation plan submitted by a Corps consultant as an appendix to the Revised Draft Environmental Impact Statement in 1978 (Appendix F Supplement, RDEIS). The same consultant participated on the HEP team as a representative of the Corps. The consultant's plan considers the same existing and future without management conditions agreed upon by the HEP team. The difference between the USFWS plan and the consultant's plan is primarily in the approach used to evaluate increases in habitat unit value with management. Using the consultant's approach, the acreage required for mitigation is considerably reduced.

The basic habitat management plan (Section 2.2.2) involves increasing habitat diversity through both interspersion (creation of a diversity of small, distinct habitat types from one large uniform type) and intraspersion (creation of a variety of age classes within a single habitat type). The HEP team originally adjusted habitat values to account for interspersion, but was unable to calculate its effects at year 100. As a result, the team discarded its use of interspersion, deciding that intraspersion was of more value to wildlife, and that interspersion did not contribute any added wildlife value if intraspersion was considered.

The consultant's plan is based upon the consideration of both interspersion and intraspersion. The management plan utilizes forest harvesting activities as the major tool for modifying habitats. Forest habitat management techniques would be more intensive than those prescribed in the proposed plan or the USFWS alternative plan. For the first 10 years of management, the number of types would be increased about five fold (from 39 to 207 types). The annual harvest rate would be approximately 0.59 cords/acre/year. (Appendix F Supplement, RDEIS). The method for including interspersion is discussed in Section 2.10.3 of Attachment I to the Report.[1]

The acreage for mitigation was calculated by dividing the habitat units lost for each type by its annualized increase in habitat units, adjusted for interspersion which is attributable to mitigation. Two conditions are considered: one using the USFWS

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[1]This plan was originally submitted in July 1978 prior to the most recent change in the USFWS Conservation and Development Report (C&D). The values presented in this section represent the most recent USFWS HEP analysis (C&D Report, Supplement No. 3). To be consistent with the updated analysis, this alternative plan evaluates the pool area alone, eliminating any analysis of the two mile buffer zone or the transmission lines.

most probable future; the other using the Corps of Engineers future projections. The results show that 141,407 acres are necessary to mitigate habitat unit losses using USFWS data, and 96,478 acres using Corps data. This is exclusive of the deer yard mitigation measures.

The consultant determined amounts of acreage required for deer mitigation based upon the user-day method. Since that time, USFWS has revised downward this estimate for deer population in the area. Because of these changes in overwintering deer population estimates, it is not possible to accurately update what the consultant had prepared for mitigation lands. At the time of his original submittal, he recommended 17,125 acres for deer yard management. Because of the recent revisions, the deer population is considerably less than that evaluated by the consultant. It is assumed that these 17,125 acres represents a maximum amount of deer wintering habitat necessary for complete mitigation using the user-day method. These lands would be added to that necessary for the terrestrial mitigation requirements. When the recommended deer yard acreage is added (17,125 acres) and the islands in the pool area subtracted (13,400 acres) the total additional land taking would be 145,132 acres using the USFWS data, and 100,203 acres using the Corps data.

Many features of the consultant's plan, were adopted in the development of the proposed plan (See Appendix F Supplement, RDEIS, 1978). The lower recommended acreage for habitat unit replacement, however, has not been accepted. The methods used to calculate interspersion values, as well as the more intensive management approach required to achieve such levels of interspersion, have not been applied or evaluated for their success on a management plan of this scale. Thus, full habitat unit replacement on the smaller mitigation area proposed is uncertain. Furthermore, implementation of this alternative would result in a greater reduction in the uniformity and continuity of large expanses of mature spruce-fir and hardwood forests, a corresponding reduction in wildlife species which frequent those type stands (lynx, marten, black bear, and spruce grouse), and a greater reduction in the overall near-wilderness character of the mitigation area.

Finally, mitigation of losses in overwintering deer habitat based upon the user-day method (maintaining existing levels of annual hunter days) is not accepted in the proposed plan. Assessment of losses based upon recreational demand rather than habitat value does not reflect the full impact of the project on the deer resource in the St. John Region.

Impacts associated with the consultant's plan would be generally positive for wildlife, favoring species adapted to a younger, more diverse forest. Approximately 200-300 miles of new gravel road will be required to implement the plan, causing some

sedimentation. Skid roads will be more frequent and utilized more often, resulting in more runoff and increased nutrient loading.

The consultant's terrestrial plan would have a total annual cost of $1,461,600 (USFWS projections) or $1,210,100 (Corps projections) at the authorized rate of 3-1/4 percent, and $2,686,900 (USFWS) or $2,137,700 (Corps) at the current 7-1/8 percent. Under this alternative wildlife plan, fisheries and endangerd species would be mitigated as in the proposed plan. Total annual costs would therefore be: at 3-1/4%, $1,532,900 (USFWS), $1,281,400 (CORPS) and at 7-1/8%, $2,763,600 (USFWS) and $2,214,300 (CORPS).

6.04 Mitigation Plan for Deer Wintering Habitat (Plan D)

This alternative would consider mitigating only for the 25,921 acres of deer yards inundated by the Dickey-Lincoln project. These yards are composed mainly of mature spruce-fir habitat. The lands that would be acquired would consist of all the deer yards located within a one-mile zone surrounding the proposed impoundment (south of the St. John River), the deer yards in the Allagash area recommended under the proposed plan, and a series of yards near the mouth of the Allagash. This would amount to 7,500, 14,500, and 3,000 acres, respectively, for a total of approximately 25,000 acres of deer wintering habitat. To ensure proper management of the deer resources, an additional half-mile strip surrounding each deer yard would be acquired. This will approximately double the required acreage to about 50,000.

The objective of the deer yard management is to increase the carrying capacity of wintering areas by both insuring the maintenance of quality shelter areas and by sustaining a moderate level of habitat productivity and food availability to overwintering deer.

Deer yard management would involve group and single tree selective timber harvests on a stand-by-stand basis. Cutting cycles would be planned at 10 to 15 year intervals to create a diversity of age classes through the shelter stands while maintaining a dense mature spruce-fir type. More specific management details are cited in Attachment 1, Section 2.3.1(a). Access already exists to all deer yards to be acquired. New road construction and maintenance will be limited primarily to temporary skid roads which will be seeded after use.

Implementation of these practices is expected to approximately double the current carrying of deer wintering areas which are acquired and managed. Overwintering surveys would be conducted in all deer yards to be acquired to determine baseline population levels and increases in population achieved through management.

A three-year monitoring study would be conducted in the project area to determine the response of deer to loss of traditional wintering areas and effective measures for minimizing the impacts of displacement.

Deer yards in the one-mile area south of the St. John River would be intensively managed, implementing mitigation measures identified in the monitoring study. This would prevent overbrowsing. The provision of readily available food sources, the creation of deer yard conditions, the scheduling of a special hunting season, and the transportation of deer to other areas would be considered.

In addition to these acreages, the islands within the impoundment will be managed. This amounts to about 13,400 acres, bringing the total acreage to be managed to 63,400. This would be equivalent to an approximate increase in habitat units of 1,900,000 assuming an average management potential unit value of 30 as representative of the areas to be managed. The replacement of 1,900,000 habitat units represents mitigation for about 60 percent of the habitat units lost due to inundation.

The spruce budworm infestation greatly affects these dense mature spruce-fir forests. Implementation of the forest practices outlined above will have to incorporate preventive cutting practices for the budworm control. The preventive cutting practices are designed to reduce fir composition in favor of the more resistant spruce, usually by removing the less vigorous mature overstory and the suppressed understory (often dense stands of small diameter fir).

High tree mortality due to budworm damage in the deer yards will limit the effectiveness of cover in the mature spruce-fir type, and the carrying capacity for overwintering deer and the associated mature spruce-fir wildlife community.

In deer yards that are predominately red spruce or northern white cedar, partial cutting to reduce budworm damage would be performed. These species are less susceptible to budworm damage than is fir.

The terrestrial management plan described above would favorably impact wildlife species associated with a dense spruce-fir habitat (overwintering deer, black bear, marten, spruce grouse). Management of the half-mile buffer strip would accommodate other species. By reducing the possibility of overbrowsing, the deer yard management plan should be capable of replacing the number of deer displaced due to the Dickey-Lincoln project. By increasing the carrying capacity of spruce-fir habitat adjacent to the project area, adverse impacts on other species of wildlife due to displacement should be minimized.

This alternative plan was developed on the basis of input from the Maine Department of Inland Fisheries and Wildlife, the Maine State Planning Office, and the general public, which indicated that the loss of overwintering deer habitat is of primary concern to

people of the State of Maine. To fully mitigate for losses in both deer wintering habitat and overall habitat productivity would require the acquisition of at least 21,000 acres in deer wintering habitat and surrounding buffer, in addition to the recommended acquisition of 112,370 acres under the proposed plan.

This alternative plan to acquire and manage only deer wintering habitat has not been accepted, primarily because it does not address or fulfill the range of mitigation objectives based upon habitat evaluation and mitigation of lost habitat value. In addition, the acquisition and management of small, fragmented management units generally reduces the overall efficiency and effectiveness of mitigation measures.

The estimated total annual cost of this alternative wildlife plan area $552,400 at 3-1/4% and $916,600 at 7-1/8 percent. Fisheries and endangered species mitigation under this alternative would be identical to that of the proposed plan. The total annual cost for all three components of this plan is $623,700 at 3-1/4% and $993,300 at 7-1/8%.

Section 7.00

Relationship Between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Productivity

7.00 The Relationship Between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Productivity

7.01 General

The mitigation plan proposes to offset most losses in the long term fish and wildlife productivity of the St. John River Valley imposed by implementation of the Dickey Lincoln School Lakes Project. As a result, plan implementation would generally result in the maintenance and enhancement of long term productivity. Increases in productivity, however, will be derived primarily at the expense of economic losses to the commercial forest industry and to private forest landowners and managers. Some minor reductions in long term productivity of specific forest types will be incurred.

For this discussion, "local short term uses of man's environment" will include use of the forest for commercial timber production and use of both the terrestrial and aquatic environment for recreation.

7.02 Impact Upon Short Term Uses of the Environment

The acquisition and management of 125,770 acres of commercial forest for the purpose of wildlife mitigation would affect the marketability and supply of wood products harvested from this area. Timber management would continue on these lands, but would be intended to maximize wildlife habitat value, not marketable timber yields. The annual harvest from these lands in 1979 was 34,840 cords, 96 percent of which was spruce-fir which is used for saw-timber. This species is currently in great demand and with the timber on the proposed mitigation land being removed from forest industry inventories, increased harvesting pressure on surrounding townships could occur. Impacts of the mitigation plan on forest economics are discussed in depth in Section 10 of this attachment.

The relationship between the proposed plan and recreational uses of the Allagash River area should, in general, be positive. The acquisition of lands bordering the Allagash Wilderness Waterway (AWW), and the management of those lands in coordination with AWW authorities (Bureau of Parks and Recreation), should enhance the wilderness recreation experience for which the waterway was designated. Increased road access associated with forest management outside of the AWW will provide for increased public access to the mitigation lands, and will reduce the near-wilderness character of the area in general. As a result, wilderness recreation outside the waterway may be somewhat reduced in quality.

7.03 Impact Upon Long Term Productivity

Wildlife mitigation measures will increase overall wildlife habitat productivity on the mitigation lands. The diversity of habitat types will be increased, both game and non-game wildlife populations will be increased, and overall productivity of the forest will be increased.

The acquisition and management of deer wintering habitat will increase overwintering deer carrying capacity in traditional deer wintering areas on the mitigation lands. Management practices in deer wintering areas would ensure the long term habitat value of these areas for wildlife.

Forest habitat management to maintain and enhance the wildlife habitat value of mature spruce-fir bottomlands will ensure the long term productivity of this habitat type.

Riparian habitat will be maintained and enhanced through mitigation measures as well. Along the AWW, such habitat is currently protected through the ownership and management by the State of Maine Bureau of Parks and Recreation. In addition, both the fisheries and wildlife mitigation plans recommend streamside protection through the use of watershed buffer zones. The endangered species management plan would result in the acquisition of riparian habitat suitable for protection and propagation of the Furbish Lousewort.

Wildlife-oriented forest management practices will result in minor long term productivity losses due to logging road construction and increased frequency of logging operations within forest stands. Logging road construction will result in some soil erosion and sedimentation, impacting both terrestrial and aquatic productivity. Increased frequency of logging operations will result in soil compaction, with some impact on vegetation growth and vigor.

Finally the expansion of logging road access and the breaking up of expanses of mature spruce-fir forest may reduce the long term productivity of the mitigation lands (other than spruce-fir bottomlands and deer wintering habitat) for species requiring expanses of mature forest habitat and/or low levels of human interference.

Section 8.00

Irreversible or Irretrievable Commitments of Resources

8.00 Irreversible or Irretrievable Commitments of Resources

Resource commitments required to implement the proposed mitigation plan are not irreversible in the same sense that they would be for a major construction project. They are, however, long term. Irretrievable resources are those that will be permanently lost through the proposed action.

The proposed plan would require the commitment of over 100,000 acres of commercial forest for the purpose of wildlife mitigation. Also committed would be private forest management plans and investments into those plans. The marketability and supply of commercial timber would be reduced to some degree resulting in an irretrievable loss of commercial forest products.

Forest habitat management for wildlife productivity would require the long-term commitment of the climax spruce-fir forest ecosystem, as expanses of mature spruce-fir forest would be managed to increase habitat type diversity and overall productivity. Vegetation and wildlife associated with the climax community would be replaced to some degree by species adapted to a more open, diverse forest.

Road system development and increased access associated with forest habitat management will result in an irretrievable reduction in the near-wilderness character of the mitigation lands, which is largely predicated upon the remoteness of the area from human influence. The loss in near-wilderness character is most obviously perceived as a loss to the unique wilderness recreation resources of the Allagash area. Increased road access may reduce populations of wildlife species with a low habitat tolerance for human interference.

The mitigation lands are, for the most part, presently committed for commercial timber production which is likely to result in similar but more significant resource losses than those discussed above. Furthermore, mature spruce-fir forest located within the Allagash Wilderness Waterway outer zone, and associated with deer wintering habitat on the mitigation lands will be managed to ensure the maintenance of the climax forest.

Soil erosion, displacement, and sedimentation due to logging road construction will represent an irretrievable loss to the terrestrial ecosystem, and can be expected to result in some loss in aquatic ecosystem productivity. Soil compaction due to intensive log skidding operations will result in some loss of forest productivity due to reduced growth and vigor of vegetation.

The commitment of forest land to provide for logging road access will result in a loss of vegetation and some irretrievable loss in forest productivity, as a result.

Forest habitat management, logging, road development, and associated increase in public access could result in cultural resource losses. However, such losses should be negligible since the riparian habitat in which artifacts are generally located will not be disturbed by the proposed plan. Cultural resource losses will be minimized through measures identified in Section 4.07.

In addition to the above resource commitments, man-power, fuel, equipment, and all costs of the proposed plan will be irretrievably committed to the proposed mitigation plan.

Section 9.00

Coordination

9.00 Coordination

9.01 General

Coordination between the New England Division of the Corps of Engineers and concerned Federal, State and local agencies has been continuous and extensive since environmental studies commenced in 1975. In addition to coordination with public agencies, coordination has been carried on with various private organizations and individuals.

A compilation of the coordination documents is contained in Attachment 2 of the report. These documents include U.S. Fish and Wildlife Coordination Act documents; Rare and Endangered Species Act; Section 7 Coordination documents; cultural resource coordination correspondence; and Corps of Engineers sponsored public workshop reports.

A list of contacts made in the preparation of the mitigation plan is published in Attachment 1.

9.02 Coordination with the U.S. Fish and Wildlife Service

The New England Division has maintained close coordination with the U.S. Fish and Wildlife Service since 1975. Scopes of services for aquatic and terrestrial ecosystems were reviewed and commented upon by them and adjusted when necessary to reflect those comments. A combined U.S. Fish and Wildlife Service, State of Maine, and Corps of Engineers Raptor Survey was conducted. Further surveys performed on an interagency basis have been funded by the Corps. Continuing coordination and consultation pertaining to rare and endangered species and those proposed for protection has been conducted among these agencies.

Coordination for mitigation plan formulation began in 1976 when the Corps developed an impact assessment team composed of USFWS and MDIFW personnel to survey the project area. The information obtained during this field survey was supplied to all agencies involved. At the request of USFWS, a Corps of Engineers Consultant was utilized to assist them in developing their, at that time current, Habitat Evaluation Procedure (HEP) analysis by completing forms 2 and 3 for them.

Several interagency reviews of both USFWS drafts took place and in January, 1978 the USFWS issued its Conservation and Development Report (C&D) and supplement. A second supplement to the report was issued in June, 1978. The third and final supplement to that report was issued in November, 1979. The USFWS C&D report with its supplements are contained in Attachment 2.

In June 1979, a second field survey was carried out on the proposed mitigation lands by the same agencies, and many of the same team members who participated in 1976.

Utilizing portions of the USFWS recommendations, input from several coordination meetings and telephone communications, and information gained from the interagency field survey, the Corps of Engineers developed a draft proposal for mitigation in August 1979. This draft was distributed to the USFWS and to the State of Maine for review. Subsequent to their review, a revised draft was prepared and distributed to the public for review in October.

9.03 State Agencies

Coordination has been carried out through the Office of State Planning, which was designated by the Governor as the State liaison for the proposed Dickey Lincoln hydro-electric project. Close coordination has been carried out with the Department of Inland Fisheries and Wildlife and they have provided valuable advice, assistance, and data. Coordination with the State Bureau of Parks and Recreation was initiated due to the location of the Allagash Wilderness Waterway within the proposed mitigation area. All three agencies and the Governor's office were asked to review the Corps initial draft mitigation proposal.

9.04 Organized Groups, Professional Associations, and Individual Private Citizens, and Landowners

The revised draft mitigation proposal was distributed for review and comment to approximately forty private groups, associations, and individuals in October 1979. Invitations were simultaneously extended to participate in public workshops to be held in mid-November.

Forest managers and landowners in the mitigation area were contacted both for information regarding forest management practices and to notify them concerning lands proposed for mitigation.

9.04.1 Public Information

Five news releases were prepared and disseminated to local, regional and national media describing the scope and status of fish and wildlife mitigation planning.

9.04.2 Public Workshops

The revised draft was available for public review for 25 days prior to a pair of public workshops held in Augusta, Maine on 15 November, 1979. Fourteen separate organizations and agencies participated in the workshops. The proceedings of the workshops may be read in their entirety in Attachment 2, Section 4 of the report.

Several changes were made in Attachment 1 to the report based upon public workshop input of the more important changes are listed below:

- The use of "indicator species" as a basis for habitat management is clarified in Section 2.2.

- Management practices for spruce-fir bottomlands and deer wintering areas are discussed in a separate section.

- Spruce budworm infestation and its relationships to the mitigation plan are discussed in Section 2.2.4 and elsewhere in Attachment 1.

- Losses due to the project, particularly deer resource losses, are clarified.

- Management responsibility on the mitigation lands has been clarified. Section 2.6 of Attachment 1 recommends that MDIFW manage the lands, and that the Bureau of Parks and Recreation retain its review authority in the Allagash Wilderness Waterway, and LURC retain its authority in LURC-zoned areas within the mitigation lands.

- An alternative plan to mitigate for deer wintering habitat losses only was developed partially in response to concerns expressed at the workshops.

9.05 Comments

Copies of this draft were sent to those agencies, organizations and individuals listed in Section 5a of the Summary for review.

Comments were received from the following Federal and State agencies and private entities:

Federal

U.S. Department of the Interior
U.S. Environmental Protection Agency
U.S. Department of Agriculture

State

Office of the Governor
Department of Inland Fisheries and Wildlife

Private

Wildlife Management Institute
Natural Resources Council of Maine
Society for the Protection of New Hampshire Forests
Garden Club Federation of Maine
Ms. Carol McKnight
Elizabeth Humphrey

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-80/259

MAY 1 3 1980

Colonel Max B. Sheider
Division Engineer
Corps of Engineers
Department of the Army
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Sheider:

The Department of the Interior has reviewed the supplement to the revised draft environmental statement for the Dickey-Lincoln School Lakes Project, Aroostook County, Maine. We have the following recommendations and comments on the fish and wildlife mitigation plan contained in the supplement. Specific comments on the several documents comprising the plan are included as an attachment.

General

We do not agree that the selected mitigation plan would replace 100% of the fish and wildlife habitat productivity lost due to project implementation for the following reasons:

1. In the proposed mitigation plan, the Corps states that the plan will only replace approximately 42-53% of the loss to the whitetail deer (Odocoileus virginianus) resource.

2. Under the Corps proposal, 14,540 acres of deer wintering habitat and 32,700 acres of the outer zone (500 feet-1 mile) of the Allagash Wilderness Waterway will be managed less intensively than other mitigation lands. These lands are predominately mature softwood timber stands. The Habitat Evaluation Procedures team projected a management potential (on a scale of 0-100) of 81 for mature softwood habitat. This management potential was based on the more intensive management practices the Corps proposes for the mature softwood habitat outside the deer wintering areas and the Allagash Wilderness Waterway. Management in the Allagash Wilderness Waterway was discussed at a meeting among the

Corps, Maine Department of Inland Fisheries and Wildlife, and our Fish and Wildlife Service (FWS) on November 16, 1979 (Coordination Meeting 12, page 226, Attachment 2, Fish and Wildlife Mitigation Report). At that meeting, it was agreed that the management potential of 81 could not be achieved with less intensive management. At the Corps proposed level of management, less habitat units for softwood will be mitigated than is claimed. This less intensive management is based on concerns for "deep woods" species, such as spruce grouse (Canachites canadensis), marten (Martes americana), lynx (Lynx canadensis), and black bear (Ursus americanus). However, black bear, marten, and spruce grouse were included by the HEP team in arriving at the management potential of 81 in mature softwood habitat.

3. The Corps does not apply the spruce budworm problem equally to the project and proposed mitigation areas. Forest management practices in the project area can no longer be tied to long-range management plans since these plans are dictated by the budworm damage (page 38, Fish and Wildlife Mitigation Report). Further, forest management practices responding to budworm damage are more evident in the Allagash area than in the immediate project area (page 16, supplement). Therefore, it is logical that long-range mitigation management will be dictated by the spruce budworm. The mitigation plan should be reexamined in relation to projected management potentials and the time required to attain those management potentials in the softwood habitats to reflect these assumptions. If the Corps' implication that the mitigation lands must be managed for the spruce budworm in addition to wildlife is valid, then the attainable management potentials will be reduced and will require more acres for mitigation. The Corps should perform a consistent evaluation to both the project area and mitigation area.

4. The Corps determined that 123,720 acres are required for mitigation. They propose to acquire and manage 112,370 acres of land along the Allagash River. To make up the difference, the Corps proposes to intensively manage 13,400 acres of islands within the proposed Dickey impoundment. Such a proposal is impractical because of the location of these islands in relation to the mitigation lands. Access to these islands and their potential to contribute significantly to the mitigation of lost habitat units is questionable. In addition, the Corps own argument against Plan D and parts of the FWS plan; i.e., a reduction in the overall efficiency and effectiveness of managing small, fragmented units,

applies equally to the Corps proposal to manage the islands. Contrary to what the Corps states in the syllabus to their Fish and Wildlife Mitigation Report, the FWS has recommended that these islands be established as natural areas (FWS Conservation and Development Report, Supplement 2, 1978). We believe that such a management strategy would be the most compatible use of these lands.

The Corps projection of most probable future conditions without the project is based heavily on a report (referenced in the supplement and related documents), prepared by a consultant (Kimball Report), and contained in Appendix C, Supplement 2, 1980. The information in this report and appendix was not made available to the FWS at the time it prepared Supplement 3 to the Conservation and Development Report. In fact, this appendix has not been made available to this Department for review within the current 45-day public review and comment period. As the Corps correctly points out, the differing views of future forestry management in the project area are reflected in much of the difference between the mitigation plans of the Corps and the FWS. Therefore, it would seem critical that the Corps provide this information for review.

The proposed fisheries mitigation plan assumes that population recruitment from natural reproduction within the tributary streams and nonexposed shore zones will be adequate to maintain the reservoir brook trout population at the ecosystem's carrying capacity. We question this basic assumption. To our knowledge, there has never been a significant brook trout fishery developed in a fluctuating reservoir of this type in the presence of severe competition from populations of yellow perch, white suckers, bullheads, and various species of minnows. These species are presently indigenous in the St. John drainage and can be predicted to flourish in Dickey Reservoir. The earlier life stages of the Eastern brook trout are highly dependent upon cover and food sources limited to shallow water habitat. Food availability in these areas in the reservoir will be minimal due to fluctuating water levels. Competition for these same food items by other fin fish species and direct predation will act as further limiting factors on brook trout production. Ultimately, this will reduce the standing crop. The Corps considers some of these same points and lists a series of

brook trout recovery techniques. However, they do not have a definite, funded contingency plan if their biomass replacement is unsuccessful. Realization of the maximum fish potential of the reservoir is a necessary goal to compensate the loss of the wild stream brook trout production which are irreplaceable losses.

Summary

We consider that the Corps tentatively selected mitigation plan is inadequate in terms of mitigating the project induced losses to the fish and wildlife resources. The claim that the tentatively selected mitigation plan would replace 100% of the wildlife habitat productivity lost due to project implementation is unsupported. The numerous contradictions and inconsistencies of the mitigation proposal could confuse those who lack the expertise and do not review these proposals in sufficient depth.

It is apparent that the differing views of future forestry management in the project area have led to the differences between the plans of the Corps and the FWS. Therefore, we recommend that the most probable future forestry management be investigated by an independent review team.

We also realize that lands which are proposed for acquisition in the mitigation area include 36,400 acres of land within the Allagash Wilderness Waterway, although not including the inner zone of land immediately adjacent to that river. The draft statement recognizes the river's inclusion in the National Wild and Scenic River System and states that "With careful coordination, the proposed acquisition and management of adjacent lands for wildlife mitigation will benefit wildlife by maintaining mature spruce-fir bottomlands and deer wintering habitat while adding an extra measure of protection for the Waterway and complementing the experience the Allagash Wilderness Waterway now provides (Maine Bureau of Parks and Recreation, 1979)."

We generally concur with this conclusion; however, we further believe that the final mitigation plan and the final statement should recognize the possibility that some management activities for mitigation (i.e., timber cutting and road building) may conflict with the management provisions for wild and scenic river purposes. If this occurs, it should be clear from the mitigation plan that the wild and scenic river provisions will apply. We believe such

recognition is clearly warranted by the river's inclusion in the National System and by the fact that the river is viewed as being nationally significant.

The adverse environmental impacts of any mitigation on this area of Maine must be added to the extremely adverse impacts of project implementation. These project induced losses include the large scale destruction of terrestrial and aquatic resources and the elimination of an important part of the last remaining wilderness recreational area in the Northeast. Moreover, this area represents a unique combination of aesthetic and natural resource values no longer existing anywhere else in the United States.

This Department continues to believe that the Dickey-Lincoln School Lakes Project will have severe environmental impacts on the St. John River basin and the northern Maine region. In view of these concerns, and as stated in our letter of March 1, 1979, commenting on the revised draft statement, this Department may refer this matter to the Council on Environmental Quality under the procedures specified in 40 CFR 1504.

Sincerely,

James H. Rathlesberger
Assistant SECRETARY

Specific Comments
DICKEY-LINCOLN SCHOOL LAKES PROJECT

I. Specific Comments on Supplement to DEIS

1. Page 3a. Environmental Impacts - The forest habitat management plan and associated logging road system is similar to present commercial operations, and it would not materially reduce the near wilderness character of the area.

2. Page 3, 4th paragraph. Management Site - The FWS questions the management of the 13,400 acres on the islands. We have recommended that these islands remain as natural areas.

3. Page 4, 3rd paragraph. Summary of Mitigation Measures - We do not believe this less intensive level of management will attain the management potential as implied in Appendix K and Attachment 1.

4. Page 29, 3rd paragraph. Aquatic Ecosystem - The statement that the proposed plan will manage brook trout such that the resulting lake biomass will be equal to or greater than that currently existing in the project area streams is the basic assumption of the Corps plan. A contingency plan must be funded in the mitigation authorization to provide the means to complete the biomass replacement if the basic assumption proves to be incorrect.

5. Page 33, 6th paragraph. Wildlife - The special hunting season to adjust the population to a level commensurate with the carrying capacity in surrounding yards can only be established by the Maine State Legislature. We recommend that the statement be corrected to reflect this.

6. Page 34, 2nd paragraph. Forestry - "A complete discussion of the impacts of the proposed mitigation plan on the existing forest resource is presented in Appendix C, Supplement 2, 1980." This appendix has not been provided for review.

7. Page 39, 2nd paragraph. No Federal Action - This statement is misleading on the magnitude of the project induced losses to wildlife and fishery resources. Project induced losses are not limited to 53,990 acres of spruce-fir forest and the wildlife resources associated with that coniferous habitat. The project will actually inundate 80,455 acres of terrestrial habitat and 278 miles of streams and rivers. Included in the terrestrial habitat is the largest deer yard in that portion of Maine.

8. Page 40, 2nd paragraph. U.S. Fish and Wildlife Service Mitigation Plan - the HEP team decided that the interspersion calculations were inappropriate for this application.

9. Page 40, 6th paragraph. The methodology (The 1976 version of the Habitat Evaluation Procedures) used by the FWS is the same methodology that the Corps used to arrive at their figure of 123,720 acres. On page 92, 1st paragraph of the Fish and Wildlife Mitigation Report, it states, "Both plans use the HEP procedure and the annualization technique." Therefore, the statement that, "The acquisition of 300,000 acres to replace lost wildlife habitat productivity is not acceptable because of the methodology used to arrive at this acreage requirement, and its large scale," is inconsistent and misleading. The major difference between the FWS and Corps mitigation plans is in the assumptions used for future conditions without the project and the time to attain management potential as discussed in your following two paragraphs.

10. Page 41, 1st paragraph. The future conditions without the project were based on information available to the HEP team and the FWS at the time. The Corps new evaluation of future conditions without the project is based on studies performed in late 1979 (Kimball Report) and contained in Appendix C, Supplement 2, 1980. This information has yet to be provided to the FWS.

11. Page 41, 2nd paragraph. We do not feel the Corps has adequately supported its case for obtaining management potential by year 50, particularly in the softwood habitats. In the previous paragraph, the Corps states the effect of the spruce budworm on forest (and wildlife) management in relation to the future without the project. If this is true, the budworm will have a similar effect on management potential and limit management capabilities, on the mitigation lands thereby increasing the time needed to arrive at management potential. Removal of timber from the impoundment area plus salvage of budworm infected balsam fir stands is expected to create a wood surplus at that time, and quite likely engage all available wood operators for the next 5-10 years. The time needed to arrive at management potential (100 years) was discussed and agreed upon at the meeting of July 2, 1979, among the Corps, MDIFW, and the FWS (Coordination Meeting 9, page 226, Attachment 2 of the Fish and Wildlife Mitigation Report).

12. Page 41, 4th paragraph. It is stated that the acquisition and management of 300,000 acres primarily for wildlife mitigation purposes are not justifiable when socio-economic impacts are considered. The socio-economic impacts of adequate mitigation must be added to the negative impacts of the Dickey-Lincoln School Lakes Project.

13. Page 42, 2nd paragraph. It is stated that the intent of the selection methodology has been to maximize wildlife habitat value, management potential, and management feasibility. The Corps has not demonstrated the maximization of management potential and feasibility in relation to the 14,540 acres of deer wintering habitat, the 32,700 acres of the outer zone of the Allagash Wilderness Waterway, and the 13,400 acres of islands. The reasons are stated above in the general comments.

14. Page 42, 5th paragraph. It is stated, "It is the continued judgment of the Corps that to acquire and manage in outlying areas the additional deer wintering habitat necessary to meet the FWS requirement would result in considerable losses in management effectiveness, as discussed above." This argument should apply equally to the Corps proposal to manage the 13,400 acres of islands.

15. Pages 44-46. Consultant's Terrestrial Mitigation Plan - The Consultant's Terrestrial Mitigation Plan is unacceptable because it misuses HEP in relation to interspersion, is largely theoretical, and approaches animal husbandry instead of wildlife management.

16. Pages 46-48. Mitigation Plan for Deer Wintering Habitat - This single species approach to mitigation is unacceptable since it does not address mitigation of project induced adverse impacts to other species.

17. Page 48, 2nd paragraph. Ibid 14.

II. SPECIFIC COMMENTS ON THE FISH AND WILDLIFE MITIGATION REPORT

Syllabus

18. Page ii, 6th paragraph. Plan B (FWS) does not recommend intensive forestry management to benefit wildlife on the 13,400 acres of islands that would exist within the proposed impoundments. The FWS has recommended that these islands be established as natural areas (Conservation and Development Report, Supplement 2, 1978). We question the validity and practicality of intensely managing these islands

Interagency Draft Coordination

19. Page 3, 4th paragraph. This paragraph states that the FWS Supplement 3, Conservation and Development Report, diverged from the common course. This statement is unfounded and misleading. Supplement 3 was a correction of previous mistakes (the Corps is using these corrections in this report) not a diversion from a common course. In fact, the Corps diverged from the common course from the start with its publication of the consultant's mitigation plan in 1978 and the two draft plans of August and October 1979. These plans represented a misuse of HEP. It is only now that the Corps is applying the correct methodology. The differences between the FWS plan and the Corps plan are in the assumptions used for the future without the project and the time required to obtain management potential.

Recreation

20. Page 25, 7th paragraph. Some stream fishing opportunities would remain, but the quality would be seriously impaired.

Reduction of Initial Impact on Displaced Deer

21. Page 35. Ibid 5.

Without the Dickey-Lincoln Project Existing and Most Probable Future Conditions

22. Page 38. Arguments concerning the spruce budworm and most probable future conditions are expressed in the general comments and in number 11.

Certainty

23. Page 40, 4th paragraph. This paragraph is confusing and possibly misleading. It should be expanded to explain why all HEP analyses have a certainty of less than 50% because of the actual species selection, the composition of the interagency team, the overall rating system, and the purpose of analyses.

Plan A (Corps)

Terrestrial Mitigation

24. Page 42, 5th paragraph. Ibid 11.

25. Page 43, 3rd paragraph. The documentation, Appendix C, Supplement 2, DEIS, 1980, has not been provided for review.

26. Page 44, 3rd paragraph. The figure of 115,000 acres does not agree with 123,700 acres on page 48 and Table 8, page A-12, in Attachment 1 and Appendix K. The technique is invalid since it is not consistent with the rest of the HEP procedure used. The 123,700-acre figure is correct based on the Corps assumptions.

27. Page 45, 1st paragraph. This paragraph implies the proposed mitigation plan will offset and compensate for all project induced losses to fish and wildlife resources. It should be changed to reflect the fact that it is only partial mitigation.

28. Page 45, 4th paragraph. Ibid 27.

Allagash Wilderness Waterway (AWW)

29. Page 50, 5th paragraph. In this paragraph, the Corps admits that the 32,700 acres in the Allagash Wilderness Waterway will not be managed as intensively as other mitigation lands. Consequently, the projected management potentials will not be attained and the Corps will not attain the proposed mitigation of lost wildlife habitat productivity.

Acceptability

30. Page 53, 5th paragraph. For the reasons pointed out in our general comments and throughout the specific comments, Plan A would not successfully mitigate the fish and wildlife losses.

Efficiency

31. Page 53, 8th paragraph. Ibid 30.

Public Views

32. Page 56, 1st paragraph. Ibid 30.

Plan B (FWS)

HEP Team Projections

33. Page 58, 5th paragraph. Information to disprove these assumptions has not been provided to the FWS.

Appraise Planning Objectives Fulfillment

34. Page 70, 1st and 2nd paragraphs. We feel that Plan B satisfies General Ecological Objectives 1 and 2, as well as Plan A.

EQ Objective

35. Page 71. As with Plan A, Plan B would increase the environmental quality for all known significant items.

Geographic Scope

36. Page 72. The land required is not excessive based on the assumptions used for the future conditions without the project.

Trade Off Analyses

37. Page 73, 1st paragraph. The factual data have been provided in the FWS Conservation and Development Report and its supplements. As with the Corps, data projections over the 100 year project life are based on assumptions, not fact.

38. Page 73, 2nd paragraph. The cost/benefit argument is not a valid approach for mitigation.

Plan C (Consultant's Plan)

39. Pages 75-83. Ibid 15.

Plan D (Deer Wintering Areas)

40. Pages 84-90. Ibid 16.

41. Page 100, 7th paragraph. As stated throughout our review, Plan A does not represent 100% mitigation excluding deer. See also 30, 31, and 32.

Plan A (Corps)

Terrestrial Mitigation

24. Page 42, 5th paragraph. Ibid 11.

25. Page 43, 3rd paragraph. The documentation, Appendix C, Supplement 2, DEIS, 1980, has not been provided for review.

26. Page 44, 3rd paragraph. The figure of 115,000 acres does not agree with 123,700 acres on page 48 and Table 8, page A-12, in Attachment 1 and Appendix K. The technique is invalid since it is not consistent with the rest of the HEP procedure used. The 123,700-acre figure is correct based on the Corps assumptions.

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Allagash Wilderness Waterway (AWW)

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Acceptability

30. Page 53, 5th paragraph. For the reasons pointed out in our general comments and throughout the specific comments, Plan A would not successfully mitigate the fish and wildlife losses.

Efficiency

31. Page 53, 8th paragraph. Ibid 30.

Public Views

32. Page 56, 1st paragraph. Ibid 30.

Plan B (FWS)

HEP Team Projections

33. Page 58, 5th paragraph. Information to disprove these assumptions has not been provided to the FWS.

Appraise Planning Objectives Fulfillment

34. Page 70, 1st and 2nd paragraphs. We feel that Plan B satisfies General Ecological Objectives 1 and 2, as well as Plan A.

EQ Objective

35. Page 71. As with Plan A, Plan B would increase the environmental quality for all known significant items.

Geographic Scope

36. Page 72. The land required is not excessive based on the assumptions used for the future conditions without the project.

Trade Off Analyses

37. Page 73, 1st paragraph. The factual data have been provided in the FWS Conservation and Development Report and its supplements. As with the Corps, data projections over the 100 year project life are based on assumptions, not fact.

38. Page 73, 2nd paragraph. The cost/benefit argument is not a valid approach for mitigation.

Plan C (Consultant's Plan)

39. Pages 75-83. Ibid 15.

Plan D (Deer Wintering Areas)

40. Pages 84-90. Ibid 16.

41. Page 100, 7th paragraph. As stated throughout our review, Plan A does not represent 100% mitigation excluding deer. See also 30, 31, and 32.

III. Specific Comments on Attachment 1 and Appendix K

Executive Summary

42. As stated in our general comments and throughout our review, the Corps plan does not replace 100% of the wildlife habitat productivity lost due to project implementation. See also 30, 31, 32, and 41.

Mitigation Measures

43. Page 9, 4th paragraph. "Forest habitat management of 14,540 acres of deer wintering habitat is expected to double the over-wintering deer carrying capacity in these areas, replacing approximately 42-53% of the loss in this resource." This statement is a contradiction to the statement in the Executive Summary, "It would replace 100% of the wildlife habitat productivity lost due to project implementation." See also 30, 31, 32, 41, and 42.

Forest Practices

44. Page 14, (b). Removal of 40-60% of merchantable volume is excessive and blow down of residual stands is likely to occur.

45. Page 14, (d). Infers diameter limit control of harvest which is not silviculturally sound and would not meet objectives of the plan.

Spruce Budworm Infestation

46. Page 15, 3rd paragraph. Corps states that cuttings to reduce budworm hazard would further mitigation objectives. Unfortunately, the size and location of such cuts will not be controlled by the resource managers; hence, it is unlikely that such cuts will fall within the objective of the plan (i.e., small group selection or patch cuts less than 4 acres). See also page 19 - Spruce Budworm Infestation and page 30, 3rd paragraph.

Forest Practices

47. Page 17. As pointed out in our general comments, this given forestry classification will not permit maximization of management potential. This classification will also be difficult to obtain in light of the budworm epidemic.

Timber Management Feasibility

48. Page 19. This section infers that group selection and patch cutting is not a current practice of the timber industry. Current cutting practices of Seven Islands Land Company and Boise Cascade parallel the planned management of timber lands, as outlined in Section 2.2.2 of Attachment 1.

Spruce Budworm Infestation

49. Page 20, 2nd paragraph. This paragraph states that severely damaged areas could support a shelterwood or a seed tree stand after budworm salvage. Severely damaged areas could not support a shelterwood stand, and a seed tree system is not practical for spruce-fir (Frank, R.M. and J.C. Bjorkbom. 1973. A Silvicultural Guide for Spruce-Fir in the Northeast. USDA, Northeastern Forest Exp. Sta., Gen. Tech. Report NE-6).

50. Page 20, 3rd paragraph. The statement "High tree mortality due to budworm damage will limit the effectiveness of management efforts to maintain the cover of the mature spruce-fir type and to increase its carrying capacity for over-wintering deer and the associated mature spruce-fir wildlife community" conflicts with the statement "In many instances, cutting practices intended to remove diseased wood and otherwise control budworm damage will actually further mitigation objectives," on page 15.

51. Page 21, 2nd paragraph. This statement conflicts with the management potentials derived by the HEP team.

Location and Extent of Recommended Area

52. Page 38, 3rd paragraph. Ibid 2.

Overall Management Responsibility

53. Page 44, 1st paragraph. States that the mitigation plans would become the terms of the lease for the managing authority, Maine Department of Inland Fisheries and Wildlife. It is our opinion that the measures and objectives as set forth in the mitigation plan are likely unobtainable for reasons as stated herewith. The terms of any such lease should reflect these concerns and contradictions as are evident within the mitigation plan.

Capital Equipment

54. Page 48. The item is underfunded for the needs and objectives of the mitigation plan. Certainly two vehicles for a staff of 21 people is unreasonable. Similarly, two snowmobiles are completely inadequate for efficient access to areas being prepared for future timber harvest. The heavy equipment listed is also inadequate for road maintenance.

Research and Monitoring

55. Page 49. Monitoring studies (last 2 paragraphs) outlined would be impossible to conduct with monies and personnel available.

Operating Costs

56. Page 49. Operating costs do not reflect an adequate inventory of forest stand composition and volume upon which to base initial management plans. This inventory would cost an estimated $50-60,000 without photography.

Mitigation Objectives and Recommended Measures

57. Page 52, 3rd paragraph. The statement "The proposed plan does not represent 100% mitigation of the environmental impacts of the Dickey-Lincoln project" is inconsistent with the statement in the Executive Summary, "It would replace 100% of the wildlife habitat productivity lost due to the project implementation."

Determination of Management Potential

Unit Value

58. Page 57, 1. Ibid 11.

59. Page 58, 2, 3, and 4. Items 2, 3, and 4 suggest a rapid attainment of management potential through the mitigation plan. Such predictions are unrealistic as management will be dictated by budworm infestations and not by the mitigation plan. Such predictions are also in direct conflict with the predictions stated on page 57, 2nd paragraph. See also 11.

60. Page 69, 1st paragraph. Ibid 9.

61. Page 69, 3rd paragraph. The Corps takes exception to the FWS assumption that habitat productivity will increase without the project based on the anticipated impact of the spruce budworm. However, in the next paragraph, they state, "The Corps' methodology (assumption) assumes immediate implementation of the mitigation plan and an increase in habitat value, which achieves 100% of the management potential by year 50." Such an assumption ignores the same impact caused by the spruce budworm and also ignores market conditions resulting from both budworm salvage and clearing of the impoundment. See also 11.

Consultant's Terrestrial Mitigation Plan

62. Pages 71-75. Ibid 15.

Mitigation Plan for Deer Wintering Habitat

63. Pages 75-77. Ibid 16.

USDOI, General

Responses to USDOI Comments

1. General Comment - The statement that the proposed mitigation plan would replace 100% of wildlife habitat productivity refers only to the capability to replace habitat productivity in terms of habitat units, as measured through the Habitat Evaluation Procedures (HEP). Mitigation for the loss of traditional deer wintering habitat must be assessed independently, as it requires the acquisition and management of specialized habitat which is very limited and dispersed in the Allagash Area. As a result, while management on the proposed 125,770 acre mitigation site is likely to replace 100% of habitat units lost, it cannot specifically replace 100% of the overwintering deer carrying capacity due to the limited availability of traditional deer wintering areas on the mitigation lands.

2. General Comment - Under the Corps proposed plan, deer wintering areas and spruce-fir bottomlands in the Allagash Wilderness Waterway will be managed in accordance with the deer yard management techniques outlined in Attachment I, Section 2.3.1(a). It is misleading to refer to these management techniques as "less intensive." Timber management practices in deer wintering areas and in the Allagash Area follow the same general guidelines as those to be applied in all mature softwood stands in the mitigation area (e.g., selective cutting with occasional patch cuts, generally on a 10-15 year cutting cycle).

The differences in management practices on these lands lie in specific management objectives. Deer yard management calls for the maintenance of mature spruce-fir stands adequate for winter cover (i.e., 70% crown closure and 35 feet or greater in height). Management to accommodate "deep woods" indicator species along the Allagash involves the maintenance of contiguous units of canopy cover with similar characteristics, and restrictions on increased vehicular access. To insure adequate cover characteristics as stated previously, softwood stands must be maintained as the more mature pole timber in the SW2A/2B classification (31-49 feet in height), or as sawtimber in the SW3A/3B classification (50 feet and above). (Crown closure in the "A" class is 75% and above; in the "B" class it is 31-74%). Both the USFWS and the Corps habitat management plans recommend an age class distribution of the 40% in pole timber and 30% in sawtimber for all softwood stands. A management potential of 81 is expected from this level of management in softwoods.

At the November 16, 1979 meeting alluded to, it was agreed that management according to proposed deer yard management guidelines would provide good habitat for "deep woods" species, particularly when coupled to road access restrictions. It was further agreed that, as deer yard management practices are similar to those proposed for all mature softwoods, the management potential of 81 could, in fact, be achieved if such practices could be implemented in the Allagash Wilderness Waterway (AWW). Meetings and correspondence with AWW authorities have indicated that such practices do not appear to be inconsistent with the management policies and goals of

the wilderness waterway. As a result, our calculation of habitat units to be derived from deer wintering areas and spruce-fir forest in the Allagash Wilderness Waterway is based on conclusions reached at the November 16, 1980 meeting in which it was agreed that management according to the proposed deer yard management plan would achieve a management potential of 81.

Pursuant to telephone conversations on May 19, 1980 it appears that reference to maintenance of an "overall SW2A1/3A classification" in the Corps plan (Attachment I, Sections 2.2.3 and 2.3.1(a)) contributed to comments that the plan is less intensive than that envisioned by the MDIFW or the USFWS. As explained above, the management objective here is to maintain contiguous units of spruce-fir forest that overall, have at least 70% crown closure and are 35 feet or greater in height. These objectives can be reached where stands are managed to an SW2B classification, providing these cover criteria are met. In an effort to resolve this discrepancy, specific references to an "overall SW2A/3A classification" have been removed from the final version of Attachment I.

3. General Comment - Although the spruce bedworm infestation will be a factor on both project and mitigation lands, it will certainly not affect commercial forest practices and wildlife-oriented forest practices equally. First, the mitigation plan proposed management to increase habitat diversity within and between all habitat types, rather than focusing on spruce-fir forests only. The mature softwood cover type affected by the budworm comprises less than 40% of the total mitigation area. Secondly, the objectives of wildlife-oriented timber management in spruce-fir stands are to open up the forest canopy to increase browse production on the forest floor, and to increase the number of age classes within and between forest stands. If diversity is increased by natural means (i.e., budworm mortality), then the objectives of mitigation have been furthered with less management effort. On the other hand, commercial forestry management objectives are to harvest timber to maximize profit, either in the long or the short-term. As a result, commercial forest management plans are almost exlusively geared to the harvest of mature spruce and fir sawtimber before it is rendered unmerchantable by budworm damage.

In light of the above, it seems clear that commercial forest management plans are dictated by budworm damage, while wildlife-oriented forest management plans can be adjusted and tailored to utilize the conditions created by budworm damage to increase wildlife productivity (Attachment I, Section 2.2.4). It is recognized in the mitigation plan, however, that while budworm damage should not limit the ability to increase habitat productivity overall (in terms of habitat units), the successful management of deer wintering areas and spruce-fir bottomlands for the maintenance of mature spruce-fir cover is likely to be limited by budworm damage due to the importance of the mature spruce-fir component. As a result, efforts to accommodate "deep woods" indicator species and to increase overwintering deer carrying capacity may be limited.

Finally, there does not appear to be any evidence that the application of silvicultural budworm practices on the mitigation lands would lower management potentials for wildlife. Preventative cutting practices to be considered on the mitigation lands involve removing the less vigorous mature overstory and dense, suppressed stands of fir understory where budworm damage is evident. The objective is to ensure the long term maintenance of a vigorous spruce-fir canopy. These cutting practices, if conducted with this objective in mind (rather than with the objective of commercially harvesting sawtimber), can be incorporated into the proposed habitat management plan to increase the number of age classes within dense spruce-fir stands, and thus reach the anticipated management potential.

4. General Comment - Comment #4 ignores the fact that, throughout the mitigation plan, management practices have been proposed on the project lands in an effort to provide the most effective mitigation for wildlife losses; improving wildlife habitat in the impacted area, itself. The plan provides the resources necessary to conduct management along the reservoir shoreline and on the islands. Due to the narrow linear configuration of the reservoir shoreline, wildlife management practices conducted in this area, including wetlands mitigation practices, have not been assessed for their contribution to habitat productivity in terms of habitat units. The islands, however, are accessible, and we believe they can and should be managed as cohesive management units. The resons given in Section 2.9.3 for acquiring fragmented units for deer yard management are valid for that section and the type of activity envisioned. They do not apply here for these basic reasons:

1. These islands are 10,000 and 3,000 acres in size and as such are not small fragments.

2. These lands are already within the project area and have been acquired as project lands.

3. Access to these islands is provided by boat on the reservoir during late spring, summer, and fall. In addition, they could be accessible by snowmobile or aircraft during the winter.

The USFWS recommendation to maintain the islands as natural areas is acknowledged in Attachment I, Section 2.10.2. The error in the syllabus of the Fish and Wildlife Mitigation Report has been corrected in the final report.

5. General Comments, page 3 - The Appendix C, Supplement 2, 1980 has been made available to all concerned agencies and to the general public for review within the 45 day comment period. It was mailed on 21 April 1980, immediately after receiving it from the consultant in final form. A one week extension of the comment period was granted to provide sufficient time for review of this information. The information in this report could not have been available to the USFWS for use in development of Supplement No. 3 to the Conservation and Development Report. It was released on November 8, 1980, just prior to public workshops held to discuss the mitigation plan.

The consultant's report was initiated soon after the workshops, largely in response to questions raised about forest management practices and forest economics in the project and mitigation areas.

6. General Comment, page 3 - It is well within your perogative to question the assumption. Moosehead Lake in Maine is a fluctuating reservoir which had a viable brook trout fishery. The downfall of the brook trout fishery is attributed to the introduction of lake trout and not to the yellow perch, white suckers, bullheads and various species of minnows which are also found in Moosehead Lake.

It is reasonable to assume that the earlier life stages of the brook trout will be spent in the same areas after reservoir development as they are now, namely the small brooks and streams where they are spawned, and that they will migrate downstream in normal fashion. Competition will reduce the population of brook trout from its biotic potential to the environmental carrying capacity which is its standing crop. We have estimated that this level will approximate that which would be lost due to project implementation. (Brook trout are predators and the other species have offspring which are preyed upon).

We differ in our opinion as to what is a necessary goal. A necessary goal is to mitigate to the extent practicable and to ensure a prudent Federal investment in doing so.

USDOI, Specific

SDEIS

1. Summary, Para. 3a, SDEIS. We concur.

2. Page 3, Para. 4, SDEIS. See response to General Comment #4, above.

3. Page 4, Para. 3, SDEIS. See response to General Comment #2, above.

4. Page 29, Para. 3, SDEIS. We have modified Section 3.4.1 of Attachment 1 and the SDEIS 216 review. Recognizing that in the future, demands for recreation and fishing could change we have included in the fisheries management plan the opportunity to review the operation of the project when found advisable due to change in physical or economic conditions and to report them to the Congress with recommendations on the advisability of modifying the structures or their operation and for improving the quality of the environment. This review is authorized under Section 216 of the Flood Control Act of 1970 (Title II of Public Law 91-611).

5. Page 33, Para. 6, SDEIS. In response to this comment, a statement has been added in Attachment I, Section 2.3.1(a), explaining that a special hunting season would have to be acted upon by the Maine State Legislature.

6. Page 34, Para. 2, SDEIS. See response to General Comment #5, above.

7. Page 39, Para. 2. SDEIS. The paragraph has been changed to reflect your concerns.

8. Page 40, Para. 2, SDEIS. We see no conflict between your statement and your comment.

9. Page 40, Para. 6, SDEIS. The paragraph has been modified to indicate "assumptions" rather than "methodology."

10. Page 41, Para. 1, SDEIS. See response to General Comment #5.

11. Page 41, Para. 2, SDEIS. The Corps' assumption that management potentials can be reached by year 50 is, like the USFWS alternative assumption, based in large part on the number of age classes expected in each habitat type through forest habitat management on a 10 to 15 year cycle. By year 50, between 3 and 4 cutting cycles would be completed, resulting in approximately 5 distinct age classes in each forest stand. In addition, the biotic response of indigenous fauna to such increases in habitat diversity and vegetative productivity would generally be very rapid, as most species reach reproductive age between 2 to 4 years. For these reasons, the Corps supports the assumption that 100% of the management potential can be achieved by year 50.

As discussed in the response to General Comment #3, above, we do not believe that mitigation managements efforts to increase overall habitat productivity will be significantly affected by the spruce budworm infestation. In reference to the initiation of the mitigation plan at year 0, land can be acquired and management begun at this time, irrespective of any potential wood surplus or labor shortage inducted by cutting in adjacent areas. Finally, the 100 year management time frame was agreed upon by the HEP team in 1976 and used again for consistency in the July 1979 analysis. When the USFWS issued Supplement No. 3 to the C&D Report in November 1979, revising some assumptions used in the HEP analysis and changing the recommended mitigation acreage from 160,000 to 300,000 acres, a more critical review was made of all assumptions used in the HEP analysis. In assessing in further detail the forest habitat management practices and their anticipated impact on biological productivity, it was concluded that the 50 year time frame reflected more accurately the rate at which habitat productivity would increase.

12. Page 41, Para. 4, SDEIS. Only those impacts which cannot be mitigated should be added. We have mitigated some of the adversity by reducing the acreage of acquisition.

13. Page 42, Para. 2, SDEIS. Taken in context, the statement is made that in selecting specific lands for acquisition, and management within the Allagash Area, the criteria for selection were intended to maximize wildlife habitat value, management potential, and management feasibility based on recommendations of the USFWS, MDIFW, and Corps consultants. First, as stated previously (General Comment #4), the islands are already in Federal ownership and therefore outside the selection process being

discussed here. The intent of management on the island is maximize the wildlife habitat value derived from land already in public ownership. Secondly, for the purposes of selecting mitigation lands, the Corps assumed that "maximizing wildlife habitat value" included addressing USFWS recommendations to maximize deer yard acreage and stream valley habitat, in addition to selecting lands of similar habitat type composition in the Allagash Area. Maximizing management potential and management feasibility involved selecting lands with a high component of mature softwoods which had not already been severely cut over, which were accessible by existing roads, and which did not include steep terrain or irregular management blocks. Maximizing management potential and feasibility does not necessarily refer to the selection of lands which can be managed to the greatest intensity. Again, several of these criteria were used on USFWS and MDIFW recommendations.

Clearly, the selection of deer wintering habitat and of spruce-fir bottomlands along the Allagash is justified in order to maximize wildlife habitat values as explained above. In addition, management potential and feasibility have been maximized by selecting these lands, which are predominately mature spruce-fir forest, where road access is good, terrain is relatively flat, and where lands have been selected to avoid irregular management blocks.

14. Page 42, Para. 5, SDEIS. See response to General Comment #4.

15. Pages 44-46, SDEIS. Your comment is acknowledged and included in the record. The consultants plan has not been accepted by the Corps due to uncertainty about the use of interspersion in calculations and the proposed management approach.

16. Pages 46-48, SDEIS. Your comment is acknowledged and included in the record. We concur.

17. Page 48, Para. 2, SDEIS. See response to General Comment #4.

18. Page ii, Para. 6, Report. The paragraph has been changed to reflect your position.

19. Page 3, Para. 4, Report. We disagree and have presented our view.

20. Page 25, Para. 7, Report. We fail to see how the quality of the remaining streams would be impaired.

21. Page 35, Report. See response to Specific Comment #5. (We feel the most appropriate place to present this explanation is in the mitigation plan, Attachment I).

22. Page 38, Report. See response to General Comments #3 and 5, and Specific Comment #11.

23. Page 40, Para. 4, Report. The text has been revised to obviate your concerns.

24. Page 42, Para. 5, Report. See response to Specific Comment #11.

25. Page 43, Para. 3, Report. See response to General Comment #5.

26. Page 44, Para. 3, Report. The purpose of the discussion on page 44 is to describe how results of the 1976 habitat evaluation were used as a tool in selecting specific mitigation lands. (The Allagash Area habitat evaluation data was not available initially to determine more precise acreage requirements). The point being made here is that, based on the approximate increase in habitat value expected through management, 115,000 acres provided a resonable estimate of the mitigation acreage requirement. This estimate was then used as a basis for tentatively selecting mitigation lands. Once the general mitigation area was tentatively identified, habitat evaluation procedures were conducted on these lands, and a more precise estimate of mitigation acreage requirements was developed using management potential unit values determined for the Allagash Area. This analysis resulted in the 123,700 acre figure which you acknowledge is correct based upon the Corps' assumptions.

27. Page 45, Para. 1, Report. This paragraph has been modified to address your concern.

28. Page 45, Para. 4, Report. This paragraph describes the use of habitat evaluation procedures to estimate the number of habitat units to be replaced through management on the mitigation lands, and to compare that number with the number lost due to the project. In our opinion, this discussion does not in any way imply full compensation for project induced losses to fish and wildlife resources.

29. Page 50, Para. 5, Report. Mitigation lands within the Allagash Wilderness Waterway (AWW) are expected to be managed at a level which will result in the attainment of projected management potentials. (See response to General LComment #2). Paragraph 5 on page 50 has been revised to more accurately describe proposed management activities in the AWW.

30. Page 53, Para. 5, Report. Plan A would successfully mitigate for fish and wildlife losses, though it will not completely mitigate losses. This paragraph has been expanded to acknowledge that USFWS does not find Plan A acceptable as complete mitigation.

31. Page 53, Para. 8, Report. See response to Specific Comment #30. The paragraph in question has been modified to state clearly what is achieved by Plan A: the replacement of habitat units and the achievement of fisheries and endangered species mitigation objectives.

32. Page 56, Para. 1, Report. See response to Specific Comment #30.

33. Page 58, Para. 5, Report. See respose to General Comment #5.

34. Page 70, Paragraphs 1 and 2, Report. We agree that Plan B, in its conceptual management approach should, to some extent, satisfy General Ecological Objectives 1 and 2. However, since Plan B does not budget funds for research and/or monitoring, it is questionable how valuable such contributions to ecological knowledge will be.

35. Page 71, Report. The paragraph has been modified to reflect your concerns.

36. Page 72, Report. Your comment is acknowledged and included in the record.

37. Page 73, Para. 1, Report. The text has been modified to indicate the role of assumptions in the statement. It should be noted that by acquiring and managing the mitigation lands recommended by Plan B represents an increase in carrying capacity of slightly over 15% above that currently practiced throughout the project area by the forest industry using Fish and Wildlife Service assumptions.

38. Page 73, Para. 2. The paragraph has been reworded to indicate that the ratio reflects an analysis tool for determining a prudent Federal investment.

39. Page 75-83, Report. See response to Specific Comment #15.

40. Pages 84-90, Report. See response to Specific Comment #16.

41. Page 100, Para. 7, Report. See response to Specific Comment #30. The paragraph in question has been modified to clarify the level of mitigation to be achieved by Plan a.

42. Executive Summary, Attach. I. See response to General Comment #1.

43. Page 9, Para. 4, Attach. I. These statements do not contradict one another. See response to General Comment #1.

44. Page 14(b), Attach. I. The guidelines presented on page 13 and 14 have been presented to indicate a minimal level of protection which has been shown to be compatible with commercial forest practices. Based on your comments suggesting that guidelines (b) and (d) are inconsistent with proposed management objectives, these specific guidelines have been eliminated from the plan to prevent their potential application on the ground forest habitat management.

45. Page 14(d), Attach. I. See response to Comment #44, above.

46. Page 15, Para. 3. The management objective of the mitigation plan is to convert extensive stands of even-age forest to a variety of age classes through a combination of selection cutting, patch cutting, and clear-cutting techniques (Attachment I, p. 12, 13). Based upon the best available information describing preventative cutting methods for budworm

(Appendix C, Supplement No. 2, 1980). It does not appear to us that the implementation of such practices by the managing agency would be inconsistent with the proposed mitigation plan. It is worth noting here that the USFWS recognizes in their forest habitat management plan (C&D Report, Supplement No. 2), the wildlife habitat value of various land and water features which contribute to forest habitat diversity by providing openings in the forest:

> "Each area of the same forest type also will have other features that add to the desired diversity of the forest. These include streams, ponds, bogs, marshes, beaver ponds, log landings, and trails."

It would seem that openings created due to preventative cutting practices would likewise contribute to habitat diversity if conducted according to the objectives and guidelines discussed in the mitigation plan. See also response to General Comment #3.

47. Page 17, Attach. I. See response to General Comment #2.

48. Page 19, Attach. I. Available information on commercial cutting practices indicate that group selection and patch cutting, though currently used, are not the predominant management techniques in the project and mitigation areas (Attachment I, pp. 39-40, and 56-59; Section 10, Attachment III).

49. Page 20, Para. 2, Attach, I. Discussions with Corps forestry consultants, and information provided in Section 10, Attachment III, supports the recommended use of shelterwood and seed tree forest management to promote rapid regeneration following severe budworm damage. Although Frank and Bjorkborn (1973) do not recommend the seed tree method as optional for spruce-fir regeneration, this does not mean that this technique cannot be effectively employed where forest management options are limited by budworm damage.

50. Page 20, Para. 3, Attach. I. These two statements are not contradictory. It is acknowledged in the plan that in areas being managed to maintain adequate spruce-fir canopy cover (Section 2.2.3, Attachment I), successful mitigation may be limited. On the other hand, in areas being managed to generally increase habitat diversity (Section 2.2.2, Attachment I) mitigation objectives can, in fact, be furthered by the effects of budworm mortality. See also response to General Comment #3.

51. Page 21, Para. 2, Attach. I. We disagree.

52. Page 38, Para. 3, Attach. I. See response to General Comment #4 and Specific Comment #2.

53. Page 44, Para. 1, Attach. I. This paragraph has been modified to indicate that the mitigation plan would provide a framework for developing terms of the lease. However, we continue to believe that the management

measures and objectives set forth in the mitigation plan are workable, and would expect them to be complied with as a management framework -- in developing and implementing the terms of the lease.

54. Page 48, Attach. I. In response to your comment, the capital equipment budget has been increased to provide for the following additional equipment: 2 bulldozers, 1 road grader, 1 dump truck, 2 four wheel drives, 2 two wheel drives, 2 snowmobiles, 1 skidder, and 5 chainsaws. This additional equipment, coupled with the addition of a road engineer and two additional equipment operators, should provide for adequate habitat management, road building, and road maintenance capability.

55. Page 49, Attach. I. We disagree. The currently recommended work force of foresters, 4 biologists, and up to eleven forestry and wildlife technicians seems to provide an adequate labor supply for the necessary monitoring surveys. In addition to budgeted research funds, field supplies and research equipment are provided for in the costs of facilities, capital equipment, and operating costs.

56. Page 49, Attach. I. We believe the necessary inventory of forest stand composition and volume can be conducted using the forestry and wildlife staff enumerated above. Detailed cover type mapping adequate for inventory purposes has been developed for the mitigation area based on 1979 color infra red photography. Resources necessary for the updating of this information, for ground-truthing, and for timber cruising are adequately provided for in the mitigation plan. See response to Specific Comment #55, above.

57. Page 52, Para. 3, Attach. I. These two statements are not inconsistent. See response to General Comment #1 and Specific Comment #43.

58. Page 57, Para. 1, Attach. I. See response to Specific Comment #11 and General Comment #3.

59. Page 58, Attach. I. See response to General Comment #3 and Specific Comment #11 for reasons supporting these assumptions. Such assumptions are not in conflict with predictions made on page 57, paragraph 2, as these predictions are based on the future without the project condition, where the land would continue to be managed as commercial forest.

60. Page 69, Para. 1, Attach. I. This paragraph has been modified, replacing the work "methodology" with the word "assumptions." See also response to Specific Comment #9.

61. Page 69, Para. 3, Attach. I. See response to General Comment #3 and Specific Comment #11.

62. Pages 71-75, Attach. I. The Consultants Plan has not been accepted by the Corps due to uncertainty about the use of interspersion in calculations and the proposed management approach.

63. Pages 75-77, Attach. I. We concur.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

April 28, 1980

Colonel Max B. Scheider
Division Engineer
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Scheider:

We have completed our review of the Draft Supplemental Environmental Impact Statement (EIS) for the proposed Fish and Wildlife Mitigation Plan for the Dickey-Lincoln School Lakes Project.

Clearly, the most significant impacts of the activities set forth in the plan are related to economic issues which are not within EPA's areas of jurisdiction and expertise. However, we wish to note that strict adherence to sedimentation control measures will be required to protect local streams from sedimentation due to erosion from increased road construction and logging activities on the lands acquired for mitigation.

Though the plan was developed to mitigate the impacts of the Dickey-Lincoln project on the terrestrial and aquatic ecosystem, it is clear that many of the significant fish and wildlife impacts which we commented on in detail in our letters dated December 7, 1977, and September 8, 1978 (copies of which are enclosed) will not be successfully mitigated.

We appreciate the opportunity to comment. If you have any questions, please contact Betsy Higgins of my staff.

Sincerely,

William R. Adams, Jr.
Regional Administrator

Enclosures

U.S. Environmental Protection Agency

1. No response necessary. Thank you for your review.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
USDA Office Building, University of Maine, Orono, Maine 04473

April 8, 1980

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

ATTN: NEDPL-IP

Dear Sir:

We appreciated the opportunity to review the draft supplement Environmental Impact Statement for the Dickey Lincoln School Lakes. Neither the programs of the USDA Soil Conservation Service nor the programs of Soil and Water Conservation Districts in Maine will be directly impacted by the proposed Dickey Lincoln Hydroelectric Project.

We have no further comment.

Sincerely,

Eddie L. Wood
State Conservationist

cc: Cletus J. Gillman, Director
Northeast Technical Service Center

U.S. Department of Agriculture

1. No response necessary. Thank you for your review.

STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA, MAINE
04333

JOSEPH E. BRENNAN
GOVERNOR

May 9, 1980

U. S. Army Corps of Engineers
Colonel Max B. Scheider
Division Engineer
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Scheider:

This is in response to your request for my views on the Dickey/Lincoln Project Draft Supplement Environmental Impact Statement addressing the proposed Fish and Wildlife Mitigation Plan. Based on an interagency review I have the following comments on your Plan and its DSEIS:

a) The terrestrial mitigation measures in the Proposed Plan appear to strike a reasonable balance between providing mitigation for wildlife losses and extensive public sector forest land aquisition with its associated impacts upon current landowners.

b) A thorough evaluation should be made of the financial impact aquisition would have upon the current owners of the lands proposed for aquisition, including the impacts which would result from forced capital gains. Obviously, compensation to landowners for aquisition should reflect these considerations.

c) I have been advised by the Commissioner of Inland Fisheries and Wildlife that the proposed fisheries mitigation measures leave Maine's sportsmen with no substantial compensation for the loss of one of the State's highest quality fisheries. As substantial fisheries mitigation should be provided, I urge you to reexamine the various ways in which this could be accomplished.

d) The Mitigation Plan should clearly provide for review and approval authority by the Maine Land Use Regulation Commission over activities on the mitigation lands.

e) It is stated that the Mitigation Plan provisions would become the lease terms for the managing authority (IF&W). As the measures and objectives set forth in the proposed mitigation plan are unlikely to be obtained, the lease terms should be modified to reflect reality and should allow the Department of Inland Fisheries and Wildlife enough flexibility to respond to changing conditions.

As a supporter of the project, I believe that your attention to these points and the enclosed list of detailed comments that have been prepared by state agencies should improve the plan and broaden public support for the Dickey/Lincoln project as a whole.

Sincerely,

Joseph E. Brennan

JOSEPH E. BRENNAN
Governor

JEB/bls

encl:

DETAILED COMMENTS BY STATE AGENCIES

Proposed Terrestrial Mitigation Plan -

1. p. 14 - (b) Removal of 40-60% of merchantable volume is excessive. Blow down of residual stands is likely to occur with such removal.

   (d) This guideline inferes diameter limit control of harvest, which is not silviculturally sound and would not meet objectives of the plan.

2. p. 15 - Spruce Budworm

   The Plan states that cutting to reduce budworm hazard would in many cases benefit wildlife as called for in the Plan. We do not feel that this will be true, because the size and location of such cuts will not be controlled by the resource managers.

   Appendic C of the DSEIS supports our view, stating clearly on p. 49 that the adverse effects of Spruce Budworm on mitigation efforts are far more pronounced than are positive effects.

   Appendic C of the DSEIS also states that the present spruce budworm epidemic may make implementation of the Plan "extremely difficult". Neither the current plan, nor the DSEIS reflect the timber consultant's estimate of the severity of the budworm problem.

3. p. 17 - Forest Practices

   (a) The proposed forest stand conditions (SW2A/3A) are not the optimum conditions for deer wintering area habitat value. Less dense condition (SW2B/3B) would be more desireable. In any case, spruce budworm damage will make it difficult to achieve either of these stand conditions.

4. p. 17 - Road System

   It is unlikely that the proposed methods for restricting access to certain roads and providing for rapid reversion of certain categories of roads to vegetative cover will be successful. The Plan should state that road closure policies and methods should be coordinated with the Maine Forest Service to ensure adequate fire-control access.

5. p. 19 - Timber Management Feasibility

   This section infers that groups selection and patch cutting is not a current practice of the timber industry. Current cutting practices of Seven Islands Land Co., Boise Cascade International Paper and others parallel the planning management of timber lands as outlined in Section 2.2.2.

6. p. 20 - The Plan states that severely damaged areas could support a shelterwood or a seed tree stand after salvage. Severely damaged areas could not support a shelterwood stand and a seed tree system is not practical for spruce-fir (Frank & Bjorkbom, 1973)

7. p. 21, 2nd paragraph

This paragraph does not reflect the greatly reduced ability to improve or even provide habitat value for deer that will result from spruce budworm damage.

8. p. 38 Section 2.4

The Plan proposes that the islands in the Dickey Reservoir, which comprise 13, 400 acres, would be actively managed to improve habitat values. If the reasons given in section 2.9.3 for not aquiring scattered lands are valid, this is impractical given the island locations in relation to the mitigation lands. Access to the islands and their potential to contribute significantly to the mitigation of lost habitat unit values is questionable.

9 . p. 44 Management Authority in the AWW and compliance with LURC regulations. - 3rd paragraph, first sentence:

reference is made to areas on the mitigation lands zoned by LURC, implying that some areas are zoned and others are not; in fact, all areas within the mitigation lands are zoned in some fashion.

10. p. 44, 2nd paragraph, 3rd sentence:

LURC also has authority to review and approve or deny timber harvesting and road building plans in the outer zone insofar as such proposals affect areas within protection districts, and also has authority to review and approve or deny development activities in management districts.

11. p. 45, 2nd paragraph, 4th sentence:

reference is made to practices being as restrictive as existing regulations and policies. It is not clear to which specific regulations and policies reference is made.

12. p. 48, Section 2.8.3. Capital Equipment

This item is substantially underfunded for the needs and objectives of the Mitigation Plan. Two vehicles for a staff of 21 people is insufficient. Two snowmobiles are inadequate for efficient access to areas being prepared for future timber sales. The heavy equipment listed is also inadequate for road maintenance.

13. p. 48, Section 2.8.4. Research and Monitoring

The monitoring studies (last 2 paragraphs) outlined could not be conducted with the levels of funding and personnel provided.

14. p. 49, Section 2.8.5.

Operating costs do not reflect the costs of conducting adequate inventories of forest stand composition and volumes upon which to base initial management plans. This inventory would cost an estimated $50-60,000 without photography.

15. p. 49-50 Section 2.8.6. Road Construction Costs

Maintenance cost estimates, on p. 50 are vague, and appear to be contradictory.

16. p. 50-51 Section 2.8.8. Income Generating Activities

The estimated annual timber cut which appears to reflect normally anticipated volumes contradicts statements included in Section 2.2.4. (Timber Mgt. Feasibility p. 19) and Section 2.7.8. p. 16 & Section 3.02 p. 24; of the DSEIS, March 1980.

17. A number of statements in the DSEIS and Plan appear to be contradictory and confusing concerning the impact upon timber yields that would result from the Mitigation Plan. For example, sections 4.4.3 and 5.0 of the DSEIS and section 2.8.8. of the Plan. While such impacts are stated to be negative, no data is provided to support such statements; in fact, information provided within the DSEIS and Plan suggest that the impact upon timber yields will be positive.

18. p. 52 Section 2.9.1. Mitigation Objectives & Recommended Measures.

The first sentence states, "The proposed plan does not represent 100% mitigation of the environmental impacts of the Dickey/Lincoln Project." Yet in the Executive Summary (Attachment 1) the clear inference is that it would by stating, "It would replace 100% of the wildlife habitat productivity lost due to the project implementation."

19. p. 65 Mitigation of Lost Habitat Productivity

In the second full paragraph, the Corps takes exception to the USF&WS assumption that habitat productivity will increase without the project, because of anticipated impact of the spruce budworm. However, p. 69 states, "The Corps methodology assumes immediate implementation of the mitigation plan and an increase in habitat value, which achieves 100 percent of the management potential by year 50." This assumption does not consider that same impact caused by the spruce budworm and market conditions resulting from both budworm salvage and impoundment clearing that are cited to refute the USF&WS assumptions.

20. Section 4.06 of the DSEIS states that it is not expected that use of recreational resources in the Allagash Area will be altered by the Mitigation Plan. We do not agree with this statement as it seems inconceivable that recreational use, particularly hunting and fishing, will not increase.

State of Maine
Governor Joseph E. Brennan

General Comments

1. We agree and appreciate the Governor's support on this recommended plan.

2. We have made as thorough an evaluation as possible of the financial impacts imposed upon the land owners whose lands would be acquired. These are brought forth in the EIS and in Appendix C Supplement No. 2. Compansation for land acquisition will be governed by several possible avenues. If the landowner is a willing seller, the price will be negotiated and agreed to by both parties. Should the landowner choose not to be a willing seller, the price paid for the land will be governed by condemnation proceedings.

Public Law 91-646, Uniform Relocation Assistance Act of 1970, provides for uniform and equitable treatment of persons displaced for their homes, businesses, or farms by Federal and Federally Assisted Programs. It also establishes uniform and equitable land acquisition policies for these projects. Included among the items under PL 91-646 are the following:

a. Moving Expenses

b. Replacement Housing (Homeowners)

c. Replacement Housing (Tenants)

d. Relocation Advisory Services

e. Recording Fees

f. Transfer Taxes

g. Mortgage Prepayment Costs

h. Real Estate Tax Refunds (Pro-rata)

i. Last Resort Housing

Within a reasonable time prior to displacement, the Division Engineer must certify that there will be available, in areas generally not less desirable and at rents and prices within the financial means of the families and individuals displaced, decent, safe, and sanitary dwellings, equal in number to the number of, and available to, such displaced persons who require such dwellings and reasonably accessible to their places of employment.

3. It is difficult to develop a rationale from the evidence available which indicates that substantial fisheries mitigation should be provided.

Sportsmen from all areas surrounding the project area have not in the past nor in the present utilized the existing resource anywhere near its potential. In 1975, 4400 mandays use for fishing was listed. This level of usage and all projections used were coordinated with the State of Maine and the Heritage Conservation and Recreation Service and were considered reasonable and as accurate as possible. These values were used in our analysis in the development of a fisheries management program for mitigation of losses caused by the project. These values would indicate that the cost of fisheries mitigation beyond that which is proposed at this time would not be a prudent Federal investment. The use of these values among other parameters such as mercury, available nutrients and proposed project recreational development were offered for review to the Department of Inland Fisheries and Wildlife and they offered no comments on our earlier Fisheries proposals.

On 7 December 1977, the State of Maine submitted its comments on the DEIS. These comments included those made by the Department of Inland Fisheries and Wildlife. In these comments they state:

> "It is not possible to mitigate the loss of a stream fishery; miles of stream cannot be reproduced; remaining stream fisheries may be managed to increase productivity of fish, or a lake fishery may be substituted, but the miles of streams lost in an impoundment are irreplaceable. This thinking should be reflected in the DEIS."

They continue by stating:

> "As with stream fisheries, loss of white water canoeing cannot be mitigated . . ." and "Although canoeing the DEIS speaks of a new fish hatchery to support a salmon or lake trout fishery, no determination has been made as to the costs of such a hatcher; there is also some question as to whether or not an economically acceptable hatchery site exists in Aroostook County, or anywhere in the State. Hatcheries have specific site requirements and are expensive to build, operate and maintain. One of the species suggested for management in the impoundment is lake trout. To provide for a desirable harvest of lake trout, the entire flowage must be cleared of all tree growth . . ."

In its comments of 19 December 1977 and 6 March 1979 the Department of the Interior expressed concern over the introduction of salmonid species which would accumulate high levels of mercury.

The preceeding comments and the advise of our consultants have provided the basis for our current proposal. However, recognizing that in the future,

demands for recreation and fishing could change or that project purposes can be upgraded, we have included in the fisheries management plan the opportunity to review the operation of the project when found advisable due to the significantly changed physical or economic conditions and to report to the Congress recommendations on the advisability of modifying the structures or their operation for improving the quality of the environment. This review is authorized by Section 216 of the Flood Control Act of 1970 (Title II of Public Law 91-611).

4. In response to your comment, Section 2.6 of Attachment I has been modified to clarify the review and approval authority of the Maine Land Use Regulation Commission over activities on the mitigation lands.

5. The paragraph in questions is Section 2.6 entitled Mitigation Management Responsibility. This paragraph has been modified to indicate that the objectives and measures will be the basis upon which a lease is drawn up. The purpose for this is to ensure the Federal Government that the funds it expends in mitigation are being reasonably spent for that purpose. See also USDOI Specific Comment #53.

Specific Comments

1. Page 14, Attach. I. See response to USDOI Specific Comment #44.

2. Page 15, Attach. I. See response to USDOI General Comment #3, and Specific Comments #11 and #46. The mitigation plan and impact statement reflect the timber consultant's estimate of the severity of the budworm problem as it relates to deer yards. However, deer yards comprise less than 12% of the total mitigation management area.

3. Page 17, Attach. I. See response to USDOI General Comment #2.

4. Page 17, Attach. I. The paragraph in question has been modified to reflect this concern.

5. Page 19, Attach. I. See response to USDOI Specific Comment #48.

6. Page 20, Attach. I. See resposne to USDOI Specific Comment #49.

7. Page 21, Attach. I. The potential impact of budworm damage on species-specific mitigation for deer is described on page 20, paragraph 3. It is not expressed in the paragraph in question because this paragraph discusses the impact of budworm damage on mitigation planning in general. Deer wintering habitat comprises less than 12% of the total mitigation management area.

8. Page 38, Section 2.4, Attach. I. See response to USDOI General Comment #4.

9. Page 44, Para. 3, Attach. I. The paragraph in question has been modified to eliminate this implication.

10. Page 44, Para. 2, 3rd sentence. This statement has been modified in accordance with your comment to provide greater detail.

11. Page 45, Para. 2, 4th sentence. This statement has been modified to specify the policies and regulations referred to. Note that detailed references to LURC regulations and to AWW policies are provided on pages 44-45.

12. Page 48, Section 2.8.3, Attach. I. See response to USDOI Specific Comment #54.

13. Page 48, Section 2.8.4, Attach. I. See response to USDOI Specific Comment #55.

14. Page 49, Section 2.8.5, Attach. I. See response to USDOI Specific Comment #56.

15. Pages 49-50, Section 2.8.6, Attach. I. The road maintenance cost estimates presented here were derived from an estimated cost per thousand board feet. The cost estimate was converted to a per cord basis by the Corps' wildlife consultant. The consultant's figure then had to be adjusted to reflect maintenance costs on 200 rather than 270 new gravel roads. Because these estimates are now believed to be low, additional capital equipment and road management personnel have been added to the mitigation plan to provide for an adequate road construction and maintenance program.

16. Pages 50-51, Section 2.8.8, Attach. I. We do not see any contradiction in these statements. The timber yield from the mitigation lands is anticipated to remain at .31 cords/acre/year - the annual Aroostook County average. As these lands are generally considered above average in productivity, this estimated yield is appropriate. Further, as it is stated in Section 3.02, page 24 of the SDEIS, the merchantible yield is likely to shift from predominately sawtimber to predominately pulp wood. The stumpage values calculated in Section 2.8.8, utilize this pulp wood value, rather than the higher value to be derived from the sale of sawtimber.

Finally, as spruce budworm and forest economic factors lend some uncertainty to estimates of stumpage revenue to be derived from mitigation management, the final mitigation plan recommends that all mitigation costs be assumed by the Federal Government. Any revenue returned from stumpage sales will be turned over to the U.S. Treasury.

17. Section 2.8.8, Attach. I, Section 4.04.3 and 5.0, SDEIS. The statements to which you refer are not contradictory. In reviewing the SDEIS, it is important to differentiate between environmental impacts on forest productivity (Section 4.04.3, Forestry) and Socio-economic impacts on the commercial forestry sector (Section 4.05, Socio-economic Impacts). Impacts of the mitigation plan on forest productivity are expected, overall, to be positive. Conclusion to that effect are well documented in

Section 4.04.3. Impacts on the commercial forestry sector, however, will be negative. Again, conclusions to that effect are well documented in both Section 4.05 and Section 10 of Attachment III.

18. Page 52, Section 2.9.1, Attach. I. These statements are not contradictory. See response to USDOI General Comment #1.

19. Page 65, Attach. I. See response to USDOI General Comment #3 and Specific Comment #11.

20. Section 4.06, SDEIS. Paragraph one of this section has been changed to clarify its intended meaning.

DEPARTMENT OF
INLAND FISHERIES AND WILDLIFE
284 STATE STREET
AUGUSTA, MAINE 04333

GLENN H. MANUEL
Commissioner

J. WILLIAM PEPPARD
Deputy Commissioner

April 24, 1980

Colonel Max B. Scheider
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Scheider:

We have reviewed your draft supplement Environmental Impact Statement and associated attachments, as well as Appendix K. Fish and Wildlife Mitigation Plan for the Dickey-Lincoln School Lakes Project, Maine dated February and March, 1980, and would like to offer the following comments:

1. Wildlife - Mitigation Proposal - Corps Plan A

The HEP Team projected the annualized future Habitat Unit Value (HUV) of the project area to be 4,325,430 habitat units. The Corps (Fish and Wildlife Mitigation Report, February, 1980, Page 38) has elected to reduce the 4,325,430 H.U. figure to 3,222,085 H.U. on the basis that according to the Kimball Report, App. C. Supp. 1980, the spruce budworm damage to spruce-fir forest has approached 75% of the current year's foliage in the project area and forest management practices in the project area can no longer to tied to long range management plans, but will be dictated by the budworm damage. The Corps' Fish and Wildlife Mitigation Report, Page 38, goes on to state, "Considering the budworm infestation and current forestry practices, it is clear the project lands will not be managed to benefit wildlife in the future. The timber companies, or their agents, will have to increase the size of clear cuts for economical purposes and utilize more, if not all, of the tree harvest for timber products. This will reduce habitat values in the area due to the creation of large even-aged tracts of land. Whole tree utilization and mechanized techniques will reduce availability of browse and cover, as well as adversely impact overall forest productivity. For this reason, the projected future habitat value will remain identical to the existing conditions or even decline. As there would be no net increase in the habitat in the impoundment area over the project's life, the annualization of future conditions results in no change in existing habitat values. These assumptions were used for Plan A."

It is our position that if the budworm is instrumental in negating long term forest management plans in the project area, it will also have the same affect upon the proposed mitigation lands in the Allagash. If this proves to be the case, it is doubtful if a management Habitat Unit Value of 74.6 can be obtained in the spruce-fir habitat on the mitigated lands. Also, it certainly will be impossible to reach the maximum management potential value on the mitigated lands in 50 years, as stated in the Corps Plan A.

Our position is reinforced by Environmental Impact Statement, Dickey-Lincoln School Lakes, Appendix C, Social & Economic Assessment (Supplement 2), 1980, Page 44, Section 1.3.7 Opportunity Cost Resulting from Budworm Damage: "In addition to the forest resource which may be lost, another major component which may be drastically changed is the wildlife habitat potential of the forestland." Page 46, Section 2.2 Acquisition of the Mitigation Lands, which addresses the need for immediate acquisition procedures and states in part, "Their refusal may result in lengthy court condemnation proceedings and delay implementation of the plan. In addition, it may be necessary to impose regulatory constraints on the landowners to prevent overcutting and destruction of the forest land before it is acquired for mitigation. Any severe overcutting may reduce the habitat potential for portions of the land and thereby render elements of the plan ineffective." Page 46, Section 2.3.1 Economic Operability of Initial Plan Implementation, states, "The plan presently calls for management measures to begin concurrently with project construction. Included in these measures is the initiation of timber marketing in designated areas. Successful implementation of this phase of the plan from an economic viewpoint however is questionable." Page 47 and 48, Section 2.3.2 Effects of Present Harvesting on Plan Implementation, states in part, "Of the total acreage within the mitigation area, approximately 44,000 acres have been designated as mature spruce-fir. This timber type furnishes the greatest wildlife management potential. However, harvesting practices are continually reducing this component. As a result, the overall wildlife management potential may be declining. To compnesate for this loss, additional land acquisition may be necessary to achieve the desired wildlife mitigation. The possibility of additional land acquisition should be carefully reviewed and presented in the finalized mitigation plan."

We would also like to point out that Corps Plan A proposes to manage the spruce fir bottom lands of the Allagash Wilderness Waterway (approximately 32,700 acres between the 500 ft. zone and the one mile zone), as well as all traditional deer wintering areas on the mitigation lands to an SW2A/3A classification in anticipation of obtaining a management unit potential of 81. The HEP Team felt that a SW2B/3B classification was superior. In addition, we question whether or not a management potential of 81 will be obtained by managing to a SW2A/3A classification.

We would also like to point out that the Executive Summary (Fish and Wildlife Mitigation Report, Attachment 1) states that, "The terrestrial

mitigation plan proposes to manage habitat types in such a manner as to effectively increase their carrying capacity for wildlife. It would replace 100 percent of the wildlife habitat productivity lost due to project implementation." This appears to be contradictory to the following statement made on Page 9 of the above mentioned report, "Forest habitat management of 14,540 acres of deer wintering habitat is expected to double the overwintering deer carrying capacity in these areas, replacing approximately 42-53 percent of the loss in this resource." In our opinion the Dickey-Lincoln School Lakes, Appendix C, Social & Economic Assessment (Supplement 2) report casts considerable doubt as to whether or not the Corps' proposed plan will provide mitigation of 42-53% for deer wintering areas as so stated. This assumption is based on the following quote made in the Report on Page 49 and 50, Section 2.3.3, Effects of Spruce Budworm on Plan Implementation, which states, "The adverse effects of budworm are, however, quite pronounced. Currently there are approximately 14,540 acres of deer wintering yards within the proposed mitigation area. As a result of the present infestation a reduction of yards will likely occur. Without preventative cuttings the loss may reach 7,000-11,000 acres (6). These losses may also be somewhat reduced on those yards which have a significant component of white cedar and/or black spruce (13). The exact volumes of cedar and spruce present is unavailable and studies to determine an accurate estimate of possible deer wintering yard losses is recommended. Along with the loss of wintering yards, heavy infestation and defoliation and mortality will affect the spruce-fir bottomlands which have been zoned in the mitigation plan for deep woods species. As a result, management measures to maintain and enhance the habitat potential for such species as spruce grouse, marten, lynx and black bear may be reduced. The loss of the habitat units may drastically reduce the potential for successful implementation of the mitigation plan. It is therefore quite essential that the finalized mitigation plan discuss and carefully consider the potential impact of spruce budworm infestation and spruce-fir mortality on plan implementation."

While it is true that the number of acres recommended for Wildlife Mitigation has been increased from 100,000 (managed at the 100% level) to 112,000 acres plus the 13,400 acres of islands scattered throughout the proposed impoundment, the Department of Inland Fisheries and Wildlife continues to maintain the position that the Corps' Plan will not completely mitigate the loss of the wildlife resource.

We base our opinion on the material discussed above, the page by page comments of Attachment 1 (attached), and our concern for the incomplete mitigation for the loss of deer wintering areas in the Dickey-Lincoln area as stated in our correspondence to you of August 29, 1979.

2. Fisheries - Mitigation Proposal

As in the previous draft Mitigation Proposal, the Corps' fisheries

Mitigation Plan proposes, "to manage to its maximum native potential the existing brook trout fishery within the reservoir as well as the brooks and streams leading into the reservoir." The objective is to manage the reservoir brook trout fishery to replace the estimated trout biomass loss (18,434 lbs.) in stream, river, and lake areas to be inundated, without use of hatchery stock. The goal is to replace or reduce impacts due to project implementation, rather than produce the best possible fishery.

The proposed fisheries mitigation measures leave Maine's sportsmen with no substantial compensation for the loss of one of the State's highest quality fisheries. Substantial fisheries mitigation in some form should be provided.

Sincerely,

Glenn H. Manuel
Commissioner

GHM:cs

Enclosures

DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
SPECIFIC COMMENTS
DICKEY-LINCOLN WILDLIFE MITIGATION

Attachment I

P. 14 - (b) removal of 40-60% of merchantable volume is excessive and blow down of residual stands is likely to occur.

(d) infer diameter limit control of harvest which is not silviculturally sound and would not meet objectives of the plan.

P. 15 - Spruce Budworm Infestation -

States that cuttings to reduce budworm hazard would further mitigate objectives. Unfortunately, the size and location of such cuts will not be controlled by the resource mgrs; hence, it is unlikely that such cuts will fall within the objective of the plan (i.e., small group selection or patch cuts less than 4 acres). See also p. 19 - Spruce Budworm Infestation, Also P. 20 - 3rd paragraph.

P. 17 - Forest Practices -

(a) SW2A/3A classification proposed - HEP Team felt B classification superior and either will be difficult to obtain in light of budworm epidemic. SW2A/3A classification would not meet management potential of 81.

P. 19 - Timber Management Feasibility -

This section infers that group selection and patch cutting is not a current practice of the timber industry. Current cutting practices of Seven Islands Land Co., Boise Cascade, International Paper Co., and others closely parallel the planned management of timber lands as outlined in Section 2.2.2. of Attachment 1 - (Mitigation Plan).

P. 19 - Spruce Budworm Infestation -

Statement contradicts statement on p. 15.

P. 20 - States that severely damaged areas could support a shelterwood or a seed tree stand after budworm salvage. Severely damaged areas could not support a shelterwood stand and a seed tree system is not practical for spruce-fir. (Frank & Bjorkbom, 1973).

P. 21 - Second paragraph - again a statement that conflicts with MUPV established under HEP.

P. 38 - Section 2.4 -

Suggests that the islands in the Dickey Reservoir which comprises 13,400 acres would be managed as set forth in the mitigation plan. Such a proposal is impractical because of the location of these islands in relation to the mitigation lands. Access to these islands and their potential to contribute significantly to the mitigation of lost habitat unit values is questionable.

Sec. 2.6 Mitigation Mgt. Responsibility

States that the mitigation plans would become the terms of the lease for the managing authority (probably IF&W). It is unlikely, in our opinion, that the measures and objectives as set forth in the mitigation plan will be obtainable for the reasons as stated herewith. The terms of any lease should reflect the concerns.

Sec. 2.8.3 Capital Equipment

This item is underfunded for the needs and objectives of the mitigation plan. Certainly 2 vehicles for a staff of 21 people is insufficient. Similarly 2 snowmobiles is completely inadequate for efficient access to areas being prepared for future timber management activities. The heavy equipment listed is also inadequate for road maintenance.

Sec. 2.8.4 Monitoring studies (last 2 paragraphs) outlined would be impossible to conduct with monies and personnel as proposed.

Sec. 2.8.5 Operating costs do not reflect an adequate inventory of forest stand composition and volumes upon which to base initial management plans. This inventory would cost an estimated $50-60,000 without photography.

Sec. 2.8.6. Road Construction Costs -

p. 50 maintenance cost estimates are vague and confusing and appear to be contradictory.

Sec. 2.8.8 Income Generating Activities

The estimated annual timber cut which appears to reflect normal anticipated volumes contradicts statements included in Section 2.2.4 (Timber Mgt. Feasibility p. 19) and Section 2.07.8 p.16 & Section 3.02 p.24; of Profit Supplement Environmental Impact Statement, March 1980.

Sec. 2.9.1 (p.52) Mitigation Objectives & Recommended Measures.

The first sentence states, "The proposed plan does not represent 100% mitigation of the environmental impacts of the Dickey-Lincoln Project." Yet in the Executive Summary (Attachment1), they infer that it would and state the following, "It would replace 100% of the wildlife habitat productivity lost due to the project implementation." This is obviously an oversight and should be corrected to avoid erroneous conclusions by those who do not review these proposals in sufficient depth to uncover the numerous contradictions and inconsistancies of the mitigation proposal.

p. 56-57 Determination of Habitat Unit Losses

This needs to be discussed with Bureau of Forestry personnel for validity of assumptions presented.

Sec. 2.9.2 (p. 57)

The plan suggests that mgt. of mitigation lands will start at year 0. Such a proposal is unrealistic in terms of market conditions that are likely to exist at that time. Removal of timber from the impoundment area, plus salvage of budworm infected balsam fir stands is expected to create a wood surplus at that time, and quite likely engage all available wood operators for the next 5 - 10 years.

Sec. 2.9.2 (p. 58) Top of page

Items 2, 3, 4 suggest rapid attainment of habitat unit values through the mitigation plan. Such predictions are unrealistic as management will be dictated by budworm infestations and not by the mitigation plan. Such predictions are also in direct conflict with the predictions stated on page 57, first paragraph.

Sec. 2.9.3 Mitigation of White-Tailed Deer Losses

p. 61 - The plan states that, "The carrying capacity is likely to rebound from any overbrowsing..." Overbrowsing infers death of the browse species in question and recovery from such a condition is unlikely. In the second paragraph they state, "The mitigation lands proposed for acquisition include approximately 14,540 acres of existing deer wintering habitat, mitigating for approximately 42 to 53 percent of the average annual deer loss." This statement is in direct conflict with the statement in the second paragraph of the Executive Summary which states that the mitigation plan would replace 100 percent of the wildlife habitat productivity lost due to project implementation.

p. 65 In the second full paragraph, the Corps takes exception to the USF&WS assumption that habitat productivity will increase without the project based on the anticipated impact of the spruce budworm. However, in the next paragraph they state, "The Corps methodology (assumption) assumes immediate implementation of the mitigation plan and an increase in habitat value, which achieves 100 percent of the management potential by year 50." Such an assumption ignores the same impact caused by the spruce budworm and also ignores market conditions resulting from both budworm salvage and clearing of the impoundment.

Sec. 2.10.4 Mitigation Plan for Deer Wintering Habitat. (p. 75)

This plan is totally unacceptable to the Department of Inland Fisheries & Wildlife. This does not conform to the intent of the Fish & Wildlife Coordination Act.

State of Maine
Department of Inland Fisheries and Wildlife

General Comments

1. General Comment, Paragraphs 1 and 2. See response to USDOI General Comment #3, and Specific Comments #11 and #46. Also see response to State of Maine Governor's Office Specific Comment #3.

The Corps does not accept the wildlife habitat projections of its independent forestry economics consultant which are referenced in your comment. For reasons put forth in the comments referred to above, the Corps does not believe that the overall wildlife habitat potential of the mitigation lands will be seriously jeopardized by budworm damage.

In terms of plan implementation at year 0, it is the Corps' position that land can be acquired and management begun with resources provided in the mitigation plan, irrespective of short-term market conditions induced by project construction. Further, the potential for court action and over-cutting of of forest land by landowners has been recognized throughout the mitigation planning process, with the intent that the effects of such actions would be minimized. However, to anticipate such actions an include them as factors in the assessment of mitigation acreage requirements is not appropriate.

2. General Comment, Para. 3. See response to USDOI General Comment #2.

3. General Comment, Para. 4. See response to USDOI General Comment #1.

4. General Comment, Para. 4. Based on information presented in Appendix C Supplement No. 2, 1980 (Section 10 of Attachment III), the plan acknowledges that mitigation efforts for deer wintering habitat will be limited in their effectiveness by the spruce budworm infestation. As a result, mitigation measures may not be result in 42-53% replacement of carrying capacity. The Corps does not believe, however, that additional deer wintering habitat should be acquired and managed in small dispersed units in order to better satisfy this species-specific mitigation objectives.

5. General Comment, Para. 5. The mitigation plan itself recognizes that complete mitigation for wildlife resource losses due to the project is not attainable. We do believe, however, that it is incumbent upon the MDIFW under the Fish and Wildlife Coordination Act to express the level and extent of mitigation which is satisfactory to the State of Maine as mitigation for loss of its wildlife resources.

6. General Comment, Paragraphs 7 and 8. The goal of mitigation is to reduce or eliminate impacts within the realm of reasonability. Recreational use analysis predicts that there would be minimal use (4600 user days) of the area by year 2030. These projections indicate that it would not be a prudent Federal investment to develop a lake type fishery

for the area. There are several lake fisheries in the market area which are underutilized. See also response to the State of Maine's Governor's Office General Comment "C".

Specific Comments

1. Page 14, Attach. I. See response to USDOI Specific Comment #44.

2. Page 15, Attach. I. See response to USDOI Specific Comment #46. See also response to USDOI General Comment #3.

3. Page 17, Attach. I. See response to USDOI General Comment #2.

4. Page 19, Attach. I. See response to USDOI Specific Comment #48.

5. Page 19, Attach. I. We do not see any contradiction between these statements.

6. Page 20, Attach. I. See response to USDOI Specific Comment #49.

7. Page 21, Attach. I. We disagree.

8. Page 38, Section 2.4, Attach. I. See response to USDOI General Comment #4 and Specific Comment #2.

9. Section 2.6, Attach. I. See response to USDOI Specific Comment #53.

10. Section 2.8.3, Attach. I. See response to USDOI Specific Comment #54.

11. Section 2.8.4, Attach. I. See response to USDOI Specific Comment #55.

12. Section 2.8.5, Attach. I. See response to USDOI Specific Comment $56.

13. Section 2.8.6, Attach. I. See response to State of Maine Governor's Office Specific Comment #15.

14. Section 2.8.8, Attach. I. See response to State of Maine Governor's Office Specific Comment #16.

15. Section 2.9.1, Page 52, Attach. I. These statements are not contradictory. See response USDOI General Comment #1.

16. Pages 56-57, Attach. I. See response to USDOI General Comment #3. The USFWS has recommended a review of forest management practices by a panel of independent foresters, including the Bureau of Forestry.

17. Section 2.9.2, Page 57, Attach. I. See response to General Comment #1, above.

18. Section 2.9.2, Page 58, Attach. I. See response to USDOI General Comment #3 and Specific Comments #11 and #59.

19. Section 2.9.3, Page 61, Attach. I. The statement in question has been quoted out of context. The plan actually states that carrying capacity will rebound from any overbrowsing ". . . to the degree that the impacts of overbrowsing can be moderated or prevented on the remaining winter areas managed for overwintering deer." Overbrowsing refers to any overutilization of individual plants which results in reduced net growth, vigor, or in death. Recommended techniques for reducing overbrowsing are included in the mitigation plan. Also see response to Specific Comment #15 above and General Comment #1.

20. Section 2..9.3, Page 65, Attach. I. See response to USDOI General Comment #3 and Specific Comment #11.

21. Section 2.10.4, Page 75, Attach. I. We concur.

Wildlife Management Institute

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DANIEL A. POOLE
President
L. R. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
JACK S. PARKER
Board Chairman

April 24, 1980

Colonel Max B. Scheider
Division Engineer
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Attn: NE DPL-IP

Dear Colonel Scheider:

The Wildlife Management Institute has reviewed the Draft Supplement Environmental Impact Statement, Dickey-Lincoln School Lakes, Maine, New Hampshire and Vermont, USA and Quebec, Canada. The following comments have been coordinated with our Northeast Representative, Gordon C. Robertson.

In general we are pleased to see the Corps, the Maine Department of Inland Fisheries and Wildlife, and the U.S. Fish and Wildlife Service utilize a common procedure based on habitat analysis to attempt to arrive at an equitable mitigation plan for wildlife. However, we are disappointed to learn that the Corps has rejected the completed Habitat Evaluation Procedures (HEP) conclusion and recommendations because mitigation acreage exceeded the Corps' parameters for actual mitigation action. More importantly the Corps has ignored the obvious, i.e., a project that potentially requires three-fold mitigation acreage is not in the best interest of environmental quality. Therefore, we oppose the construction of the Dickey-Lincoln project as now proposed.

In reference to the Corps selected mitigation alternative, we offer the following comments:

1. In addition to the proposed 112,370 acre mitigation lands, the project terrestrial lands total 13,400 acres. Page 3 volume 1 (1.04.1.2) states these project lands will also be subject to management, but the report does not reveal what the objectives and means of management for this area are. It would seem that these project lands also should be included in the mitigation offering and specific management plans revealed. This would seem especially relevant since 44 percent of the traditional deer wintering areas for this region will be inundated by the project impoundment.

2. The outlined forest management approach is both ambitious and intensive. Our concern is that the level of intensity is too high for practicality. This approach may well lead to one or more of the following: a) Small area and low number stem per acre harvests, especially in small diameter class timber provide low incentive for forest industries. A large portion of the harvests in the mitigation area will be victim of those criteria. Therefore, it may be difficult to carry out the proposed management plan; b) The mitigation area will not be financially self-sufficient, primarily for the reason cited above. Monies obtained through visitor-use fees are token at best, especially when the costs of collecting visitor fees are taken into account; c) The frequent harvests will lead to soil compaction which may in turn adversely affect soil structure, vegetative reproduction, and stream water quality. The above disqualities will generally lower the quality of habitat for fish and wildlife as well as affecting growth of the forest stands being managed; d) A decrease in the "deep woods" species such as black bear is probable because of a higher disturbance level; and e) Inadequate staffing for the mitigation area. To adequately manage 100,000+ acres at the level presented, a larger "on ground" technical staff is needed.

3. There are a number of conflicts, contradictions, and inadequacies in the wildlife management plan. The assumption has been made that the mitigation lands will be managed to 100 percent of their potential. This is unrealistic and does not display sound management logic. The very complex systems involved with their dynamic numbers and types, both floral and faunal, make the management potential of 100 only a projected idealistic goal. A management potential of 70-80 is considered high under the best conditions.

Rather than commenting on each species management plan as outlined in the draft, we want to express our concern about the overly ambitious goals the Corps has set for forest, fishery, and wildlife management in the mitigation area. The plan has dealt with each species individually but not with the resources cohesively. The plan does not identify management units or compartments, it does not set management priorities for wildlife, and does not offer an acceptable fisheries plan.

In summary, we find the Corps-selected mitigation plan as unacceptable as the proposed Dickey-Lincoln hydro project.

Sincerely,

Daniel A. Poole
President

DAP:lbb

Responses to WMI

General Comments

1. General Comment, Page 1, Para. 1. It is incorrect and misleading to suggest that the Corps has rejected the FWS Habitat Evaluation Procedure (HEP) results because the resulting acreage requirements exceed Corps criteria for actual terrestrial mitigation. First, the Corps rejects only the USFWS' recommended mitigation acreage requirement, which is based upon that agency's use of its HEP. HEP was used as a tool for developing the Corps' proposed land acquisition, as well. The USFWS and the Corps worked closely to gather data for the HEP analysis, and to develop the conceptual approach to mitigation management. The difference between the two agencys' proposals for land acquisition lies in their respective land-use projections for the future without the project, and future with the project and mitigation. (These differences in projections over the 100 year project life are explained in Appendix K, p. 69). The use of alternative land use projections which have at least as much validity as those used in the USFWS HEp analysis does not, in our opinion, constitute a rejection of HEP. We feel this statement detracts from the high level of coordination and cooperation demonstrated by the Corps and the USFWS in the development of the terrestrial mitigation plan.

Secondly, the Corps' parameters for actual mitigation actions' are based upon the Fish and Wildlife Coordination Act, (16 U.S.C. 661-666c; pl 85-624) which charges the Corps to develop a plan which includes ". . . such justifiable means and measures for wildlife purposes as the reporting agency finds should be adopted to obtain maximum overall project benefits . . ." HEP has been used by the Corps as a tool to identify lands of similar habitat type composition for management, and to determine the approximate acreage required to mitigate for lost habitat productivity. We do not believe that HEP is intended to provide the only form of analysis upon which ". . . justifiable means and measures for wildlife . . ." are base.

In short, the proposed mitigation plan has been developed utilizing HEP and our consultation with the USFWS throughout its planning stages. In the final analysis, the plan represents the level of land acquisition and management which the Corps feels is justifiable and in the public interest for wildlife mitigation in conjunction with the proposed Dickey-Lincoln Project.

2. General Comment, Page 1, Para. 1. There is no factual basis for the statement that the Corps has ignored the environmental implications of a project the size of Dickey-Lincoln which undoubtedly requires three-fold mitigation acreage according to the USFWS Conservation and Development Report (C&D Report). The Revised Draft Environmental Impact Statement on the Dickey-Lincoln project was issued in December 1978, pending the development of a proposed mitigation plan. The C&D Report (Supplement No. 3), which recommended the acquisition and management of 300,000 acres for

mitigation was not issued until November 1979. Proposed mitigation plan, as well as the USFWS C&D Report, will be included in the Final Environmental Impact Statement on the Dickey-Lincoln Project. It is at that time that a decision on the project will be made, taking into account the substantial requirements for mitigation.

Specific Comments

1. Page 3, Section 1.04.12, SDEIS. The 13,400 acres of project lands are to be managed under the mitigation plan to increase overall habitat productivity. These lands are similar in habitat type composition to the lands to be acquired in the mitigation area, and do not include deer wintering habitat, the plan proposed that they be managed according to the basic management scheme described in Section 2.2.2 of Appendix K. Species management plans would be implemented on these lands, as on lands in the mitigation area, according to Section 2.3 of Appendix K. Note, that implementation of this management approach on these project lands was taken into account in determining road access and manpower requirements for management (Appendix K, Section 2.7, 2.8.6).

2(a). The conceptual basis for the mitigation plan is to conduct forest management practices for the benefit of wildlife, not necessarily to provide harvesting incentives to commercial foresters. It is recognized that the guidelines put forth for wildlife-oriented timber management may limit the operational feasibility of the management plan. It is for this reason that the mitigation plan includes costs for road construction, maintenance, and associated labor, and assumes (for planning purposes) a 25 percent increaes in the cost of timber harvesting on the mitigation lands. (Timber management feasibility is discussed in further detail in Attachment I, Section 2.2.4 and in Appendix C, Supplement No. 2 to the EIS). It should be noted that, although some net stumpage income may be derived from the mitigation lands, the mitigation plan assumes that all management costs will be at Federal expense.

2(b). The mitigation area is not intended to be financially self-sufficient, just as most Federal and State wildlife management and refuge areas are not financially self-sufficient. Both first costs and operation and maintenance costs of mitigation will be financed at Federal expense (See Fish and Wildlife Mitigation Report, p. 55 and Attachment I, Section 2.8). The plan does presume, however, that with the road access and timber harvesting subsidies discussed above, incentives to harvest will be sufficient on balance to implement the proposed timber harvesting schedule without additional management costs.

2(c). Intensive forest management practices will have some adverse impacts on soil structure, vegetative reproduction, and stream water quality, though many of these impacts will be greatly reduced through compliance with guidelines for proper road location, construction, and maintenance, and through prescribed skidding and felling practices (Attachment III, Section 4.00). At the same time, the proposed selection cutting practices out overmature and diseased wood, maintaining vigorous trees, and

encouraging shrub and herbaceous growth. By providing a diversity of age classes in forest stands, and by increasing the interspersion of habitat types, the quality of habitat for most species of wildlife will be enhanced. Finally, selective cutting practices and logging road construction as prescribed in the plan are not expected to result in appreciable or long-lasting adverse impacts on salmonid fisheries in the mitigation area.

2(d). As noted in Attachment I to the Report, forest habitat management practices to increase overall wildlife habitat productivity will necessarily reduce the uniformity and continuity of large expanses of mature spruce-fir and hardwood forest, and will require expansion of the existing logging road system. As a result, some decrease in populations of certain "deep woods" species is probably unavoidable. However, within the context of a generally intensive management plan intended to replace lost habitat productivity, several measures would be implemented to sustain these populations.

The 32,000 acres of mitigation lands located within the Allagash Wilderness Waterway, and 14,500 acres of traditional deer wintering acres would be managed to maintain contiguous dense spruce-fir shelter areas while sustaining a moderate level of habitat productivity and food availability for "deep woods" indicator species: black bear, overwintering deer, marten, and lynx. These lands would be managed without increasing the major access road system. Increased human interference on secondary access roads would be minimized on all mitigation lands by proper road placement, construction, and reseeding practices, as well as by vehicular access restrictions (Attachment I, Sections 2.2.2 and 2.2.3). In addition, population status and habitat tolerance studies on these indicator species have been initiated and would be continued under the mitigation plan. Study results identifying locations of high biological importance to these species, and specific habitat requirements and tolerances, would be applied to road construction, timber harvest planning, and species management practices on the mitigation lands. Finally, species management practices such as the identification and protection of nesting and denning sites and the maintenance of cover should also contribute to the maintenance of population levels of these species.

2(e). Section 2.8, Attach. I. Based on comments from several sources, manpower resources for mitigation have been increase by five man-years, increasing the staff to between 16 and 26 full-time members; depending upon seasonal manpower requirements (Attachment I, Section 2.8). Increases in manpower are primarily intended to improve the adequacy of the road construction and maintenance program and the wetlands habitat management plan. We feel this level of staffing is adequate to implement the mitigation plan over the 125,770 acre area.

2(f). Recognizing the concerns expressed in your comments for potential adverse impacts of the proposed forest management approach, it should be pointed out that such impacts would be compounded approximately three-fold if implemented over the 300,000 acre area proposed in the U.S. Fish and Wildlife C&D Report.

3. Our staff has found this comment very difficult to interpret precisely, and to respond. Both the USFWS and Corps mitigation recommendations are based on the assumption that management potentials determined by the interagency HEP team for each cover type can be achieved. (The management potential is, in fact, based on the conceptual management plan presented.) The management potentials used in both analyses are identical, and generally range from 63.0 to 88.0, depending on the vegetative cover type.

The mitigation plan does not assuem that management potentials of 100 will be reached. It does, however, assume -- as determined by the HEP team -- that 100% of the management potential determined for each habitat type will be achieved.

4. General Comment, Para. 3, Page 2. The mitigation plan has, in our opinion, dealt with forestry, fishery, and wildlife resources in a cohesive fashion. The forest habitat management approach was developed, in large part, by an interagency HEP team of wildlife biologists. The team agreed early on in the HEP process that the assessment of wildlife losses and the identification of wildlife mitigation measures should be based on important habitat types - rather than on a species-by-species basis. As a result, the objective of the basic management approach is to increase wildlife habitat productivity for most wildlife species by increasing overall habitat diversity. Management techniques prescribed in specific habitat types are intended to improve habitat productivity for the community of wildlife which typify that type. The wildlife management priorities put forth in the mitigation plan are clearly outlined in the Fish and Wildlife Mitigation Report and Attachment I as Mitigation Objectives. To spell out species management priorities would not address the objective of mitigation planning, which is to offset wildlife losses resulting from the project; except for deer wintering habitat, such losses have been quantified through HEP in terms of habitat units (habitat productivity).

NATURAL RESOURCES COUNCIL OF MAINE
335 Water Street Augusta, Maine 04330 207-622-3101

May 5, 1980

Colonel Max B. Scheider
Corps of Engineers
Division Engineer
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Scheider:

The following comments are provided by the Natural Resources Council of Maine, The National Wildlife Federation and the National Audubon Society in response to the draft supplemental environmental impact statement fish and wildlife mitigation report for the Dickey-Lincoln hydroelectric project.

We will avoid redundancy by assuming that the comments filed by the Natural Resources Council of Maine on November 28, 1979 will be considered part of our formal response to the EIS. Many of the issues raised by us at that time have not been modified in this March/February 1980 EIS. All words bracketed by quotation marks are taken from the documents written by the Corps as part of the EIS.

General Comments

1. We believe that Corps of Engineers has not fulfilled its responsibility "to plan for the conservation of wildlife resources by preventing loss and damage to such resources as well as providing for the development and improvement thereof..." in connection with water resources development in the Dickey-Lincoln project area. While we agree with the Corps' statement "Many of these losses cannot be avoided or mitigated," we cannot accept the low level of mitigation provided in the Corps' recommendations.

2. In particular, we agree with the statement that "The loss of stream and river habitat for native brook trout is deemed unmitigable," but we find this position unacceptable. While some of the fisheries alternatives do not provide for full mitigation, they provide greater compensation to the State of Maine for the losses incurred by building the project.

3. We are convinced that the mitigation plan will not succeed in increasing the habitat for deep woods, edge, marshland, and other wildlife species by intensive management on only 112,000 acres. The plan is riddled with inconsistent

statements about increasing wildlife habitat for various species on the same limited acres. Such intensive management will work to the disadvantage of the deep woods species in particular. We anticipate that the seasonal fluctuation in the level of the Dickey reservoir will greatly reduce the value of the "artificial wetlands" planned for that area.

4. We believe that the U.S. Fish and Wildlife Service method of calculating the required acres for mitigation is more sound than the Corps'. U.S.F. + W.S. is correct in assuming that the manipulation of habitat will take more time than projected by the Corps. We agree that the socioeconomic impacts of a 300,000 acre mitigation plan would be severe, but we believe that a serious attempt at mitigation would have to set aside such a land base. It will take at least that much land to compensate for the inundation of 88,000 acres.

5. We call attention to the finding that "the benefits to wildlife (of the U.S.F. + W.S. alternative) will be significant." We also agree that the 400-500% increase in the cost of such mitigation plans more accurately reflects the value of the present fish and wildlife habitat which would be lost by construction of the project. Other losses such as the value of land and timber are not even calculated in these costs.

6. We are seriously concerned about the delay in implementation of effective wildlife mitigation between the time the impoundment is created and the time the effects of habitat manipulation can be expected to take effect.

7. The way the Corps counts the value of timber harvest from the mitigation lands is inconsistent with its failure to assign value to the forgone timber growth opportunities within the impoundment area. The timber harvest in the mitigation lands is taken as a benefit which will offset the costs of mitigation programs, but no such loss of timber value is calculated for the 88,000 acres to be inundated by Lake Dickey.

8. The reduced yields of saw timber and pulpwood within the mitigation lands will hurt the local economy, as described in the mitigation report. However, the calculation of the present harvest as 34,840 cords per year is substantially below the potential .58 to .8 cords per acre timber harvest for bottom lands. Although timber harvesting in recent years has been light in the mitigation lands, that does not mean that the local economy will not be more adversely affected in years to come when that timber harvest would otherwise be heavier.

9. The Corps is totally inconsistent in its handling of the effects of spruce budworm on the terrestrial ecosystems in the impoundment area and the mitigation lands. It discounts the value of the timber volume loss caused by dam construction by 40%, but there is no equivalent loss of value in the mitigation lands. This not only inaccurately portrays the economic effects of the project, it seriously distorts the effectiveness of timber management for deep woods wildlife species. We greatly doubt that management will succeed in maintaining deep woods habitat as long as the spruce budworm infestation persists.

10. Finally, NRCM strenuously objects to the statement that "The environmental impacts of the plan constitute an overall improvement in fish and wildlife habitat conditions in the mitigation lands." There is no evidence of improvement of fisheries habitat or endangered species habitat.

Social and Economic Impacts

11. The reduced yield of saw timber and pulpwood from the mitigation lands will hurt the local economy as expressed in the impact statement. However, as mentioned previously, the effect has been underestimated by some 75-250%. (See comment No. 8)

12. The harvesting operations within the mitigation lands are admittedly "economically impractical". However, there is no provision for "financial inducement" - that is money to be provided to cover the losses in timber harvesting. The only financial calculation for timber harvesting is a 250,000 per year profit. This profit is not described elsewhere in the report, so it is assumed that the "financial inducements" will fall as a further burden to the taxpayer. There is no indication whether that taxpayer will be the Maine or U.S. taxpayer.

13. In the social and economic assessment, the lack of hardwood markets will "definitely affect the success ... of the plan." "A 100% government subsidy" may be necessary to support harvesting operations. This is inconsistent with the statements elsewhere in the report that a 25% reduction in the timber harvest will be necessary to cover the uneconomic nature of harvesting operations. A three to five cord per acre harvest is fundamentally so uneconomic that it will cause "a huge operating cost and deficit in the annual operating budget for the area." Nowhere have these costs been reflected in the annual operating expenses provided in the summary.

14. The Corps has admitted that further adjustments for true road maintenance costs are needed, but these have not been made. This lip service to problems raised in comments to the original draft wildlife mitigation plan is typical of the superficial response to those comments.

Wildlife Impacts

15. The Corps assumption that the present trend of deer populations in the St. John region is declining is false. Nowhere in the report is there documentation of this change, and nowhere is there documentation of the "climatic trend" which is causing a decline in deer populations.

16. The plan calls for only 42-53% mitigation of the loss of deer populations. This is totally unacceptable to NRCM. This is one of the major deficiencies in the mitigation of effects on wildlife.

17. The intensive management practices proposed for wildlife in the mitigation lands are unrealistic in many ways. They generally fail to appreciate the impact of the spruce budworm and the threat which it presents to the total forest. This statement that "uneven age spruce fir forest and climax forests ...are less susceptible to budworm attack" is misleading. Adjoining lands may harbor spruce budworm infestations which could wipe out spruce fir deeryards within the mitigation lands.

18. Another inconsistency in the plan is the statement that there will be "an increase in permanent hard roads" and the statement that roads will be reseeded to improve wildlife habitat. Roads that are used for access on a ten year harvesting rotation cycle are not likely to be suitable for reseeding.

19. The immediate consequence of constructing the dams and flooding 88,000 acres will be to destroy the habitat for more than 2,000 deer. The plan calls for an extended hunting season to avoid "adverse impact on the surrounding deeryard." The plan goes on to discuss "monitoring deer response to loss of habitat...possible for techniques for...creating new yards...and special hunting season...". None of these measures should be interpreted as mitigation of deer losses from the impoundment.

Fisheries Impacts

20. NRCM agrees with the statement that "the loss of stream and river habitat for native brook trout is deemed unmitigable." However, we do not accept the unavoidable and uncompensated loss to Maine of one of the finest natural brook trout fisheries in the entire United States. At least the U.S.F. + W.S. proposal attempts to provide some compensation.

21. The proposed 100 foot buffer along reservoir tributaries will offer no substantial improvement to the fisheries habitat. Present timber harvesting standards already severely restrict cutting within that zone.

22. The five year survey of creels to be undertaken 15 years after commencement of the project is an unacceptable form of mitigation. NRCM is not prepared to wait 20 years to have the inevitable answer on the fisheries impact of the dams to be confirmed.

23. The value of the fish habitat to be sacrificed by the creation of Lake Dickey is grossly underestimated. We concur that the Dickey Reservoir will offer poor feed, the water level fluctuation will be destructive to plants, the low oxygen levels will not support many fish species, and erosion from drawdown will adversely affect the fishery. We object to the proposal which offers a biomass equivalent in such a lake in return for the loss of magnificent natural St. John River brook trout fishing.

Rare and Endangered Species

24. NRCM agrees that the St. John River Valley is "renowned for rare and unusual plants". We draw attention to the conclusion that there is no real mitigation plan for such plants. The proposal for furbish lousewort preservation in no way compensates for the losses to other plants species.

25, We seriously doubt that the management plan for the furbish lousewort will "remove the species from jeopardy". Reducing its natural range by more than 50% is not going to improve its chances of survival.

Sincerely,

ROBERT H. GARDINER, JR.
Executive Director

RHG:cc

Natural Resources Council of Maine

General Comments

1. Your comment has been noted and our recommendation remains as set forth.

2. See response to USDOI General Comment #6, State of Maine Governor's Office General Comment "C" and MDIFW General Comment #6.

3. We cannot agree with your statements pertaining to the effectiveness of proposed forest and wetland habitat management measures, and evidence available to us indicates the opposite of your views. You have not supplied us with any data or research which would alter our position. We believe a careful evaluation of the management measures should resolve what may appear to you as inconsistencies.

4. Your beliefs and opinions are noted and have been placed in the record.

5. See response to Comment #4, above.

6. We have proposed to initiate management of the mitigation plan beginning the first year of construction. This would begin with land acquistion for both reservoir and mitigation lands. See response to Wildlife Management Institutes Comments #21(d) for discussion of deep woods species management.

7. The wording of the comment is somewhat confusing. However the value of the timber is included in the negotiated purchase price of the land. Our policy is to allow landowners to harvest if they so desire and then pay them for the land at its value after harvesting. If they choose not to harvest, then we pay for the timber and land. All revenues from timber sales of Federally owned lands would be returned to the U.S. Treasury.

8. The mitigation land is not entirely bottomland and neither is it entirely softwood. Therefore, the calculation as it stands is correct.

9. On pages 42 and 43 of Section 10 of this Attachment the opportunity costs resulting from budworm damage are addressed.

10. Your objection is noted. However, this is the overall assessment and the following sentences indicate that there are adversities. Fisheries will be improved from what they would be without management and the acquisition and protection of Furbish Lousewort is an improvement over the continual destruction of its habitat as it now stands.

11. Sawtimber yield will be reduced due to the frequency of cutting. However, pulpwood production will increase to the point where the overall production will equal current rates. See also response to your Comment #8.

12. Section 2.8.8 of Attachment 1 explains the calculation. All costs except those attributable to flood control are reimbursed through the sales of power. Therefore neither the U.S. nor the Maine taxpayer will be responsible for costs incurred by mitigation of fish and wildlife impacts.

13. These costs are included in the operational and maintenance costs of the management staff and in the 25% subsidy (not 25% reduction, as you state, but rather a 25% deduction).

14. The report has been changed to reflect more accurately the costs of road maintenance. See response to State of Maine Governor's Office Specific Comment #15.

15. In determining losses to the deer resource, the Corps does not assume a decline in the deer population, but a maintenance of current population levels. However, the mitigation plan references reports from the MDIFW to support the observation that deer populations have, in fact, been on the decline since the 1950's, and that this trend is expected to continue. You have presented no evidence or population data to support your challenge to an observed population trend which is now acknowledged as valied by the MDIFW, the Corps, and the USFWS (Conservation and Development Report, Supplement #3), and therefore we cannot concur with your assessment.

16. Your position is acknowledged and included in the record. Reasons for not attempting 100% mitigation of deer wintering habitat are presented in Attachment I, Section 2.10.2.

17. See response to USDOI General Comment #3, and Specific Comments #11 and #46. Also see response to State of Maine Governor's Office Specific Comment #2.

18. The recommended increase in the number of permanent gravel roads is in no way inconsistent with recommended reseeding of secondary access roads and skid trails. Roads used for access on a 10- to 15-year cutting cycle will generally be suitable for reseeding.

19. As clearly stated in the mitigation plan, these measures are intended to reduce project induced losses to the deer resource by minimizing or preventing overbrowsing of adjacent deer wintering habitat. These measures are not intended to offset losses in deer wintering habitat inundated by the project, they do constitute a very important form of mitigation.

20. There is no justification to attempt to develop a fishery at the expense and usage levels now projected for the area. We do not deem this activity to be a prudent Federal investment. In fact, such a development, if it were successful in attracting people (which the State and Federal Recreation resource people say it won't) could be viewed by many as an energy drain because of the fuel used in transportation. See also responses to USDOI General Comment #6. State of Maine, Governor's Office General Comment "C", and MDIFW General Comment #6.

21. The one hundred foot buffer is maintained to protect the remaining streams.

22. The five year survey is not form of mitigation. It is a tool for fishery management. Dickey Lake will not be low in oxygen by salmonid standards once the pool has limnologically stablized. Your objection is expressed by others and has been included in the record.

23. The proposal for the Furbish lousewort was not intended to compensate for losses to other plant species. However, the acquisition and perpetuation of this habitat will benefit all other faunal and floral associates of the lousewort. As pointed out in the U.S. Fish and Wildlife Service' Biological Opinion, this habitat is currently being destroyed and such acquisition will preclude further destruction.

24. The U.S. Fish and Wildlife Service has indicated in their opinion:

> ". . . if the Corps develops and implements successfully the following conservation program in consultation with and with the assistance of the Service, the continued existance of this endangered species is not likely to be jeopardized as defined in Section 402.02 of the Interagency Cooperation Regulation . . ."

and we are in concurrence with them.

SOCIETY
FOR THE
PROTECTION
OF
NEW HAMPSHIRE
FORESTS

5 SOUTH STATE STREET
CONCORD, N. H. 03301
(603) 224-9945

April 10, 1980

John P. Chandler, Colonel
New England Division, C.E.
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Chandler,

We have reviewed the Proposed Fish and Wildlife Mitigation Plan for the Dickey-Lincoln School Lakes Project. Thank you for the opportunity to comment.

Replacement or mitigation of the loss of 278 miles of free flowing streams and rivers with a lake habitat is not an acceptable "mitigation" to our Society.

Acquisition of land along the Allagash River to compensate for lost acreage and to accommodate displaced wildlife populations raises some serious questions.

-By managing the acquired forests to maximize wildlife values and not timber harvests, what plan is there to mitigate the loss of over 100,000 acres of timberlands when demand for forest products is increasing and the supply is decreasing?

-In order to accommodate the displaced wildlife populations, the lands acquired along the Allagash River will have to be intensively managed. Group selection cuttings may have to be on a 10-15 year cycle rather than a 30 year cycle. Aside from potential serious ecological effects of intensive harvesting (e.g. nutrient removal, increased surface runoff, sedimentation); what impact will intensive harvesting have on the overall quality of the Allagash River corridor and its value to displaced wildlife?

Our Society continues its grave concern and opposition as reflected in previous comments on the Corps' Revised DEIS and the DOE transmission phases of the project. The

proposed mitigation plan underscores our feeling that the Dickey-Lincoln project makes little economic or environmental sense.

We continue our opposition to the project and request continued information on its planning.

Sincerely,

Cleve Kapala
Director of Programs and Policy

CK:pc

cc: The Honorable James C. Cleveland
The Honorable Norman D'Amours
The Honorable John Durkin
The Honorable Gordon Humphrey

Society for the Protection of New Hampshire Forests

General Comments

1. General - The 100,000 acres of timberland proposed for mitigation will not be lost, as forest habitat management under the proposed mitigation plan will require the implementation of an intensive timber harvest schedule. The current average annual yield in the area (.31 cords/acre/year) will be sustained under the proposed management plan. Further, the proposed mitigation plan, developed pursuant to the Fish and Wildlife Coordination Act, is strictly intended to mitigate adverse impacts of the Dickey-Lincoln Hydroelectric Project on fish and wildlife resources. A mitigation plan for potential losses to commercial forest resources, specifically, is neither authorized nor required. It should be noted, however, that in developing the mitigation plan, efforst were made to minimize the impact of the plan on the commercial forest based by selecting lands within the Allagash Area which were already under some form of commercial forest land use restriction by the State of Maine.

2. General - As explained in consideragel detail in Appendix K, Section 2.2.3, lands acquired within one mile to each side of the Allagash River will be managed differently than the habitat management plan envisioned for most of the mitigation lands. The objective of management in the Allagash River corridor is to maintain dense spruce-fir cover while sustaining a moderate level of food availability. Construction of new logging roads, subsequent increases in access, and the adverse environmental impacts associated with these activities would be kept to a minimum. Discussions with the Maine Bureau of Parks and Recreation and the Maine Department of Inland Fisheries and Wildlife indicate that this proposed management plan can be implemented to simultaneously increase habitat productivity for wildlife and maintain, if not enhance, the overall environmental quality of the Allagash River corridor.

The Garden Club Federation of Maine

Webber Pond Road
RFD#1
Augusta, Maine 04330
May 10, 1980

Colonel Max B. Scheider
Division Engineer
Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Colonel Scheider:

The Garden Club Federation of Maine endorses the position of the Natural Resources Council of Maine relative to the draft environmental impact statement fish and wildlife mitigation report for the Dickey-Lincoln hydroelectric project as put forth in their communication to you of May 5, 1980.

Sincerely yours,

Mrs. Robert L. Dow
Natural Resources Chairman

The Garden Club Federation of Maine

1. No response necessary. Thank you for your review.

April 27

Dear Army Corps of Engineers, New England Division Engineer,

I object to the mitigation proposal of the Dickey-Lincoln Dam.
I don't think that the people and the animals of that region should be moved from their natural environment for the electric ease and comfort of the people southern new England. I agree with Elizabeth Sisson that a real replacement would consist of something like returning marginal farmland or cleared land to nature. As the earth is depleted of lumber, the value of the timber there will go up in the future. I think the timber industry is of greater value to the people and the economy of Maine than the Dams temporary jobs and mitigation would be.
I wholeheartedly think that the cost of the Dam and its mitigation isn't worth the money that it would cost and that the wilderness and the town of Allagash are priceless to its residents. Sincerely

Ms. Carol McKnight, Dudley Homestead, Mapleton, Me 04757

Ms. Carol McKnight

1. No response necessary. Thank you for your review.

Elizabeth Umphrey
Castle Hill,
Maine
(P.O. Box 77
Mapleton, Me 04757)

Dr. B. E. Darrett
U.S. Army Corps of Engineers
Waltham, Mass.

Dear Sir,

I think the U.S. Army Corps of Engineers mitigation project for the proposed Dickey-Lincoln hydroelectric project on the St. John River is absurd.

In the first place, it does not replace habitat lost by the flooding that would accompany the dam construction; it merely preserves an existing area as it is to the detriment of the local lumber industry.

Second, it falls far short of the land area the U.S. Fish and Wildlife Service says would be needed to mitigate the habitat loss caused by the dam, if such mitigation is, in fact, possible, and not just the figment of a bureaucrat's imagination.

Third, purchase of the land for the mitigation project and its annual operating cost would add millions to the total cost of the Dickey-Lincoln dam project. I notice the cost was not added, as of your latest summary of the dam project, to the overall cost. I suggest it has a significant negative impact on the cost-benefit ratio of the project, whose benefits already are most questionable.

As a resident of northern Maine, and a taxpayer, I suggest you find better things to do with your time and our money than to pursue pork-barrel projects for an irresponsible government. Junk both projects before more money is wasted on them.

Sincerely,

Elizabeth Umphrey

Elizabeth Umphrey

Elizabeth Humphrey

1. No response necessary. Thank you for your review and opinions.

Section 10.00

Forestry Impact Report

615 W. HIGHLAND AVE.
EBENSBURG, PA. 15931
814-472-7700

Kimball Forestry Consultants

Division of
L. Robert Kimball
Consulting Engineers

March 10, 1980

Division Engineer
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

ATTN: Environmental Analysis Branch
B. E. Barrett, Ph.D.

Re: Forestry Economic Impact
Study for Mitigation Lands
Dickey-Lincoln School Lakes
Project, Maine

Dear Dr. Barrett:

Herewith enclosed are two (2) copies of the final report for the above referenced project.

Sincerely,

KIMBALL FORESTRY CONSULTANTS

Darrell E. Wilson, R.P.F.
Vice President

DEW/dn
Encl.

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1.0 PRESENT & PROJECTED FOREST ECONOMY WITHIN THE STUDY AREA WITHOUT MITIGATION PLAN IMPLEMENTATION

1.1 Description of the Proposed Mitigation Lands

The area being proposed for mitigation comprises one hundred percent (100%) of Townships T12 R11, T12 R12, T13 R12, T13 R13; fifty percent (50%) of T11 R13; and forty-nine (49%) of T12 R13. (See Figure 1, Proposed Mitigation Lands.) The following table presents a break-down of the acreages involved:

TABLE 1
ACREAGE ALLOCATION FOR MITIGATION LANDS

Township	Total Acreage In Township	Total Acres Allocated For Mitigation
T11 R13	22,842	11,433
T12 R11	23,268	23,268
T12 R12	23,298	23,298
T12 R13	22,339	10,981
T13 R12	20,460	20,460
T13 R13	22,931	22,931
Totals	135,138	112,371

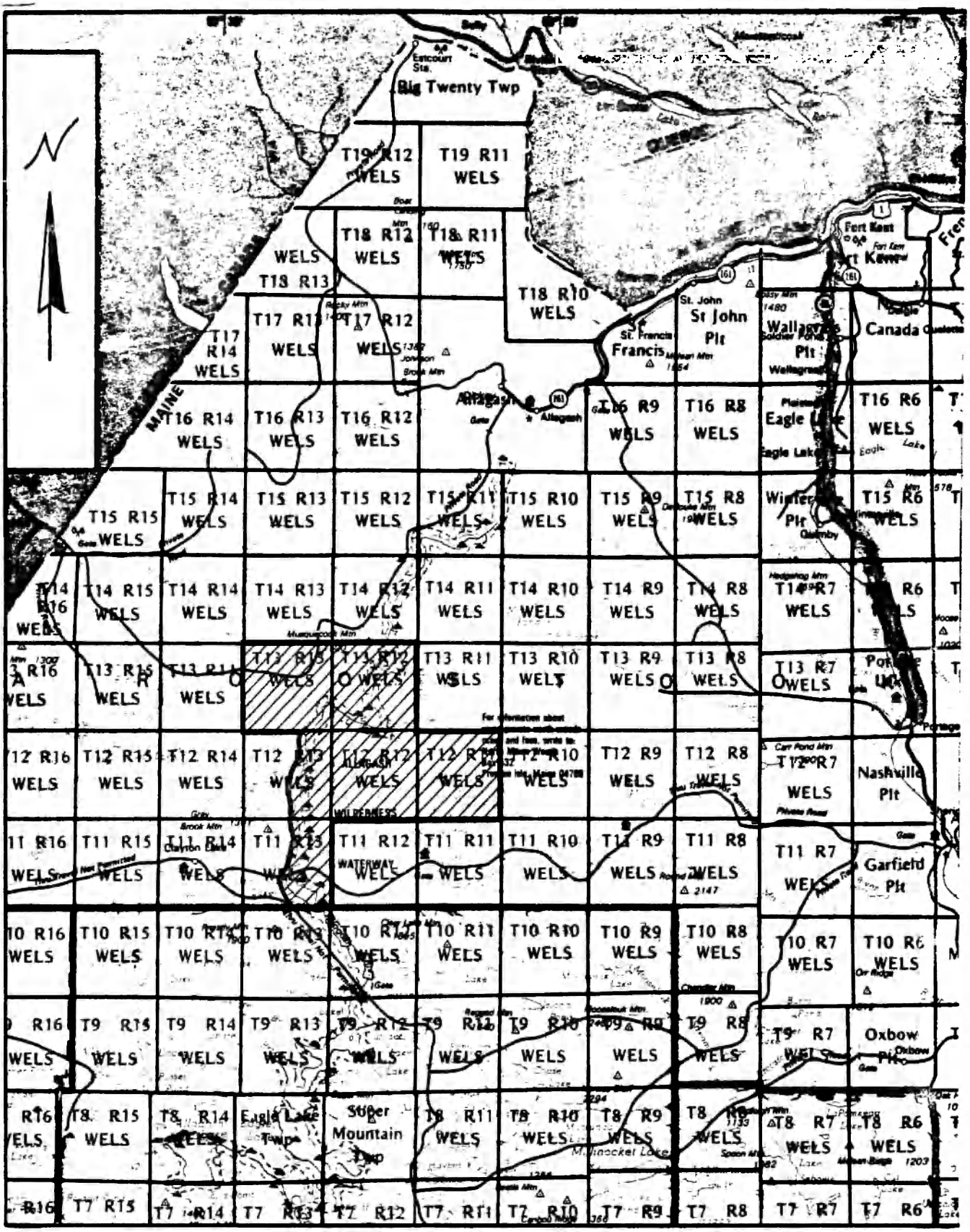
Ownership of lands in the mitigation area, as is common in Townships in northern Maine, is on the basis of common and undivided interest. Rather than designate specific parcels of land as being owned by a particular person, corporation, etc.., ownership and a percentage of the total land area of each Township is based on the original proportion of financial investment. The property owners are, in effect, shareholders who participate proportionately in the profits (and losses) associated with the economic activities within the Township.

FIGURE 1

MITIGATION LANDS
DICKEY-LINCOLN SCHOOL LAKES PROJECT
MAINE

MITIGATION AREA

SCALE: 1" = 10 MILES



The present distribution of ownership, by percentage, in the Townships under consideration is shown in Table 2.

1.2 Present Timber Harvesting Activities In The Mitigation Area

1.2.1 Identification of Mills Presently Drawing From The Mitigation Lands

The data presented in the report regarding the degree of dependency of both Maine and Canadian based mills on mitigation lands timber was obtained from the owners and/or managers of the individual mills and the major landowners and/or managers of lands within the mitigation area. The landowner/managers contacted were Great Northern Paper Company, International Paper Company, Prentiss & Carlisle and Seven Islands Land Company. The original selection of mills to be contacted was determined from the Maine Forest Service list of Maine Primary Forest Products Manufacturers, April 1979, and the sawmills that were actually contacted were selected on the basis of annual production and location. Generally, the sawmills that were surveyed produced at least 250 MBF (thousand board feet) of lumber per year, and were located within seventy miles of the mitigation area. To insure the validity of the mill inventory, a limited number of larger mills located within ninety to one hundred miles of the area were contacted. In addition to these Maine mills, eight Canadian mills located within seventy miles of the proposed mitigation area were contacted. A summary of mills contacted by telephone, personal visits, or survey questionnaire follows:

TABLE 2

DISTRIBUTION OF OWNERSHIP/MANAGEMENT INTEREST IN MITIGATION LANDS BY MAJOR SHAREHOLDERS

Acres (%)

Township	Total Acres in Mitigation Lands	Great Northern Paper Company	International Paper Company	Prentiss and Carlisle Company	J.O. Irving Ltd.	Pete* Sawyer	Seven Islands Land Management Co.	Others**
T11 R13	11,433	0 (0%)	9,820 (86%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1,613 (14%)
T12 R11	23,268	10,240 (44%)	6,010 (26%)	0 (0%)	890 (4%)	5,120 (22%)	0 (0%)	1,008 (4%)
T12 R12	23,298	18,507 (79%)	0 (0%)	0 (0%)	1,338 (6%)	0 (0%)	2,453 (11%)	1,000 (4%)
T12 R13	10,981	0 (0%)	5,847 (53%)	3,667 (33%)	396 (4%)	0 (0%)	0 (0%)	1,071 (10%)
T13 R12	20,460	13,331 (65%)	0 (0%)	0 (0%)	4,117 (20%)	0 (0%)	2,156 (11%)	856 (4%)
T13 R13	22,931	0 (0%)	4,141 (18%)	15,909 (69%)	1,743 (8%)	0 (0%)	0 (0%)	1,138 (5%)
TOTALS	112,371	42,078 (37%)	25,818 (23%)	19,576 (17%)	8,484 (8%)	5,120 (5%)	4,609 (4%)	6,686 (6%)

*Managed by Pete Sawyer for the Dunn Heirs
**Unidentified, may represent one or more owner/management groups

Location	Total No. of Mills	No. of Mills Contacted
Maine		
Franklin County	17	1
Aroostook County	41	22
Penobscot County	39	10
Piscataquis County	21	4
Totals	118	37
Canada		
New Brunswick Province		2
Quebec Province		6
Totals		8

Of the thirty-seven (37) Maine mills contacted, three (3) are reportedly drawing timber from the mitigation area, while three (3) of the eight (8) Canadian mills contacted also reported that they are drawing from this area (Table 1). Two (2) of the three (3) Maine mills referred to are owned by Great Northern Paper Company, the third mill is owned by International Paper Company. The survey indicated that the remaining mills within a reasonable travel distance of the mitigation area are not dependent on timber from these lands. However, it should be noted that the International Paper Company mill located in Jay, Maine, is dependent on chips from Canadian mills drawing from the proposed mitigation area.

The location and related data relevant to the six (6) using mills is presented in Table 3. Complete information regarding employment parameters could not be obtained. As indicated in Table 3, approximately forty-four percent (44%) of the present harvest is going to Maine mills and fifty-six percent (56%) is going to Canadian mills. The survey also

TABLE 3 - MILLS LOCATED OUTSIDE MITIGATION LANDS DRAWING FROM MITIGATION AREA

Location	Type of Processing	Yearly Capacity	Quantity Drawn From Mitigation Lands	Seasonality	Employment Parameters		
					Occupation	Number Employed	Salary/Yr. or Wage/Hr.
Maine							
Masardis	Lumber	60,000 MBF	1,500 MBF/yr.	yr. round	_____	Not Obtained	_____
Portage	Chips	180,000 cds	8,500 cds/yr.	yr. round	_____	Not Obtained	_____
Ashland	Lumber	90,000 MBF	2,000 MBF	yr. round	Not Obtained	400	$7,500,000 (annual payroll)
*Total Quantities		480,000 cds	15,500 cds				
Canada							
St. Pamphile	Lumber	45,000 MBF	8,000 cds/yr.	yr. round	Mgt. & Prof.	4	$ 20,000/yr.
	Shingles	7,000 MBF	1,490 cds/yr.		Skilled	100	$ 7.50/hr.
	Chips	4,000 tons			Unskilled	120	$ 6.00/hr.
St. Pamphile	Lumber	50,000 MBF	1,950 MBF	yr. round	Mgt. & Prof.	15	$ 20,000/yr.
	Chips	100,000 cds			Skilled	90	$ 8.00/hr.
					Unskilled	70	$ 6.50/hr.
St. Juste	Lumber	30,000 MBF	5,950 cds	yr. round	_____	Not Obtained	_____
*Total Quantities		**364,000 cds	19,340 cds				

*Assuming one cord = 500 board feet = 2 tons

**Does not include 4,000 tons of chips, since they are a by-product

NOTE: Although the International Paper Co. mill in Jay, ME, does not draw directly from the Mitigation Lands, it is dependent on chips purchased from Canadian mills that draw from Mitigation Lands.

revealed that the three (3) Maine mills are dependent on timber from the mitigation lands for approximately three percent (3%) of their yearly production needs; the three (3) Canadian mills draw approximately five percent (5%) of their yearly needs from the proposed mitigation lands.

Based on the present harvesting activities reported, Table 4 was prepared to relate these activities to each of the six (6) Townships involved. As with Tables 2 and 3, harvest volumes for Townships T11 R13 and T12 R13 have been adjusted to reflect the appropriate percentage of these Townships allocated for mitigation. Table 4 indicates that the average harvest per acre is .34 cords. However, if Townships T12 R11 and T12 R12 are excluded, this figure increases to .45 cords/acre. The lower figures for T12 R11 and T12 R12 can be attributed primarily to the following circumstances; T12 R11 was harvested in the late 1950's and is just now about ready to be harvested again; approximately 7,000 acres within T12 R12 were burned over in 1968. Allowing for these considerations, the average annual harvest figure for lands within the mitigation area has been established at .40 cords/acre. This appears to be a reasonable average, and will be used throughout this study.

The marketing of timber from the mitigation area is quite complex. This is due to an unusual combination of related factors that are unique to northern Maine. These factors include: (1) The availability of markets for timber in both Maine and Canada; (2) The common and undivided land

TABLE 4

*PRESENT TIMBER HARVEST IN MITIGATION AREA

Township	Yearly Volume	Avg. Cords/Acre	Market Location	Species***
**T11 R13	5,950 cds	.52	Canada	Spruce/Fir
T12 R11	3,000 cds	.13	Maine	Spruce/Fir
T12 R12	2,000 cds	.09	Maine	Spruce/Fir
**T12 R13	3,900 cds	.36	Canada	Spruce/Fir
	490 cds	.04	Canada	Cedar
T13 R12	10,500 cds	.51	Maine	Spruce/Fir
T13 R13	8,000 cds	.35	Canada	Spruce/Fir
	1,000 cds	.04	Canada	Cedar
TOTAL	34,840 cds			

*Based on information provided by land owner/managers, mill owners, and field personnel.

**Calculated on the following basis:

Township	Acres Proposed for Mitigation	Present Avg. cds/acre Harvested	Estimated Yearly Volume
T11 T13	11,443	.52	5,950 cds
T12 R13	10,981	.40	4,390 cds

***Although some hardwood is included in the harvest figures presented, hardwood has not been separately identified since the volume is relatively small and exact market locations could not be established.

ownership mix in each town and the fact that both Maine based forest industries and private landowners often commonly share in the ownership and economic operability of a given town; (3) The majority owner (or collection of owners under a management firm) of a given town is often, but not always, responsible for managing the forest lands and distributing profits and expenditures to other minority owners according to their proportionate shares; (4) The availability and competition of both Canadian and American labor and industry to both harvest and process timber from the area; (5) The trading, buying and selling of timber, primary and secondary forest products and manufacturing by-products between American landowners and forest industry and Canadian industry at constantly changing dollar exchange rates; (6) The ownership, construction and maintenance of unrestricted weight limit on timber haul roads by American landowners and forest industries; and (7) Reasonable rail transportation between sawmills in both Maine and Canada and pulp and paper mills in Maine and wholesale and retail outlets in New England.

Figures 2 through 4, Hypothetical Timber Marketing Situations #1, #2 and #3, are provided to illustrate some of the potential interplay between the above described factors.

1.2.2 Present Management Practices In Mitigation Area

Great Northern Paper Company, International Paper Company and Prentiss & Carlisle Company, the major landowners/managers for the six townships located within the proposed mitigation

Figure 2

Hypothetical Timber Marketing Situation #1
Township X, Range Y
Aroostock, County, Maine

Common & undivided ownership between Landowners A, B & C with Landowner A being the Majority Owner/ Forest Manager and also a forest industry

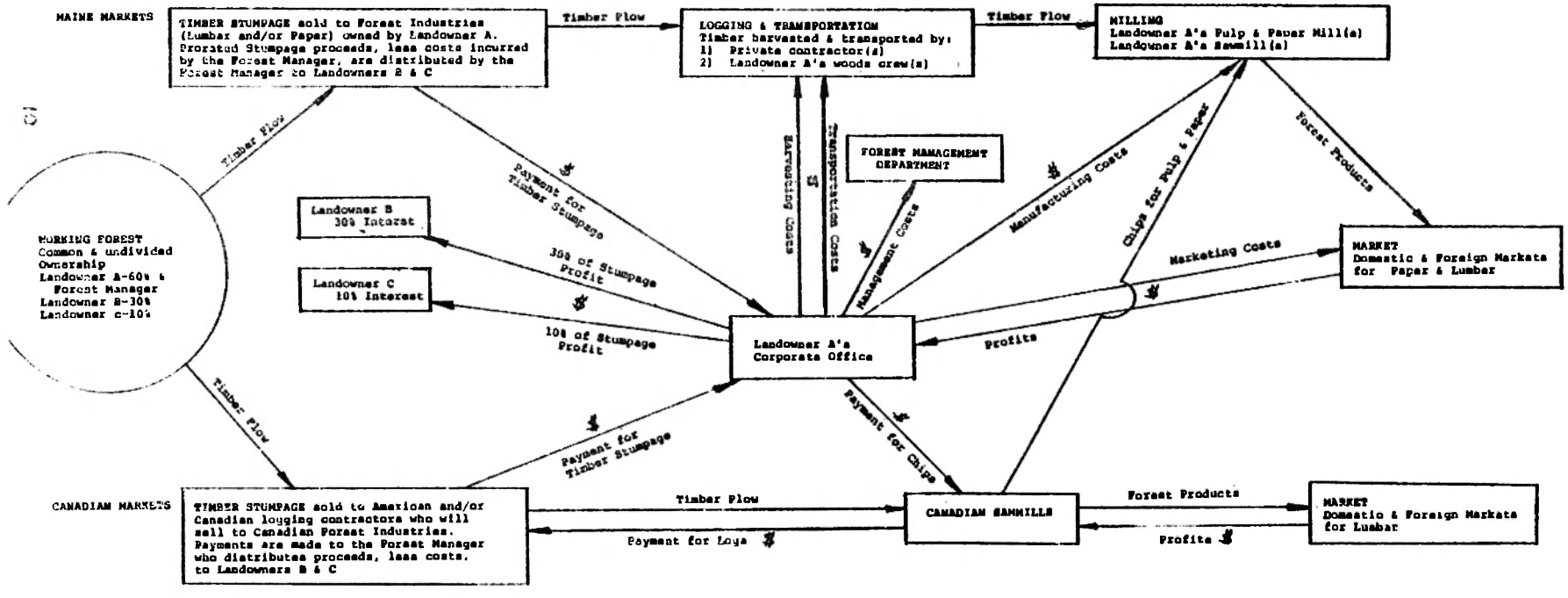


Figure 3

Hypothetical Timber Marketing Situation #2
Township X, Range Y
Aroostock County, Maine

Common and undivided ownership Landowner A being the Sole Owner/Forest Manager and a forest industry

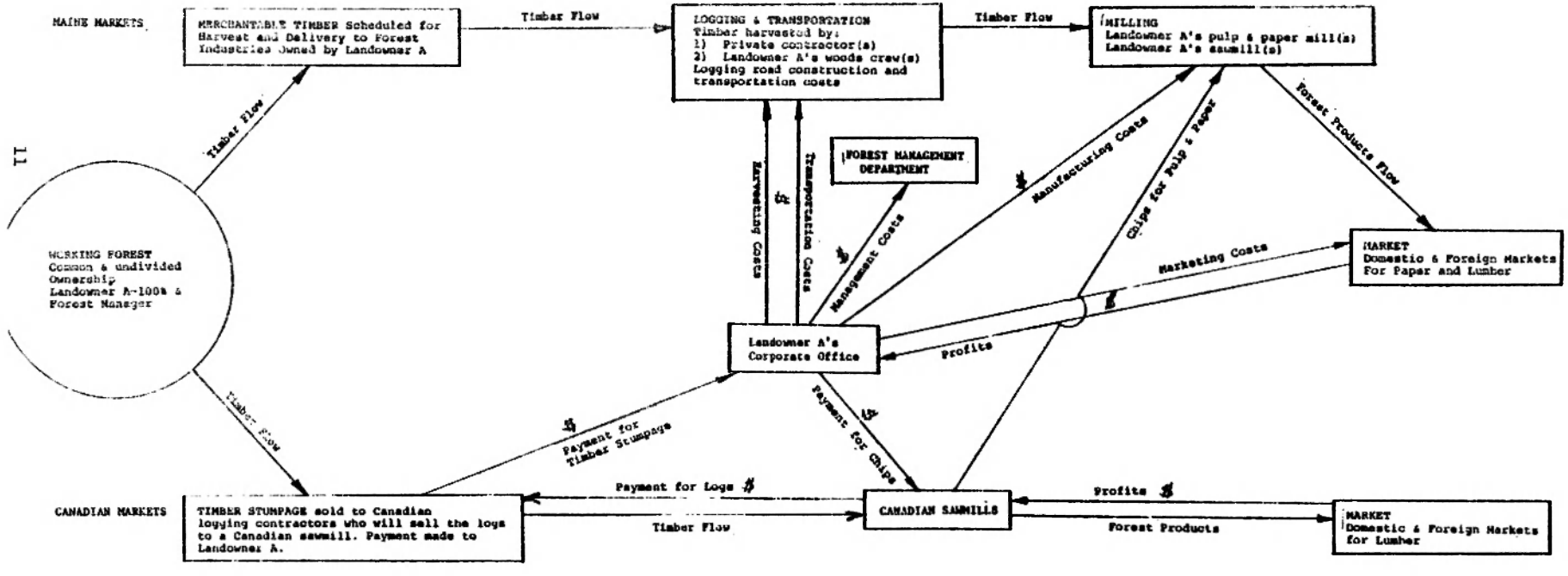
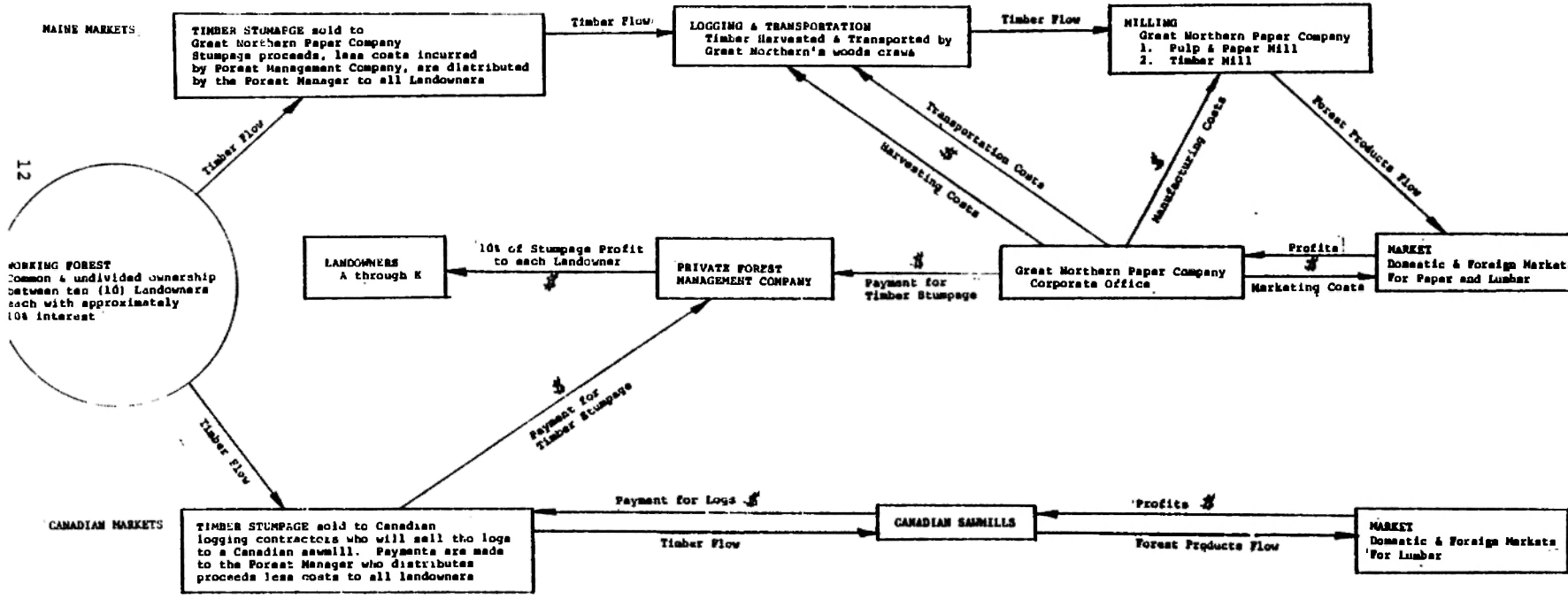


Figure 1

Hypothetical Timber Marketing Situation #3
Township X, Range Y
Aroostock County, Maine

Common and undivided ownership between Landowners A through K with a private Forest Management Company being the Forest Manager



area indicated that essentially the management practices presently in effect in these towns will continue for at least the next five to eight years. Their primary management objective is to manage the timber resources on a sustained yield. This basis, which will insure a never ending and constant supply of quality sawtimber and poletimber. However, market and spruce budworm infestation largely control the intensify of their management practices and priorities. Currently there is a considerable demand for spruce-fir sawtimber and poletimber. In addition, the spruce budworm infestation is very serious in these towns. However, the present market for hardwoods is limited primarily to the grade sawtimber and veneer markets. Consequently, the spruce-fir stands are being intensively managed primarily in salvage operations, and the hardwood stands are receiving little, if any, management attention.

The harvesting practices to be incorporated in any given stand is determined by on-site inspection and analysis. Accessibility, species composition, stand vigor, age distribution and stocking are some of the parameters that govern how the stand will be harvested. Selective harvesting or uneven-aged silviculture is used when access and stocking are good and the chances of windthrow are minimal. This practice allows the manager to maintain better control over the species composition of the stand and helps minimize the likelihood of stand degradation from insects or disease.

Currently the selective timber harvest operations enacted by the land managing companies in the area have set a 3 to 6 inch DBH limit on fir and a 10 to 12 inch DBH limit on spruce. However, the spruce limit fluctuates up to 20 inches DBH in some areas. (7)

Drawbacks to selective harvesting is that harvesting operations are more costly due to a more frequent cutting cycle and lighter volume removal per acre. Also, the logging operations may cause damage to trees not designated for removal.

Clearcutting or even-aged management is used when access and stocking are poor, the age distribution of the stand is uniform and/or there is a high risk of windthrow, insect or disease damage. The advantage of this method is that mechanical harvesters such as the feller bunchers and the feller forwarders can be used in the harvesting operations. These machines not only enable the companies to reduce their harvesting cost per unit volume removed, but also increase the amount of utilization of each tree harvested.

Table 5 provides a breakdown by town regarding the recent harvesting practices of the various landowners and managers within the mitigation area.

As discussed in section 1.3 present management practices in the spruce-fir habitat type are being disrupted and largely controlled by the severity of the spruce budworm infestation. Chemical spraying, clearcutting, salvage cutting and the

TABLE 5

RECENT HARVESTING PRACTICES OF LANDOWNER AND/OR MANAGING COMPANIES WITHIN THE MITIGATION AREA, BY TOWN

Landowner/Manager	Range	Recent Harvesting Practices
Great Northern	T12 R11	2400 Acres of regeneration representing clear-cutting (1/10 of township) (30-150 acre cuts). Still high percentage of mature (60-100 years with 90% crown cover) and selectively cut stands.
	T12 R12	6050 Acres of regeneration indicating clear-cutting (26% of area). Clearcuts generally from 30-500 acre blocks with one evenaged regeneration tract of 2200 acres. Low per-centage selective cutting. Still high per-centage of mature types.
	T13 R12	3676 Acres of regeneration or 16% of area clearcut recently. (30-300 acre clearcuts). High percentage of selectively cut and mature types.
Prentiss and Carlisle	T13 R13	12% of area in small clearcuts (35-200 acre cuts). High percentage of mature types and selectively cut stands
International Paper	T11 R13	Total selective harvesting - no clearcuts
	T12 R13	991 acres of regeneration. In small clear-cuts (9% of area) (30-80 with one 200).

Source: Attachment 1 Fish and Wildlife Report March 1, 1980

encouragement of more spruce regeneration are some of the silvicultural treatments being employed to alleviate present and future budworm related problems.

Even though the majority of the mitigation area is under private ownership and management, there are mandatory state land management regulations which must be complied with at all times. The Maine Land Use Regulation Commission (L.U.R.C.) and the Maine Department of Conservation, Bureau of Parks and Recreation are the two principal state agencies responsible for implementing these regulations.

L.U.R.C. regulations require the landowner/manager to file for a permit prior to the harvesting of timber in areas specifically zoned as Protection Districts which include mountain areas, steep slopes, important historic sites and natural areas (such as deer yards). Harvesting permits that are filed by landowners/managers must consider and address special harvesting guidelines for each specific timber harvest operation.

The Department of Conservation is concerned with the management practices on land located within a one mile limit of the Allagash Wilderness Waterway (A.W.W.), a protected strip of land ranging from 400' to 800' in width, on either side of the Allagash River. The section of the A.W.W. that is in the mitigation area represents approximately 3700 acres of land. As for the one mile zone, the A.W.W. requires that a permit (Cutting Plan) must be filed by land managers explaining in detail their proposed harvesting plans. (See Appendix 1 & 2.)

The main purpose of the permit is to assist the Department of Conservation in controlling the type and number of clearcuts and access roads within the one mile zone of the A.W.W.

1.2.3 Management Resources

As stated earlier, the ownership of the land in the mitigation area is on a basis of common and undivided interest by Township. As such, normally multiple owners share all economic gains and expenditures on a percentage basis. Profits realized from the sale of timber within a particular Township are distributed according to the fractional share held by the various owners whether they be individuals or companies. Taxes and maintenance costs and other expenditures are also shared in a similar manner.

Usually, the majority shareholder (owner) within a Township assumes the management responsibilities. However, Township owners frequently share management responsibilities when it is expedient (e.g. if a minority landowner in T12 R12 has a forestry management crew working in T12 R11, and the majority landowner of T12 R12 does not have a crew in the immediate area, the minority owners' crew may assume temporary management responsibilities in T12 R12).

There are six major landowners/managers within the proposed mitigation area; Great Northern Paper Company, International Paper Company, Prentiss & Carlisle Company, J. O. Irving Limited, Pete Sawyer*, and Seven Islands Land Company**.

*Manages primarily lands owned by the Dunn Heirs.
**Manages primarily lands owned by the Pengree Heirs.

Table 2 indicates the percentage distribution of ownership/ management within the Townships that comprise the potential mitigation area.

Management responsibilities within the mitigation area are distributed among three major owners. Great Northern Paper Company assumes management responsibilities in T12 R11, T12 R12 and T13 R12; International Paper Company in R11 R13 and T12 R13; and Prentiss & Carlisle Company in T13 R13.

Great Northern Paper Company is one of the major timberland owner-managers in the north Maine woods region. They have management responsibilities for both company owned and jointly owned land. A professional staff of qualified foresters, land managers and marketing specialists provide management services that include silviculture, surveying, mapping, planning and supervision of harvesting, road construction, marketing and related forest management activities. The land in the proposed mitigation area is managed out of the Portage, Maine, office. The firm employs approximately forth (40) foresters and approximately 250 support personnel.

International Paper Company is reported by the Maine Forest Service as holding ownership and/or joint ownership in approximately 1.25 million acres of timberland in the State of Maine. Within the proposed mitigation area they have management responsibility for approximately 25,818 acres, as indicated in Table 2. The firm employs approximately fifty professionals in the foresty and land management fields. Personnel operating out of Ashland and Clayton Lake

are responsible for all forest management activities within the proposed mitigation lands.

The firm of Prentiss & Carlisle Company of Bangor, Maine, manage approximately 800,000 acres of woodland in Aroostook County of which an estimated 19,576 acres are within the proposed mitigation area. Management of the timberlands is the responsibility of the firm's chief forester, who works out of Ashland. Services include silviculture, mapping, surveying, stumpage sales, harvesting sequence and methods, inventories and consulting, road layout, line work, accounting activities and check scaling.

1.2.4 Existing Road Network

The basis used for estimating the miles of road that now exist in the mitigation area, was the information provided by International Paper Company. The miles of gravel road and bulldozed winter roads for T11 R13, T12 R11 and T12 R13 were furnished by International Paper Company. Using these figures, an average was obtained for the two road types; gravel, 0.6 miles per square mile; bulldozed winter roads, 1.1 miles per square mile. Using these values, estimates were established for the remaining three Townships as follows:

Township	Miles of Gravel Road	Miles of Bulldozed Winter Roads
T11 R13	21	48
T12 R11	39	9
T12 R12	29	15
T12 R13	17	47
T13 R12	38	9
T13 R13	22	40
Totals	166	168

The above two road types would be considered major roads, with an estimated present value of $15,000 per mile for gravel roads and $6,000 per mile for winter roads. It has been estimated that the cost of constructing a 28 foot standard gravel road today would range from $25,000 to $35,000 per mile (including bridges and culverts). Information obtained from Appendix K, Fish & Wildlife Mitigation Plan (Preliminary) indicates that road maintenance costs average $0.05 per thousand board feet per mile per year. The road inventory presented here does not include an undetermined amount of permanent and temporary skid roads.

1.2.5 Present Harvesting and/or Operators in Mitigation Lands

Information regarding wood harvesting companies and operators was obtained from two of the three major shareholders in the proposed mitigation lands; Great Northern and International Paper.

Great Northern Paper is the largest timber harvesting company presently operating in the proposed mitigation area and uses their own logging crews to harvest approximately 375,000 cords per year. In addition, the company contracts services from a number of private logging contractors for about 300,000 cords per year. As noted in Table 4, approximately 12,500 cords of this harvest comes from the proposed mitigation lands. Great Northern Paper Company reportedly employs over 400 people in nine company operated camps in Maine.

International Paper Company, the second largest owner/manager in the mitigation area, uses private loggers, on a contractual basis, to conduct their harvesting activities. The Company reportedly has two contractors, employing 40 people, operating in Township T11 R13, and one contractor, employing 30 people, operating in Township T12 R13.

Due to the limited amount of information obtained relative to the number of people presently employed in harvesting activities on mitigation lands, an estimate has been made based on information provided by private logging contractors, area foresters, and forest managers. Production estimates for a two man logging crew ranged from 20 to 30 cords per day depending on weather conditions, terrain and type of harvesting being done (selective cut or clean-cut). The average two man crew reportedly works four to five days per week, 25 to 30 weeks per year. Averaging these figures, one two man crew, cutting 25 cords per day, 124 days per year, would cut 3,100 cords per year. Based on the reported annual harvest in the mitigation area of 34,840 cords (Table 4), an estimated 11 to 12 man crews (22-24 people) would be required to harvest this quantity of timber. However, this does not take into consideration the time required to move from one harvesting location to another, equipment failure, accidents, etc. Also, it does not consider support personnel employed in the logging camps, truck drivers and field supervisory personnel. Therefore, it is estimated that approximately 70 people are presently employed in logging activities within the mitigation area.

Logging crews, consisting of two men, average about $40,000 per year (assuming a 25-30 week work year). This includes the fee for skidder rental.

1.2.6 Timber Flow Into Canada

The information presented in Table 3 indicates that approximately 19,340 cords per year of timber from the mitigation area is presently going to three Canadian mills in Quebec Province. These mills produce construction lumber, cedar shingles and wood chips, some of which is marketed in the United States. Based on available data, Table 4 was prepared to more specifically identify the present timber flow from the mitigation lands. As indicated, the predominant species harvested is spruce and fir. All of the cedar from these Townships reportedly goes to Canada. A limited amount of veneer from these lands goes to Presque Isle. This has not been identified separately in the table because the quantity is minimal.

Although the present flow of timber from the proposed mitigation area is not expected to change drastically within the next eight to ten years, the recent acquisition of the Masardis sawmill by International Paper Company will most likely decrease the volume of sawtimber now going to Canada from International Paper lands.

1.3 Spruce Budworm

1.3.1 Extent of Infestation

Of all the diseases and parasites destroying the commercial

forests of Maine, the Spruce Budworm, Choristoneura fumiferana, has had the greatest economical and silvicultural impact.

The budworm is cyclic in nature with the population reaching severe epidemic levels when large areas of spruce and fir reach maturity. There is evidence of outbreaks occurring in 1770, 1806, 1878, 1910, 1949 and from the mid-1960's until the present time. The first epidemic of real economic concern was the 1910 outbreak in which 27,500,000 cords of spruce and fir were destroyed. In some towns mortality approached 90% of the spruce fir growing stock. The latest outbreak has caused severe levels of mortality and produced large economic losses. The results of a 1976 survey show that 400,000 million board feet of standing spruce-fir timber have been killed during the current outbreak (11).

The budworm population has been fluctuating over the past several years as is evident in Figures 5, 6, 7, 8 and 9. The area of northwest Maine in which the mitigation lands are located have a moderate to severe rating with regards to defoliation and thus were considered for spraying as part of the 1979 program. Figure 10 outlines those areas which were included in the proposed spray project. (See Section, Spruce Budworm Spray Program as a Control Measure, for detailed information spraying.)

1.3.2 Timber Losses

As a result of the budworm infestation, timber quantity and quality will be greatly affected. These losses will occur

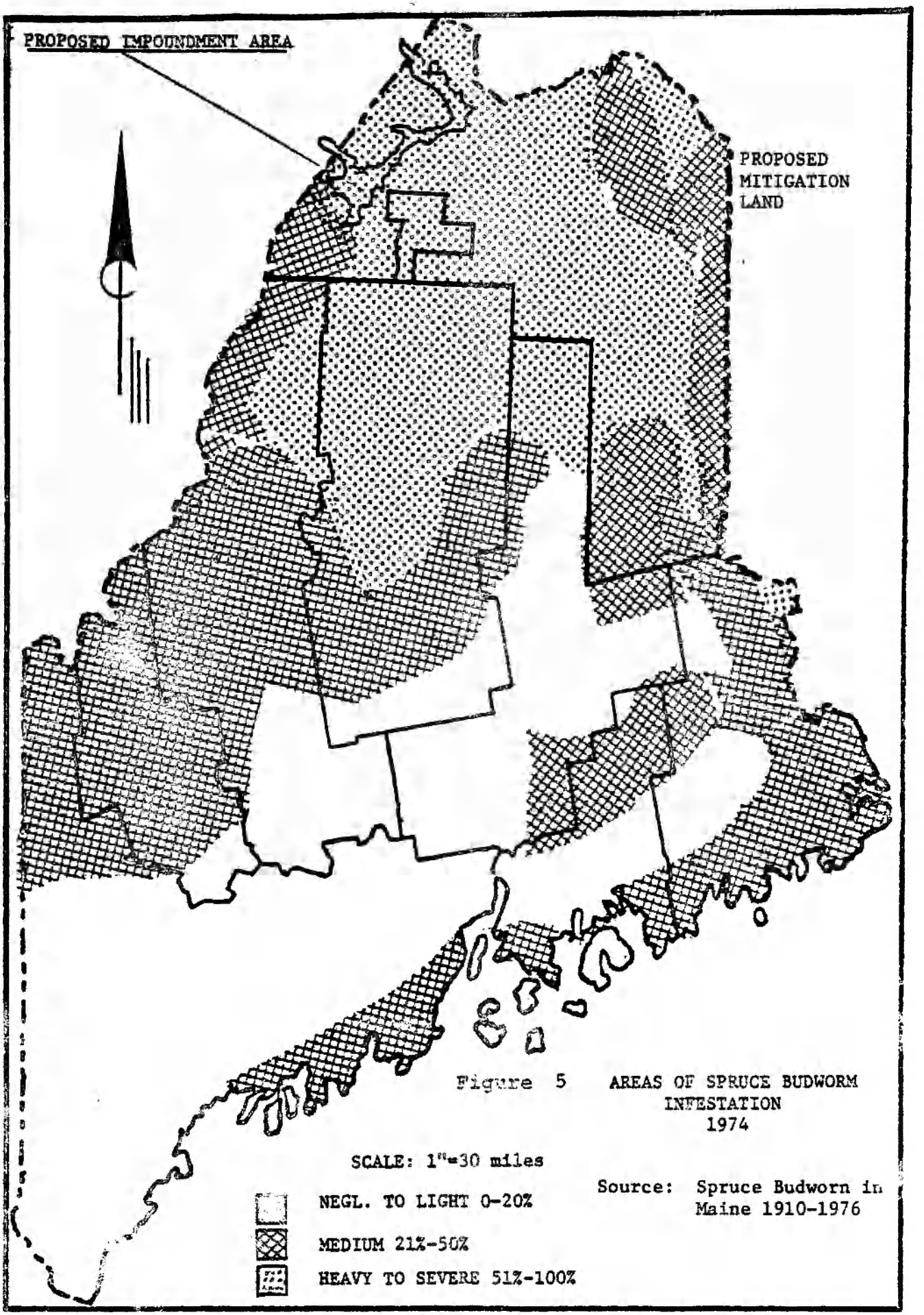


Figure 5 AREAS OF SPRUCE BUDWORM INFESTATION 1974

Source: Spruce Budworn in Maine 1910-1976

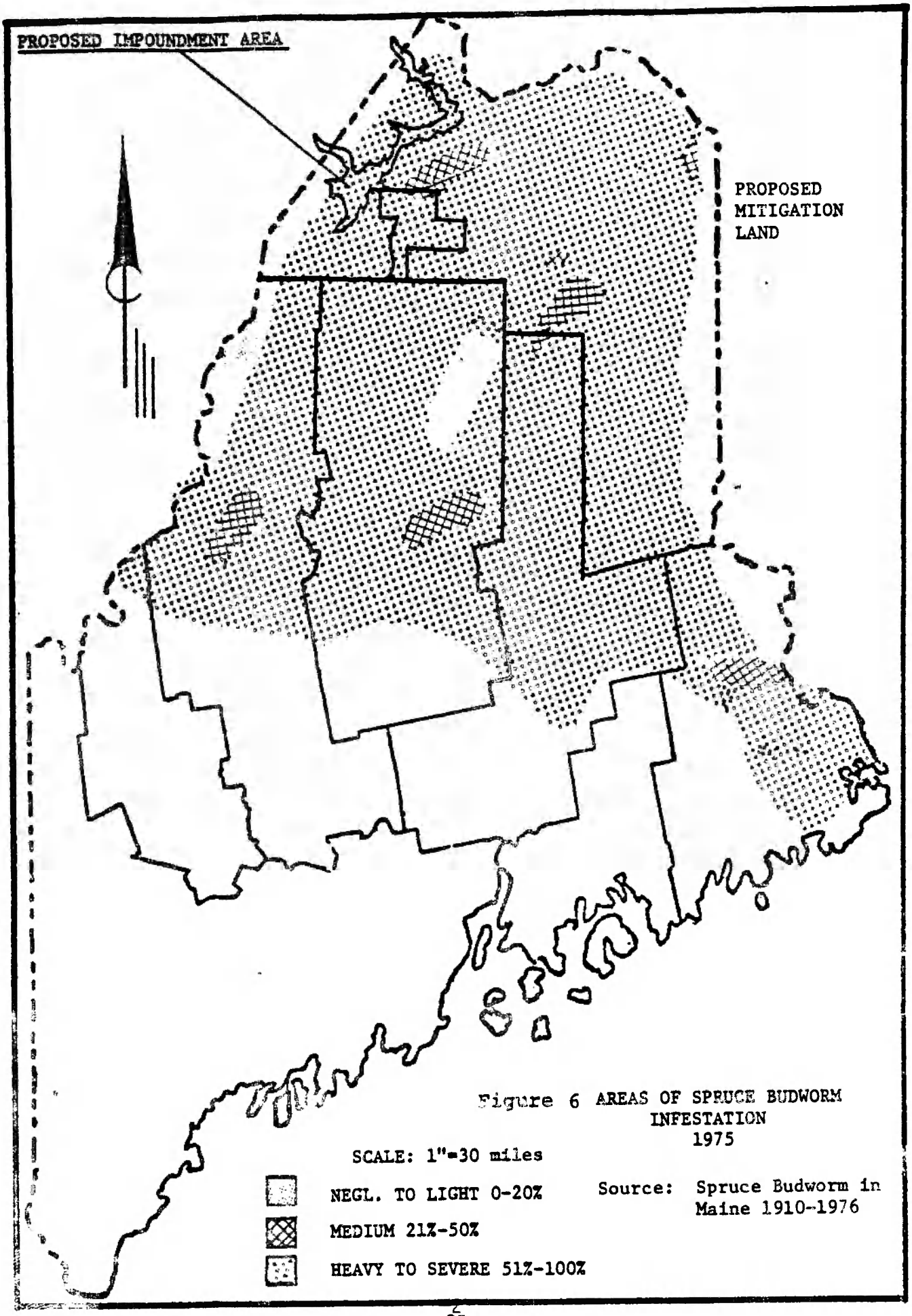


Figure 6 AREAS OF SPRUCE BUDWORM INFESTATION 1975

Source: Spruce Budworm in Maine 1910-1976

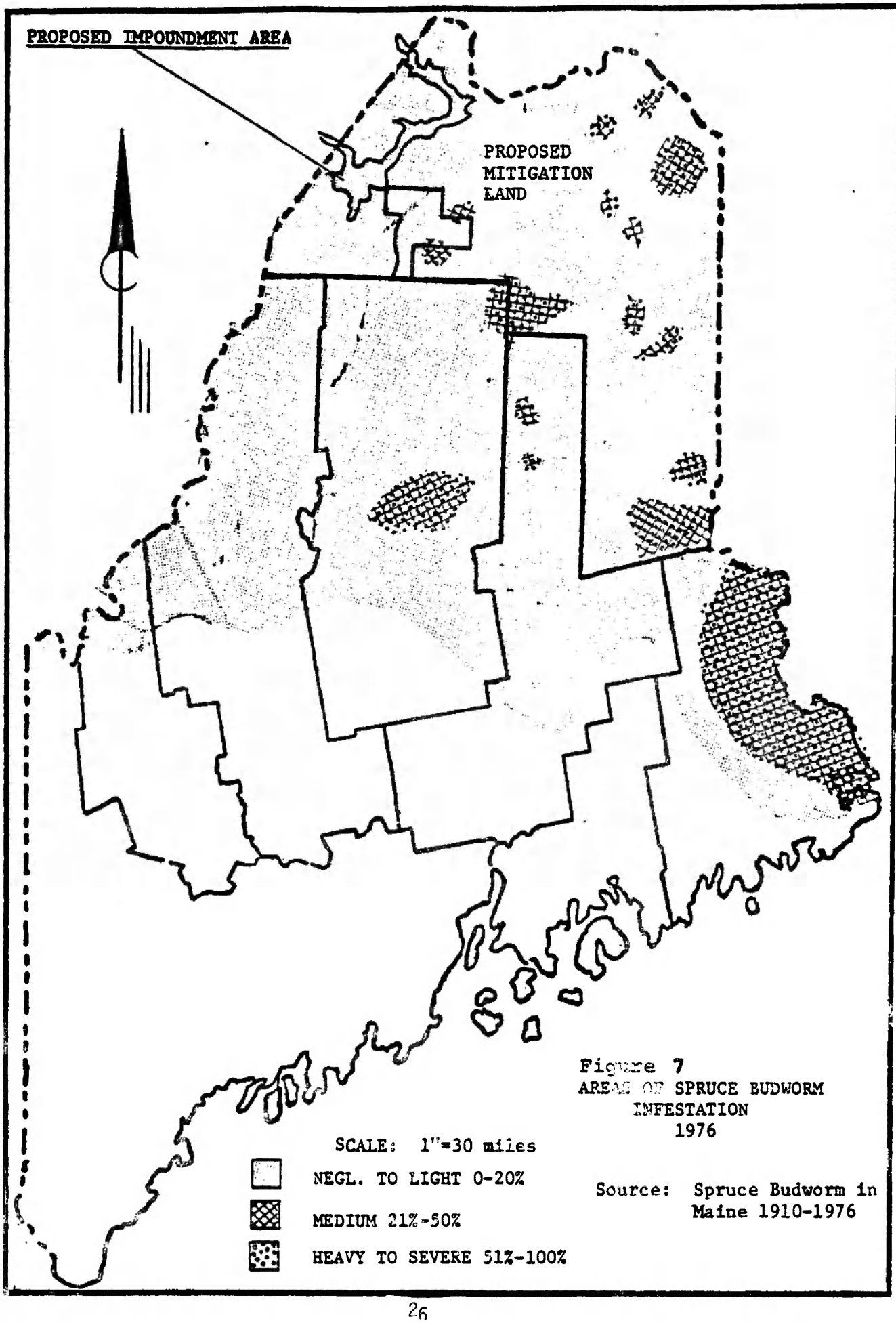


Figure 7
AREAS OF SPRUCE BUDWORM INFESTATION
1976

Source: Spruce Budworm in Maine 1910-1976

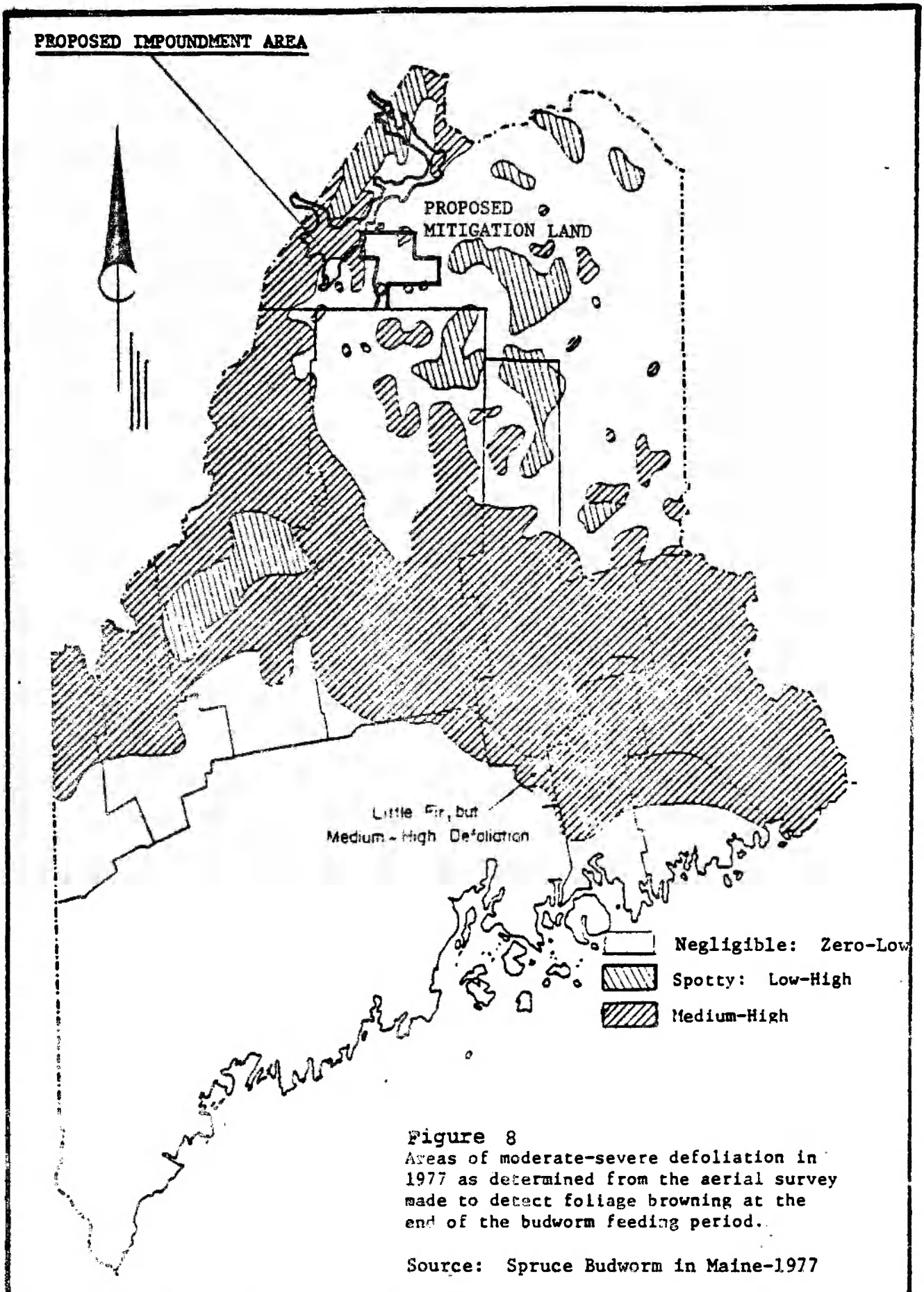


Figure 8
Areas of moderate-severe defoliation in 1977 as determined from the aerial survey made to detect foliage browning at the end of the budworm feeding period.

Source: Spruce Budworm in Maine-1977

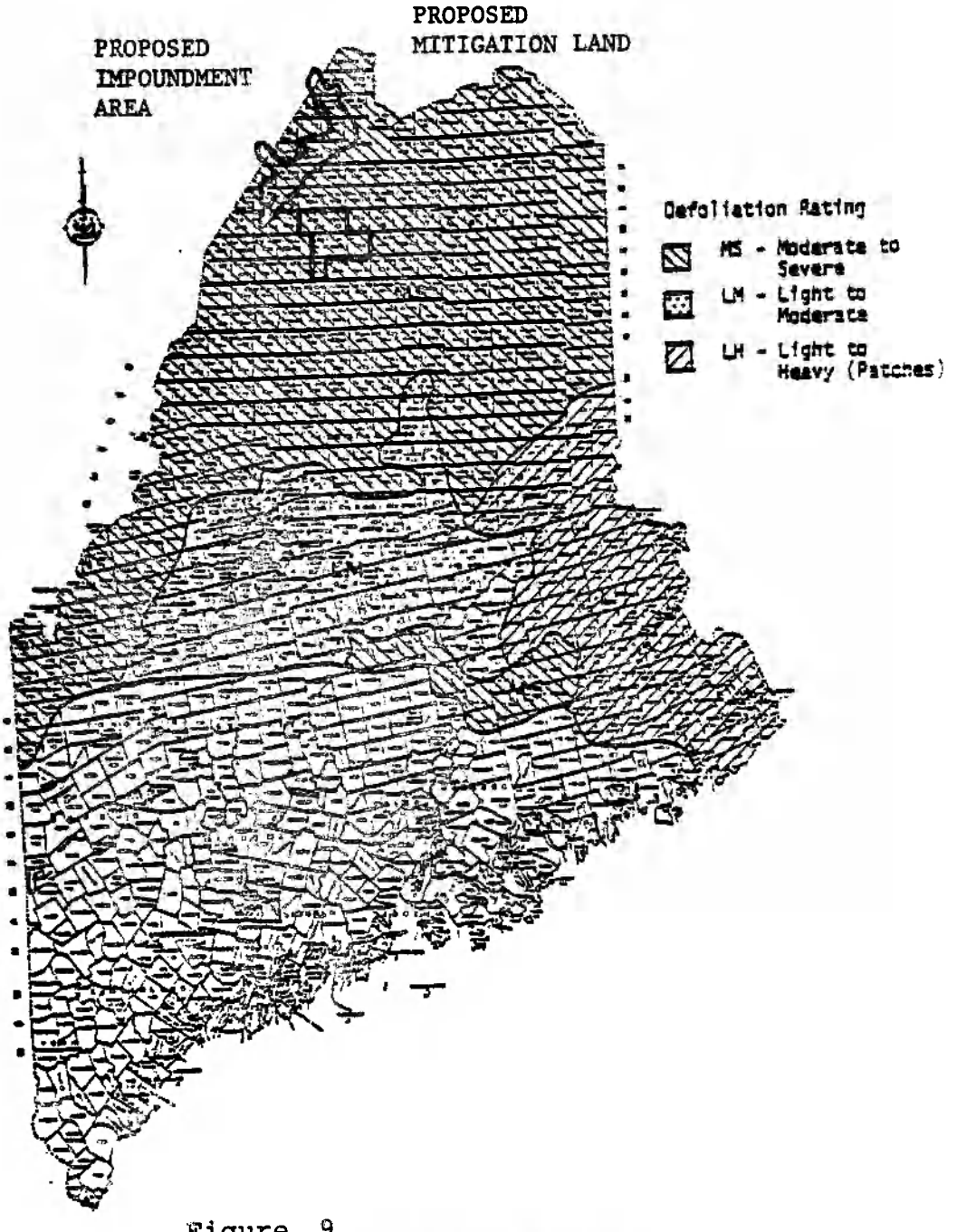


Figure 9
Spruce budworm defoliation, 1978 survey

Source: Cooperative Spruce Budworm Suppression Project Maine, 1979 Final Environmental Statement

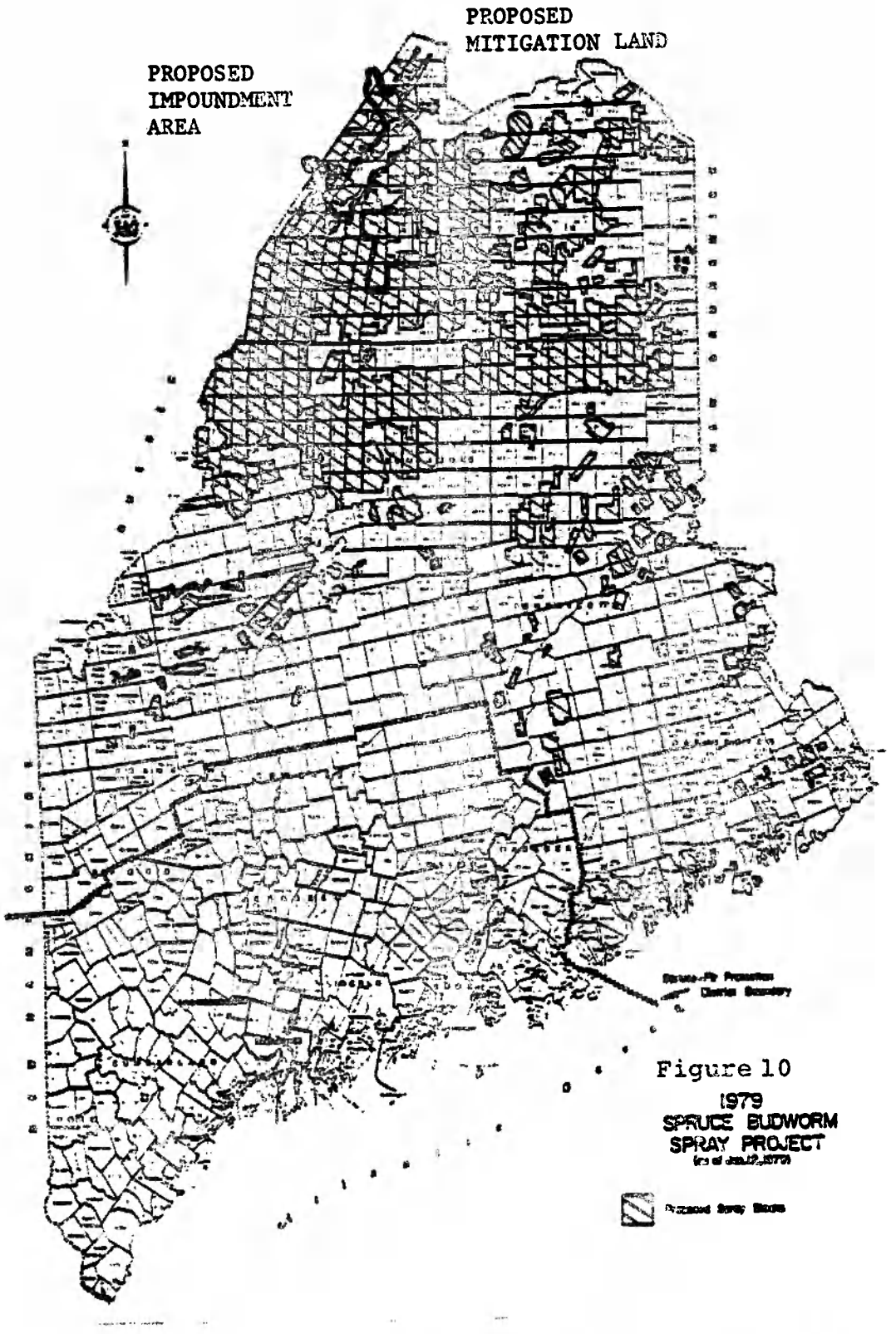


Figure 10

Source: Cooperative Spruce Budworm Suppression Project Maine, 1979 Final Environmental Statement

in three categories.

1) Growth loss

2) Volume and degradation loss

3) Mortality loss

Growth Loss

Detailed studies being conducted by Rea and Houseweart in Maine regarding budworm impact on growth are inconclusive and as a result quantitative volumes of timber losses are unavailable (2).

Studies have shown that a tree which is attacked by budworm, but not severely defoliated (i.e. loses less than 75% of the current year's growth) suffers little growth loss. Even under heavy attack (75-100%) little change can be noticed for two years. It has been found that 25-50% of the old foliage must be lost before a change in yearly growth is detectable. It does appear that the effect of defoliation is cumulative, and evident in the third year, even if defoliation for that year is slight or non-existant (3).

In reviewing the levels of budworm activity over the past several years in the mitigation area (Figures 5-9) it must be assumed that the spruce-fir is growing at a very suppressed rate, if at all. As a result of the decreased growth rates, the future harvest yields from these lands will be reduced. However, more comprehensive studies are necessary to produce valid figures on actual growth losses occurring in the study area.

Volume and Degradation Losses

In many instances tree death may not be the direct result

of budworm infestation. Defoliation may make the tree susceptible to other insect and decay fungi, however, the exact relationship between budworm attack and subsequent invasion by other agents have yet to be conclusively determined (3).

A large proportion of volume reduction occurs as a result of top damage. The tree is opened up to fungi invasion with an alteration in tree form resulting. This change occurs as a result of the lateral branches competing to achieve dominance as the main leader (3). As a result, the tree develops sweeps and crooks in the bole which will affect its potential to make quality sawtimber, but having little or no effect on its usefulness as pulp material.

In addition to changes in tree form, fungi invasion will cause discoloration in the wood fiber in the form of blue and red stain. Blue stain will result in some lumber degrade and minor pulpwood degrade due to brightness and bleaching problems. Red stain indicates wood with lower strength values. As the stained sapwood becomes a white pitted rote, it becomes useless for most wood products. Although the heartwood is still usable, the difficulty of separating the two makes conversion unprofitable (3).

The exact loss of volume will depend upon the extent and severity of degradation, the time remaining for salvage, the intended use of the tree and the specific sawmill and pulpmill conversion process used. Studies have shown that the longest time a tree can remain salvagable is five years, but complete investigations in this area need to be conducted (3).

Mortality Losses

The area within the mitigation lands contains approximately 68,000 acres of spruce-fir and mixed forest timber type. A severe budworm infestation epidemic would have a major silvicultural impact on the area as well as the rest of the spruce-fir region.

The spray program has played an important role in limiting mortality from budworm but has not eliminated it. Although there are no figures relating directly to the mitigation area, the recently published draft Environmental Impact Statement for the 1980 spray project has estimated that mortality on treated acreage averaged 0.40 cords per acre. Applying this figure to the mitigation area, approximately 27,200 cords have been lost on an annual basis. Discounting for salvagability (25%) and merchantability (30%), the estimated volume loss of the commercial forest resources approaches 14,300 cords. At $11.00/cord, the economic loss is valued at approximately $157,000 (4).

Without a spray program, however, the rate of mortality would greatly increase. In the final Environmental Impact Statement dealing with the 1979 spray program, it was stated that without spraying a mortality rate of approximately 0.8 cords/acre could be expected. At this rate, roughly 55,000 cords would be destroyed within the mitigation area in the first year. Discounting for salvagability and mortality, approximately 29,000 cords worth approximately $320,000 would be lost. In addition, if no further spraying was conducted to

control the budworm population, it is expected that 70% of the fir and 25% of the spruce growing stock would probably be lost within 5-10 years. With this loss, a period of 30 or more years would be required before the trees would reach merchantable pulpwood size again and longer for sawtimber (4).

1.3.3 Spruce Budworm Spray Program as a Control Measure

Since 1954 the spruce budworm population has been controlled to a large degree with the use of aerial spraying of insecticides. Spraying has taken the form of a cooperative program between the United States Forest Service, the Maine Forest Service, private industry and other landowners. Table 6 depicts the annualized cost of the program for each spray year by participates contribution.

From 1954-1964 all spray programs used DDT as the sole insecticide. Following public pressure to ban its use, several alternative sprays were selected including Sevin 8 oil, Dylox 4, Orthene Forest Spray and Thuricide (1). Table 7 provides a history of the sprays used since the program's inception.

Each of the above mentioned sprays is utilized in specific areas. Sevin 8 oil is recommended for use in those areas where tree condition is critical and expected budworm population levels indicate early defoliation. Dylox 4 is sprayed in areas containing bee hives due to its low toxicity to bees. Orthene Forest Spray is utilized in areas where aquatic invertebrates and fish are sensitive. Thuricide is recommended

TABLE 6

SUMMARY OF AERIAL SPRAYING FOR SPRUCE BUDWORM CONTROL IN MAINE

YEAR	INSECTICIDE	ACRES TREATED
1954	DDT	21,000
1958	DDT	302,000
1960	DDT	217,000
1961	DDT	53,000
1963	DDT	479,000
1964	DDT	58,000
1967	DDT	92,000
1970	Fenitrothion (Accothion)	210,000
1972	Mexacarbate (Zectran)	500,000
1973	Mexacarbate (Zectran)	470,000
1974	Mexacarbate (Zectran)	430,000
	Fenithrothion (Sumithion)	1,499,000
	Mexacarbate (Zectran)	238,000
1976	Carbaryl (Sevin 4 Oil)	3,460,000
	Trichlorfon (Dylox 4)	40,000
1977	Carbaryl (Sevin 4 Oil)	808,000
	Trichlorfon (Dylox 4)	55,000
	Acephate (Orthene Forest Spray)	58,000
1978	Carbaryl (Sevin 4 Oil)	967,000
	Trichlorfon (Dylox 4)	54,000
	Acephate (Orthene Forest Spray)	96,000
	Bacillus thuringiensis (Thuricide 16B)	21,000
1979	Carbaryl (Sevin 4 Oil)	2,479,000
	Trichlorfon (Dylox 4)	97,000
	Acephate (Orthene Forest Spray)	110,000
	Bacillus thuringiensis (Thuricide 16B,24,32,32B)	41,000

Source: Proposed Cooperative Spruce Budworm Suppression Project Maine 1980 Draft Environmental Impact Statement

TABLE 7

SPRUCE BUDWORM SPRAY PROJECT FINANCIAL HISTORY 1954-1979

Contributions to Project Cost

(% in parens.)

Year	Private	State	Federal	Total
1954	$ 10,045 (44)	$ 5,482 (24)	$ 7,314 (32)	$ 22,841
1958	88,054 (37)	88,270 (37)	58,612 (26)	234,936
1960	71,834 (37)	71,750 (37)	47,750 (26)	191,334
1961	23,189 (37)	23,309 (37)	15,459 (26)	61,957
1963	179,805 (37)	183,552 (38)	125,777 (25)	489,134
1964	28,018 (36)	28,017 (36)	21,667 (28)	77,702
1967	35,953 (30)	35,953 (30)	45,955 (40)	117,861
1970	84,263 (31)	80,926 (30)	105,119 (29)	270,308
1972	385,943 (29)	385,943 (29)	538,001 (42)	1,309,887
1973	360,000 (30)	228,748 (20)	588,745 (50)	1,177,496
1974	360,000 (36)	143,078 (14)	503,078 (50)	1,006,156
1975	2,361,372 (38)	745,696 (12)	3,107,068 (50)	6,214,137
1976	3,964,590 (46.5)	298,410 (3.5)	4,263,000 (50)	8,526,580
1977	1,865,055 (61.5)	77,286 (2.5)	1,092,000 (36)	3,034,341*
1978**	2,211,120 (59.2)	179,280 (4.2)	1,344,600 (36)	3,735,000
1979	6,600,000 (60)	400,000 (4.0)	4,000,000 (36)	11,000,000

*1977 costs include indirect costs, federally cost-shared.

**In 1978, outlays exceeded true project cost by 262,500. This was the cost of 3 tank cars of Sevin-4-oil purchased in 1978 but stored for use in 1979. The data shown here represent the cost of the project and not the total outlays made.

Source: Maine Forest Service

for very sensitive areas with fish, wildlife and human habitation. It is a micro-organism which is pathogenic only to certain insect larvae and therefore particularly desirable for environmental reasons. It is however quite expensive compared to the other insecticides (4).

In order to protect sensitive zones from any adverse effects resulting from the above mentioned sprays, buffer zones have been established within which no spraying will be conducted. Spraying is avoided over all open water and marshes. In addition all lands in the Allagash Wilderness Waterway have been withdrawn from spraying.

The extent of the buffer zone will depend upon the insecticide used, the form of aircraft utilized in the application, and the area being sprayed.

The justification for spraying has switched from reducing budworm population to innocuous levels (pre-1970) to preserving foliage to prevent tree mortality (post-1970). A spraying project is considered successful when the following criteria have been met: (1) a 90% reduction of the budworm population, and (2) protection of 35% of the current year's foliage. The long-term objective is to accomplish over several years a reduction of budworm population thereby regulating the forest and stabilizing the wood-using industry (4).

In 1978 these objectives were not met; primarily due to weather conditions which inhibited spraying and a budworm larvae population which developed more rapidly than the fir foliage. As a result, all of the areas sprayed within the

Allagash-St. Johns region required additional treatment in 1979.

Figure 10 outlines the spray blocks for 1979. Unlike the 1978 spray program, the 1979 project has been termed a success in meeting population reduction and foliage protection requirements.

Presently the draft Environmental Impact Statement for the 1980 project is being reviewed in public workshops and by administrative personnel. The preliminary alternative selected by the U. S. Forest Service is to provide no federal assistance for the 1980 spray program. This decision is based on the following conclusions:

"1) Previous chemical insecticide spray projects have not stopped tree mortality, prevented stand deterioration, halted the spruce budworm outbreak, or altered forest conditions which favor budworm outbreak.

2) Insecticide spraying may be prolonging the outbreak.

3) Wood supply and demand data are not available to support the assumption that the spruce and fir stands proposed for treatment should be protected.

4) Economic analyses supporting the other action alternatives are valid only if all the wood receiving protection is required to maintain the Maine forest economy.

5) Long-term effects associated with temporary reductions in population of some aquatic and terrestrial insect species are unknown.

In addition, the economic effects of insecticide treatment in any one year are short term with all costs and benefits occurring within two years. Long-term economic effects occur only when treatment is applied annually. Insecticide treatments prolong tree life and provide additional time for forest landowners to market budworm damaged or budworm-susceptible stands" (12).

Should this become the final decision of the Forest Service, the future of the spray may be in serious jeopardy. At the moment, private industry and the state of Maine have made no decisions as to what their future activities would be should federal aid be withdrawn. It is likely that the program would continue, but on a much more limited basis with only the extremely critical areas receiving treatment.

The townships in which the mitigation lands are situated presently have a 1-5% mortality rating as a result of budworm infestation. Approximately 82,300 acres have been sprayed over the past five years with areas again being recommended for future spraying.

1.3.4 Use of Preventative/Salvage Cuttings and Integrated Pest Management

As a result of the moderate to severe rating of defoliation within the mitigation area, the managers of the towns involved have taken steps to reduce the volume and economic losses resulting from the infestation. These actions are presently taking place in the form of preventative/salvage cuttings in conjunction with on-going spraying programs.

The resulting form of treatment can be characterized as integrated pest management.

One selective harvest method being utilized involves the removal of the mature and overmature spruce and fir along with the selective reduction of fir in favor of spruce. Additional selective operations, including shelterwood and seed tree harvests, involve maintaining a spruce overstory in order to encourage spruce reproduction and reduce fir regeneration.

Another form of silvicultural treatment being utilized is clearcutting. This practice is normally instituted in mature spruce-fir stands. In the mitigation area, clearcutting is mainly being used as a salvage tool in those stands which already have, or are beginning to suffer from severe budworm attack.

Should the spray program be reduced or discontinued, the above mentioned forms of management in a much more intensified form may become the primary tool for combating the budworm infestation of the area.

Combining preventative/salvage cuttings with spraying operations results in a form of management known as integrated pest management. This form of management would allow a large portion of the existing volume in mature and overmature spruce and fir to die and remain unsalvaged. In turn, all management efforts would be concentrated on those stands which were determined to be the most productive and accessible. Direct control with insecticides, particularly Thuricide, would be required on those targeted lands until the budworm infestation

ran its course on the unprotected lands and budworm reinvasion pressures decreased (12).

Conversations with personnel from the major forest industries in the area indicate that the direction of integrated pest management is expected to change in the coming years from that of spraying to silvicultural techniques for the control of spruce budworm (7).

1.3.5 Economic Impact of Preventative Cutting and Integrated Pest Management

The state and private landowners are beginning to institute long-term silvicultural practices on a limited basis to reduce the susceptibility of spruce fir stands to budworm attack. While the long-term economic effect may be beneficial, these practices are quite expensive to implement initially. Large quantities of acreage cannot receive treatment in time to avoid damage and loss resulting from budworm attack. At the present time, area mills could not process the large volume of timber which would be removed in such operations due to their limited capacities. However, over the long term, increased productivity and reduced susceptibility to budworm should result from these treatments (4).

It may be necessary to conduct some treatments on a non-commercial basis. To help owners offset the high cost of treatment, Maine offers landowners who develop and implement an approved silvicultural treatment plan a deduction in the state's budworm excise tax (5).

An on-going study to determine the economic demand for the spruce-fir resource would be required before the expanded use of integrated pest management as a control tool can be evaluated. The initial step would involve a complete analysis of the timber supply and demand throughout the state. It is expected that a long-term stabilization of budworm population is possible if such management is applied to the entire spruce-fir resource (4). However, the use of Thuricide and other insecticides with the initiation of integrated pest management is marginally cost efficient in the short term and decreases as the volume of acres treated, the discount rate, and the number of years in which treatment is necessary increase. Due to the high cost of Thuricide, only the most valuable stands can receive treatment (12). Additional research is necessary before this practice can be instituted on a large scale in the state.

1.3.6 Impact on Timber Supply

The future timber inventory of Maine is very much in question as a result of the budworm infestation. From 1958 through 1970, approximately 36 percent of the state's spruce-fir growth was harvested. While current growth to harvest ratios have not yet clearly been determined, there are indications that it may be nearly equal. A recent study has concluded that "no latitude exists for sustaining large tree growth or mortality losses without impacting directly upon the present economic base". (12)

An accurate estimate of supply-demand data regarding the Maine forest industry is also currently lacking. As a result a precise evaluation pertaining to the degree of protection needs and economic losses from a severe budworm infestation is hard to predict (12).

It is safe to assume however that any continued or future budworm outbreak will adversely affect the spruce-fir inventory and the region's forest industry.

1.3.7 Opportunity Costs Resulting from Budworm Damage

With or without the implementation of the mitigation plan, there will be a mortality loss resulting from budworm infestation. This level of mortality will exist even with the continuation of the spray program. The assumed base mortality rate will be the previously mentioned 0.40 cords per acre. "The rate is assumed to be constant for years 1-25 and then undergoes abatement of 50% in years 26-50 and 51-100 consecutively as a result of natural or manipulated population controls." (5) This of course is only an estimate as the future levels of budworm as well as future control methods are virtually impossible to predict. A hundred year period was chosen since this is the project life of the impoundment area. Table 8 illustrates the loss that would occur within the hundred year time frame.

TABLE 8
ESTIMATED LOSS IN THE MITIGATION AREA DUE TO BUDWORM AND RELATED MORTALITY

Years	Annual Loss (M Cords)	Total Loss (M Cords)
1-25	27.2	680.0
26-50	13.6	340.0
51-100	6.8	340.0
		1360.0

Total Loss = 1,360,000 cords

Mortality losses without the spray program would be much higher. There is a potential loss of up to 70% of the fir and 25% of the spruce growing stock within 5-10 years should spraying be discontinued. Assuming an average spruce-fir stand density of 16 cords per acre and the eventual mortality of 9.9 cords per acre within ten years (4), approximately 675,000 cords would be destroyed within the mitigation area. Discounting for salvagability (25%) and merchantability (30%), the estimated volume loss approaches 355,000 cords. At the present day price of $11.00 per cord, the loss is valued at $3.9 million. The economic loss however must be considered conservately low when reviewing the recent escalating stumpage prices. In addition this price does not take into account the sawtimber volume present which would greatly increase the price. The loss for the remaining 90 years would be very difficult to estimate, but it will quite likely exceed the losses which would be experienced through a continued spray program.

In addition to the forest resource which may be lost, another major component which may be drastically changed is the wildlife habitat potential of the forestland. (See Section 2, Evaluation of the Mitigation Plan, for detailed information.) Should this occur,the possibility of lost hunting license revenue exists and should be considered as an opportunity cost. A quantitative value of this lost revenue is however quite difficult to estimate.

2.0 Evaluation of the Mitigation Plan

The successful implementation of the mitigation plan will depend upon a variety of factors which are discussed in this section. Shortcomings in any one of these factors may be of an adverse enough nature to seriously limit attainment of the desired mitigation goals. In addition to the factors mentioned below, additional areas concerning plan implementation are covered in Section 2.2.4 of the mitigation plan.

2.1 Site Selection

The townships designated for acquisition were selected according to their overall value for wildlife mitigation. Habitat type composition, forest maturity, deer wintering habitat, stream valley habitat, public ownership, site accessibility and cohesiveness of mitigation management units were the parameters used to evaluate a township's potential for wildlife mitigation. Of the various sites studied, those towns along the Allagash Wilderness Waterway and southeast of the impoundment area were found to provide the greatest potential in meeting the above mentioned needs and thus have been designated as the proposed mitigation area. Included in this area are townships T13 R13, T13 R12, T12 R12, and T12 R13 and T11 R13 from the Allagash Wilderness Waterway boundary to the east.

2.2 Acquisition of the Mitigation Lands

It is recommended that proceedings to acquire the land take place immediately following project approval as there may be delays in acquisition should the landowners refuse to accept the proposed compensation payments. Their refusal may result in lengthy court condemnation proceedings and delay implementation of the plan. In addition, it may be necessary to impose regulatory constraints on the landowners to prevent overcutting and destruction of the forest land before it is acquired for mitigation. Any severe overcutting may reduce the habitat potential for portions of the land and thereby render elements of the plan ineffective.

2.3 Implementation of the Mitigation Plan

2.3.1 Economic Operability of Initial Plan Implementation

The plan presently calls for management measures to begin concurrently with project construction. Included in these measures is the initiation of timber marketing in designated areas. Successful implementation of this phase of the plan from an economic viewpoint however is questionable.

Current project plans call for the clearing of 34,700 acres of the impoundment during the first four years of construction (13). This short harvest schedule would place an enormous amount of timber on the market. In addition to this volume, landowners throughout the region may be conducting salvage cuttings of budworm infested stands to prevent

economic losses. These two sources of raw material may push area mill capacities to their limits, leaving timber being removed not only from the mitigation lands, but from other area lands with no marketplace.

The area being cleared in the impoundment area will in all likelihood be of the clearcut nature. This will allow for a totally mechanized form of harvest to take place. In comparing this to the selective harvests or very small clearcuts proposed for the mitigation area, there exists the possibility that most woods crews may have little or no desire to work in the mitigation area. This stems from the fact that they are paid on a production basis and therefore would probably realize a greater economic benefit from harvesting in the impoundment area or elsewhere in the St. Johns/ Allagash basins. If a marketplace could be found for the material, large subsidies may be required to entice workers into the mitigation area. It must therefore be assumed that most if not all harvest operations which take place in the mitigation area during the first four years of dam construction may be of a non-commercial nature.

2.3.2 Effects of Present Harvesting on Plan Implementation

Harvesting is presently taking place according to the guidelines mentioned in Section 1.2 with regards to diameter limits and type of timber being removed. Of the total acreage within the mitigation area, approximately 44,000 acres have

been designated as mature spruce-fir. This timber type furnishes the greatest wildlife management potential. However, harvesting practices are continually reducing this component. As a result, the overall wildlife management potential may be declining. To compensate for this loss, additional land acquisition may be necessary to achieve the desired wildlife mitigation. The possibility of additional land acquisition should be carefully reviewed and presented in the finalized mitigation plan.

2.3.3 Effects of Spruce Budworm on Plan Implementation

The present spruce budworm epidemic may make implementation of the mitigation plan, both from wildlife management and timber management prospectives extremely difficult. As stated, the towns within the mitigation area presently have a critical rating with regards to mortality. An annual net volume loss of up to 27,000 cords is likely occurring. Should spraying be discontinued, much higher losses could be expected, with up to 70% of the fir and 25% of the spruce component being destroyed within 5-10 years. As a result, any anticipated harvest schedule would be upset as massive salvage operations would be required. A reduction of the forest resource base will occur as a result of the infestation and salvage operation. This reduction in quantities of softwood available for marketing would place increased emphasis on the hardwood component which as previously stated, has a very limited market. If this market is not expanded and improved to allow increased

marketing, the annual income from harvesting would be greatly reduced. This would result in an increased operating deficit for the area.

Presently the landowners and managing companies are conducting salvage operations in the area to alleviate the budworm epidemic. It would be advantageous from an economic and silvicultural viewpoint to continue these operations without interruption during and following land acquisition.

With regards to wildlife management potential, the spruce budworm will both positively and adversely affect the future habitat potential of the area.

It may serve as a silvicultural tool in some areas by thinning or removing spruce-fir stands and providing a diversified stand composition. This will serve to promote a habitat suitable for a variety of species.

The adverse effects of budworm are, however, quite pronounced. Currently there are approximately 14,540 acres of deer wintering yards within the proposed mitigation area. As a result of the present infestation a reduction of yards will likely occur. Without preventative cuttings the loss may reach 7,000-11,000 acres (6). These losses may also be somewhat reduced in those yards which have a significant component of white cedar and/or black spruce (13). The exact volumes of cedar and spruce present is unavailable and studies to determine an accurate estimate of possible deer wintering yard losses is recommended.

Along with the loss of wintering yards, heavy infestation and defoliation and mortality will affect the spruce-fir bottomlands which have been zoned in the mitigation plan for deep woods species. As a result, management measures to maintain and enhance the habitat potential for such species as spruce grouse, marten, lynx and black bear may be reduced.

The loss of the habitat units may drastically reduce the potential for successful implementation of the mitigation plan. It is therefore quite essential that the finalized mitigation plan discuss and carefully consider the potential impact of spruce budworm infestation and spruce-fir mortality on plan implementation.

2.4 Feasibility of Hardwood Marketing

The present and future demands for low quality hardwoods will definitely affect the success of implementing the mitigation plan. In this area the past and present hardwood market has been restricted to veneer and higher quality logs. The historical absence of a low quality hardwood market and the high-grading of the quality timber has resulted in residual stands that are now largely comprised of damaged, defective and low grade timber (8).

Information obtained from mills drawing from the mitigation area indicates that approximately 34,840 cords are annually harvested. (See Table 4.) Hardwood volumes, though not separately included in Table 4 represent a small percentage of the total volume. An average timber sale size for this

area is approximately 450 acres and contains approximately 4,000,000 board feet (14). The hardwood composition represents approximately 4% or 150,000 board feet (14). Therefore by using the 4% hardwood harvesting ratio it can be assumed that 1,394 cords of hardwoods are presently being harvested from the mitigation area.

According to the mitigation plan, there are approximately 34,149 acres of pure hardwood stands present in the mitigation area. (See Table 9.) Assuming that a harvest rate of .31 cords/acre/year is maintained, as proposed, then 10,586 cords of hardwood would be annually harvested. Consequently, a harvest increase of 9,192 cords of hardwoods can be anticipated. If the present hardwood market remains constant, then this additional volume may not be marketable.

As a result, a 100% government subsidy may be required just to cut, lop and pile this timber. A two-man crew is capable of harvesting roughly 25 cords per day (9). Therefore approximately 368 crew days or 74 crew weeks will be necessary to cut this timber. With the present crew salary (skidder rental included) being approximately $1,400.00 per week, the harvesting cost will be approximately $103,600.00 or $11.27 per cord.

The deficit for harvesting hardwoods can be reduced or eliminated by the development of a viable low grade market. The utilization of lower quality timber for firewood and wood pellet production and as biomass for steam and electric

TABLE 9

COVER TYPE COMPOSITION WITHIN THE MITIGATION AREA, BY ACRES

Cover Type	Softwood (acres)	Hardwood (acres)	Total Acreage
Softwood Mature	38,481	5,497	43,978
Softwood-Hardwood Mature	13,191	7,915	21,106
Hardwood Mature	1,950	13,650	15,600
Poplar Birch Mature	-----	595	595
Hardwood-Softwood Mature	3,089	5,148	8,237
Hardwood Regeneration	-----	1,344	1,344
Softwood Regeneration	1,482	-----	1,482
Totals	58,193	34,149	92,342

Figures were obtained by multiplying the average percent cover type given in the Mitigation Plan times the total acreage

energy production may be possible future markets. However, until these or other markets are made available, the harvesting of low grade timber within the mitigation area will require substantial government subsidies. A study examining the feasibility of developing future low grade hardwood markets is strongly recommended.

2.5 Evaluation of Proposed Subsidies

The proposed 25% subsidy may not sufficiently offset the cost of achieving desired management objectives. As previously discussed, in order to initiate harvesting in hardwood stands, considerable subsidies may be required. In contrast, harvesting practices prescribed for spruce-fir stands may be economically feasible without sibsidizing. The accessibility, sale size and volume per acre will determine the economic operability of each timber sale. Assuming maximum accessibility, the minimum sale size which is considered commercially feasible is approximately 2,000 cords (7). Therefore, timber sales not containing this volume will likely require some degree of subsidizing. However, a realistic estimate determining the amount of subsidizing required to inact the mitigation plan cannot be made until a detailed harvest plan is developed.

2.6 Cost of Achieving Desired Mitigation Results

The mitigation plan presently envisions an annualized cost for project implementation of $1,535,400 at the authorized 3-1/4% and $2,725,800 at the current water resource

rate of 7-1/8%. The minimum yearly potential income resulting from stumpage sales and visitor user fees is stated to be $256,900, thereby creating a possible yearly budget deficit of $1,278,500 - $2,468,900.

3.0 Economic and Forestry Impacts of Plan Implementation

3.1 Marketability

Implementation of the mitigation plan may adversely affect the marketability of the forest resource. The severity of the impact can only be rationally analyzed once a specific harvest schedule is compiled. The plan states generally how areas will be managed for certain wildlife species requirements. However, there is no reference made to where and how much of each management technique is going to be applied. For example, the plan calls for small clear-cuts 2-4 acres in size, but gives no indication of where they are going to be located, how frequently they will occur, or how close they will be to other areas designated for harvesting. All of these factors will directly affect the stumpage price and economic operability within the mitigation area.

The main objectives of the harvest plan are to decrease the uniformity of the evenaged timber types and to create a more diverse age (unevenage) distribution throughout the mitigation area. To accomplish these objectives, single and group tree selection, small patch-cuts and a more intensive cutting cycle are recommended.

In theory these recommendations are sound, however, the actual execution of these requirements may cause some marketing difficulties. First of all, the 10-15 year cutting cycle which is proposed for the mitigation area is more intensive than is presently being utilized. The forest industry/land

managing companies are maintaining a 20-25 year cutting cycle in areas being selectively harvested and are harvesting approximately .4 cords/acre/year.(7). (Refer to Table 4.) By maintaining this cutting cycle and harvest rate, the companies are removing 8-10 cords/acre/harvest. Assuming that, with the enactment of the mitigation plan, the harvest rate will be .31 cords/acre/year, then the 10-15 year cutting cycle will decrease the volume removed to 3-5 cords/acre/harvest. Since additional time and acreage will be necessary to harvest a particular volume, an increase in harvesting cost can be anticipated. Furthermore, logging contractors paid on a production basis will be reluctant to work in these areas unless they are paid a proportionally higher unit production price. Consequently, lower profits per unit of harvested timber will probably force the forest industry to purchase the timber at lower stumpage prices. Also some timber sales may produce an unreal economic situations requiring free stumpage and/or government subsidies.

As previously explained in Section 2, accessibility, species composition and volume removal will regulate stumpage prices and economic operability. Therefore, wildlife management objectives and maximum economic operability may be obtained with the careful consideration and coordination of these factors.

3.2 Supply

The proposed mitigation lands are presently being managed

for timber production by the forest industry or professional land management firms. Past and present management objectives and monetary expenditures have been made on the assumption that this land would remain under current ownership and continue to yield a reasonable financial return in the future. However, with the public acquisition of this property, returns from prior expenditures for budworm spraying, market and forest management plan development, taxation, and road construction and maintenance would not be realized by the present landowners.

In addition to these expenditures, the landowners will suffer a large monetary loss in terms of annual income. Using the present harvest rates for the mitigation area shown in Table 4, along with a value of $33 per thousand board feet for sawtimber and $11 per cord for pulpwood, approximately $443,000 could be lost on an annual basis.

One final loss that the landowners may suffer is the permanent loss of the land and the right to all potential benefits derived from the land, including the previously mentioned annual income of $443,000.

A lag time of 1 to 2 years from authorization of the mitigation plan by Congress to the time of land purchase may reduce these losses somewhat as the landowner would have time to conduct last minute harvest operations. Care must be taken however to ensure that overcutting of the lands do not take place during this time. As previously mentioned, overcutting may reduce the success of plan implementation.

Forest industries that are also landowners will be adversely affected by the potential loss of this timber source from their inventory. This loss, however, will probably not be complete as they will be able to procure some timber under a competitive bid situation which may or may not prove to be feasible depending on the various economic factors involved in governmental management of the land. Consequently, the total volume of this lost inventory may be quite large. Of the 112,670 acres designated for mitigation, approximately 88,900 acres contains mature sawtimber. Nearly half of this total acreage is in mature spruce-fir which is presently in great demand for pulpwood and lumber. Since the forest industry will no longer be able to anticipate an annual supply from these towns, intensified management will be required on their remaining land holdings. As a result, existing management plans will be disrupted and overcutting may be required in adjacent areas to obtain necessary volumes for on-going industries. It may take several years until management plans and harvesting schedules are realigned to compensate for the loss of the mitigation lands. The forest industry may eventually be able to intensify management on their remaining lands to offset the loss of this specific area. However, as additional lands are withdrawn from commercial forest production for such uses as dam impoundments, the Appalachian Trail, scenic river waterways, and tribal Indian compensation, the future ability of the forest industry to satisfy increasing market demands may become critical.

3.3 Potential Impacts of an Expanding Road System

The frequency and quality of the roads throughout the mitigation lands will play an important role in plan implementation. On the lands outside of the Allagash Wilderness Waterway, present plans call for additional major access roads to compliment the existing roads. These roads will be laid out to facilitate practical management on a 10 to 20 year cycle. Major access roads will be constructed at intervals of not less than one mile. In addition, secondary access in the form of permanent and temporary skid trails will be increased to provide access to particular forest stands (13).

No new major access routes will be constructed on lands within the Allagash Wilderness Waterway. However, one new major road, parallel to the Allagash River at or near the one mile zone perimeter, may be constructed to aid planned management. Additional access would be available through temporary roads and skid trails (13).

The current plan presently calls for all road construction and maintenance costs to be borne by the federal government. This will enhance the feasibility of more profitable timber sales as prospective purchasers will not be required to invest money into road construction. Instead they may direct their dollars towards paying a higher stumpage price for the timber. Regardless of whether the government or the timber buyers pay for the necessary road work, it must be realized that a huge operating cost and deficit will exist in the annual operating budget for the area.

Current expansion plans call for approximately 200 miles of new road to be constructed at a cost of between $30,000 to $45,000 per mile. Main haul roads are presently being constructed for approximately $25,000 per mile (9). As a result, the proposed budget for new road construction should be more than adequate to accomplish the desired goals.

The finalized plan should however re-evaluate the money budgeted for annual road maintenance. Currently, $31,000 per year has been designated for this operation. However, conversations with personnel from Great Northern have revealed that approximately $7,000 per mile is currently being spent on maintenance (9). Assuming this figure to be valid, only roughly 4.5 miles could be properly maintained on an annual basis. The correct appropriation for road maintenance must therefore be based on a realistic cost per mile times the number of miles being treated annually. The total mileage treated will depend upon the location of acres being treated and utilized in any given year.

It is possible that the present landowners may continue to construct new roads and maintain existing ones during the ownership transition period. Their decisions will be viewed from a totally short term economic prospective. If they are able to realize their expenditures, they would likely continue construction and maintenance. If, however, expenditures exceed realized revenues, most if not all construction and maintenance operations would cease. It would therefore be quite advantageous for the government to provide incentives of some form

to the current landowners to continue maintenance operations during the transition period. As a result of continued maintenance, the government would receive a road system that is in far greater condition than it would be in if maintenance operations were discontinued.

4.0 Cumulative Impacts of the Dickey-Lincoln Project and the Mitigation Area

4.1 Loss of the Present Landowners Forest Resource Base

As previously discussed in Section 3.2, the proposed shifting of land from private to public ownership will adversely affect the present landowners/managers. Approximately 234,051 acres will need to be acquired in order to implement the entire project. Therefore, financial returns from prior expenditures (investments) will not be realized by the present owners. Furthermore, the present owners may permanently lose a considerable amount of annual revenue derived from the property. As earlier calculated $443,000.00 of annual income may be lost due to the implementing of the mitigation plan. In addition to this, an annual revenue loss of $458,095.00 to $553,861.00 is anticipated for the impoundment area due to the flooding of 80,455 acres of forest land. This figure, however, is probably exceedingly low as no sawtimber volume and values have been included. In addition, the government acquisition of approximately 33,030 acres will be required to maintain a 300 foot horizontal strip above maximum pool elevation (15). Income lost to present landowners on this land is difficult to determine as no volume estimates are available.

In summation, a minimum annual income of $901,095.00 to $996,861.00 may be lost by forest landowners with the cumulative enactment of the project and the mitigation area.

The private sector would also be adversely affected by the loss of this land from the commercial forest base. Management practices developed for this property were based on the assumption that a continual supply of timber would be obtainable from this property. However, with the project implementation, 80,455 acres of timberland will automatically be withdrawn from the resource base. In addition to this, it is not likely that future substantial timber volumes will be harvested from the 33,030 acres (needed for the 300 foot horizontal strip) and the 38,000 acres (proposed for deep woods management). Though timber yields will continue from the mitigation area, forest industries will not be able to anticipate future yields as the timber will most likely be sold on a competitive basis to the highest bidder. Consequently, the forest industries will have to intensify their management practices on their remaining holdings, Initially, a timber revenue loss may be forseeable due to the time and expenditures required to change long term management practices and to derive benefits from the results. If, however, necessary volumes cannot be obtained by intensified management, then overcutting in some areas may result. This would cause a decline in the future availability of merchantable timber. As a result of the decreased available growing stock, stumpage prices can be expected to rise.

4.2 Volume Losses Resulting from Project Implementation

The Dickey-Lincoln Environmental Impact Statement has

estimated that as a result of project implementation there could be an annual growth loss of 41,645 to 50,951 cores. Translating this into the 100 year life span for the impoundment, there may be a total project loss of 4,164,500 to 5,035,100 cords. The real loss directly attributable to Dickey-Lincoln would not however total this volume. The Forestry Economic Impact Study for the project has stated that budworm mortality in the impoundment area may total 1,577,500 cords. As a result, the volume loss directly attributable to dam construction would be 2,582,500 to 3,452,500 cords (5). It is anticipated that no real volume loss will occur within the mitigation area (outside of the previously mentioned budworm mortality) if the harvesting volumes outlined in the plan are strictly adhered too. Therefore, the volume losses resulting from project implementation will be limited to the timber resource lost in the impoundment area. At the present day rate of $11 per cord, the economic loss will total approximately $28.4 to $38.0 million. This of course is a very conservative figure as the base rate for pulpwood was used and the sawtimber volume and value was not considered. In addition, normal inflation will escalate the value of the timber resource over the 100 year period at an unknown rate.

Along with these losses, there will be additional mortality throughout the rest of the spruce-fir region as a result of budworm infestation. While the exact losses are extremely difficult to predict, any further reduction in growing stock

volumes will adversely affect future timber supplies and the forest industries of northern Maine.

This reduction will place increased demands on the remaining resource base and escalate stumpage prices throughout the region.

4.3 Effects of Salvage Schedule

Following project implementation, one of the initial impacts on timberland management will result from activities relating to harvesting the timber within the impoundment area. A detailed analysis conducted in the Forestry Economic Impact Study has determined that an eight (8) year harvesting schedule would be most advantageous. Using this schedule, the impacts on markets, forest management and labor would be reduced. In addition, this extended timeframe will allow for a greater successful initial implementation of the wildlife mitigation plan. As previously stated, the economic success of initial timber marketing operations would be questionable if a short salvage schedule was adopted.

It is therefore quite essential that the salvage operation be carried out over the longest possible timeframe in order to minimize impacts on the forest industry of the region.

4.4 Disruption in Road Access

As a result of project implementation, access problems will be created to varying degrees. With regards to the mitigation area, several criteria must be met to insure minimal impact. Unobstructed thru travel, continuation of present

haul load limits on major roads and year round travel must be assured. If these conditions are met, public acquisition of the mitigation lands should have virtually no impact on access throughout the region.

Following construction of the impoundment, existing transportation routes will however be drastically changed. Approximately 73 miles of existing roadway will be inundated. An additional 231 miles of road will be made inaccessible to the United States via the present road system (5). In order to make these areas accessible, new roads and crossways will need to be constructed at considerable cost. Compensation will be provided in the real estate estimate to enable the land-owners to construct new roads for connecting those areas which would otherwise be inaccessible. Possible future routes and crossways are shown on the attached Wildlife Mitigation and Impoundment Area Location Map. As additional travel is required to reach established marketplaces, increases in transportation costs will occur. The exact rise in costs will depend upon the additional miles traveled, along with any associated increases in gasoline and equipment maintenance costs.

4.5 Changes in Timber Flow

Following impoundment construction, a redistribution of the timber flow will occur. Timber from those areas which will be made inaccessible to the United States without new road and crossway construction, will undoubtedly move into

Canadian markets. This timber, however, will probably be sold at deflated prices as competition from Maine mills would be restricted or eliminated.

By the same token, timber located in the mitigation area and east of the impoundment would likely flow almost entirely to Maine mills. The high cost of construction for crossways over the impoundment would greatly hamper the ability of Canadian mills to competitively bid on timber within the mitigation area.

Overall, project implementation will have a greater adverse affect on the Maine forest industry. Recent timber marketing reports have shown a definite trend towards in-state utilization of the timber resource within the project area (7). Along with International Paper Company's purchase of the former Levesque sawmill in Masardis, Maine, and John Sinclair's purchase of the former Arnold Fornier sawmill in Ashland, Maine, several other major firms have made additions and/or improvements to their processing facilities. All of these signs indicate change in the flow of timber away from Canadian and towards Maine markets. However, if the project is implemented, increased utilization of the forest resource by Maine industries will likely be retarded as approximately 182,224 acres of timber will be isolated to the north of the impoundment and will be readily accessable only to Canadian markets.

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APPENDIX I

CUTTING PLAN FOR

ALLAGASH WILDERNESS WATERWAY OPERATIONS

Submitted by (Company) Great Northern Paper Company

Year & Operation # 1979-80

Location T13 R12 (East of A.W.W.) in North East portion of township (map enclosed)

Contractor Great Northern - Rocky Brook Operation

Cutting Period 5/21/79 to 5/1/80 Hauling Period Same

Wood Volume to be removed 25,000 cords Spruce & Fir

Plan for Reforestation

Natural reproduction

Marking or Cutting Diameter Limits by Species

Combination of diameter limits of 22" on Spruce and 8" on Fir in stands with sufficient Spruce basal area to remain windfirm and clearcuts on steep areas with high Fir percentages. Budworm damage is severe over entire area.

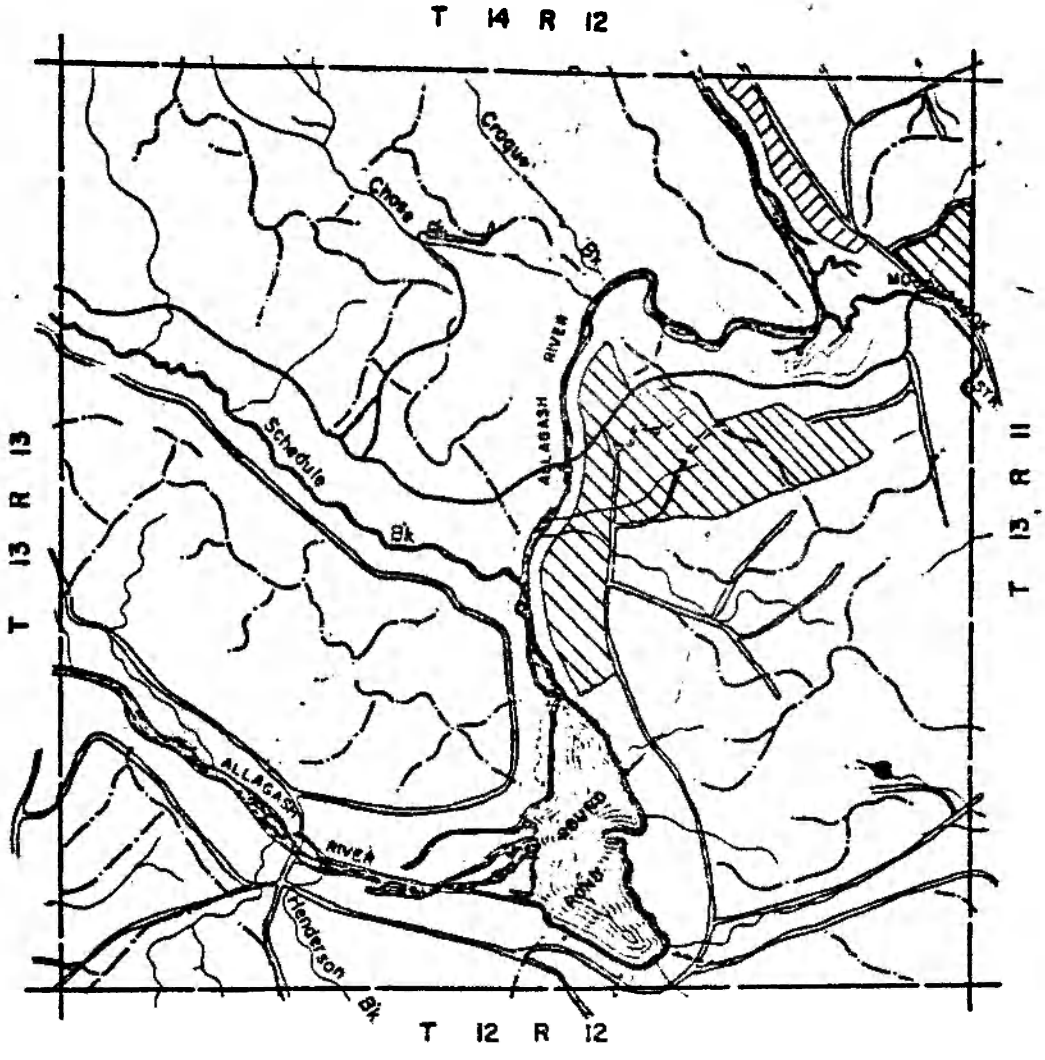
Comments on Haulroads, Camp Locations, and Waterway Crossings (attach map)

From GNP camps located on T13 R11, this operation will be cutting in the North East portion of the township. East of the A.W.W. maintenance of roads built previously will be necessary. Products will be hauled to Nashville and Portage.

Area Superintendent: O. K. Tripp, Portage Storehouse, Portage, Maine 04768

Telephone Number: 435-3681

Prepared by E. E. Chase
May 8, 1979



GREAT NORTHERN PAPER

ROCKY BROOK OPERATION

1979 - 80 Season

COMBINATION CLEARCUT & DIAMETER LIMIT

DIAMETER LIMIT

TOWNSHIP 13 RANGE 12

ARDOSTOOK CO

Scale 1" = 1 Mile

1949

APPENDIX II

CUTTING PLAN FOR

ALLAGASH WILDERNESS WATERWAY OPERATIONS

Submitted by (Company) International Paper Co.

Year & Operation # 1978 Harvest Cut

Location Twp.11 Range13, Aroostook County Maine. Harvesting operations: #1. West of Umsaskis lake. #2, East of Long lake along Glazier brook, with road right-of-way.

Contractor St. Paul Lumber Co.

Cutting Period 6/78-3/79 **Hauling Period** 6/78-3/79

Wood Volume to be Removed #1; 4,500,000 Bd Ft. spruce and fir plus associated species 30,000 Bd Ft. road right-of- way. #2, 750,000 Bd Ft. spruce and fir plus associated species 100,000 Bd Ft road right-of- way.

Plan for Reforestation

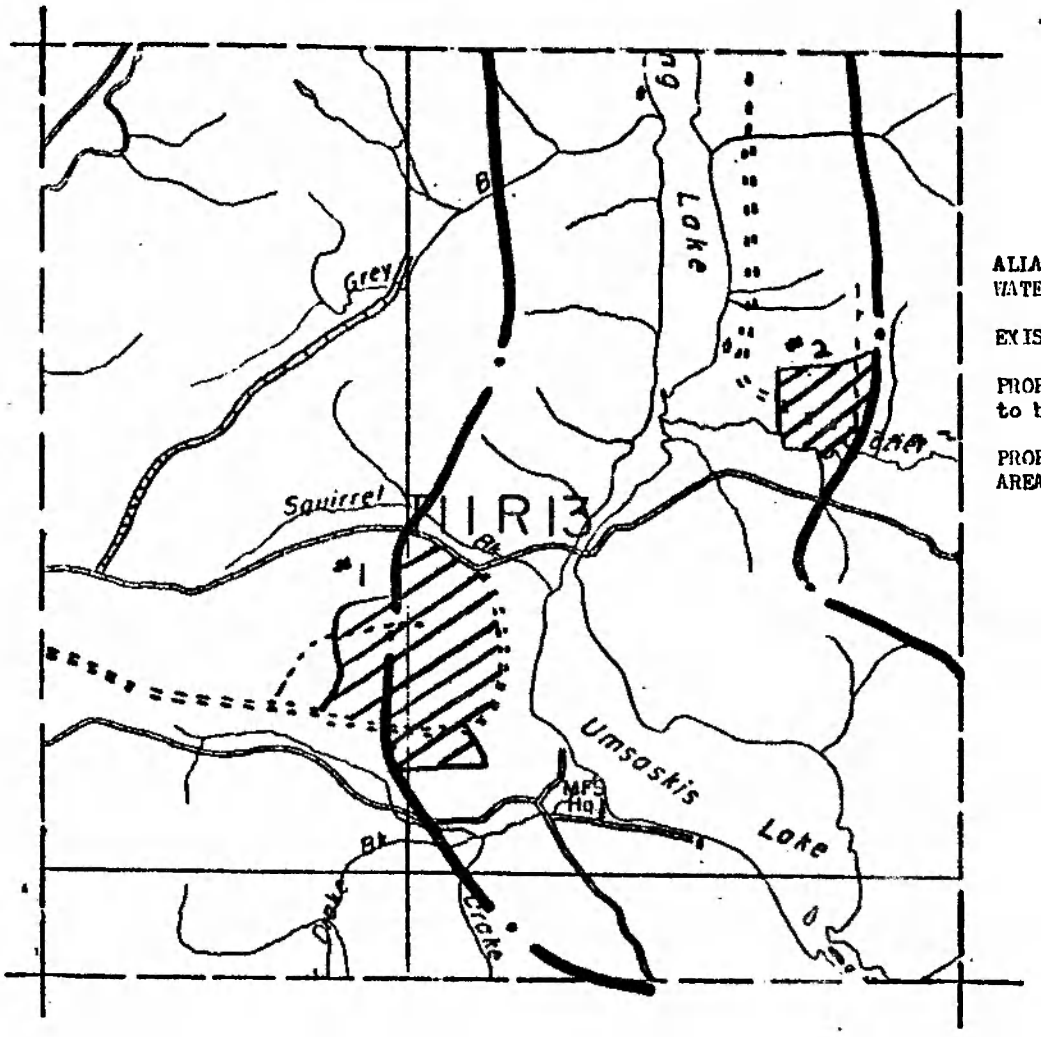
The operations are located in an area highly susceptible to future budworm feeding. Our cutting operations will remove as much fir in the stands as possible down to a six inch DBH. so as to encourage more spruce regeneration. These second growth stands are the results of heavy Lacroix cuts in the 20s and 30s and our cuts will open up these stands. The cuts will act as a thinning and will allow natural regeneration to become established, creating a more uneven age stand.

Marking or Cutting Diameter Limits by Species

Fir	- 6" DBH and up
Spruce	- Defective, defoliated, and over 13" DBH as marked
Cedar	- 12" stump diameter
Pine	- 18" stump diameter
Hardwood	- 16" stump diameter

Comments on Roadroads, Camp Locations, and Waterway Crossings (attach map)

1. Marked wood cut.
2. No camps to be located within one mile Allagash Wilderness Waterway Zone.
3. Roads will be located as shown on the attached map.
4. Areas within 250' of either shore of tributary brooks to the Allagash River will be marked so that no more than 40% of the volume will be removed.
5. All roads and trail crossings will have suitable bridges or culverts.



T11R13

1" = 1 MI.

ST. PAUL LUMBER CO.

ALLAGASH WILDERNESS WATERWAY 1 MILE ZONE

EXISTING ROAD

PROPOSED ROAD to be cut 1978-79

PROPOSED HARVEST AREA 1978-79

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