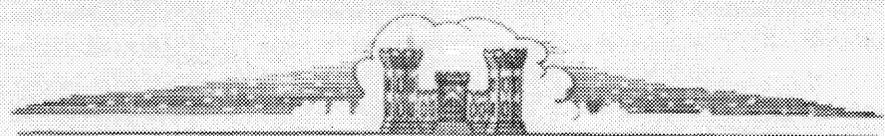


Scary

DRAFT
SUPPLEMENT
ENVIRONMENTAL IMPACT STATEMENT
DICKEY-LINCOLN SCHOOL LAKES
MAINE, NEW HAMPSHIRE AND VERMONT, U.S.A.
AND
QUEBEC, CANADA



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

MARCH 1980

DRAFT
SUPPLEMENT
ENVIRONMENTAL IMPACT STATEMENT

DICKEY-LINCOLN SCHOOL LAKES PROJECT

AT
DICKEY, MAINE

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

SUMMARY

DICKEY-LINCOLN SCHOOL LAKES
PROJECT AT DICKEY, MAINE

(X) Draft Supplement

() Final Environmental Statement

RESPONSIBLE OFFICE:

Colonel Max B. Scheider
Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154
Telephone (617) 894-2400

1. NAME OF ACTION: (X) ADMINISTRATIVE () LEGISLATIVE

2. DESCRIPTION OF THE ACTION: The Corps of Engineers proposes to acquire and manage 112,370 acres of lands in the Allagash River watershed for wildlife mitigation, and a maximum additional 500 acres along the St. John River for endangered species mitigation. The brook trout fishery that would remain in the project area after implementation would be managed to maximum native potential.

3a. ENVIRONMENTAL IMPACTS: Impacts associated with the proposed action would be to increase overall wildlife habitat productivity, reduce the loss of overwintering deer habitat carrying capacity, and to offset wildlife losses attributed to the project. In this instance 112,370 acres of terrestrial habitat would be purchased and managed for wildlife purposes and would affect existing commercial forestry operations and the supply of commercial timber products. The forest habitat management plan and associated logging road system would reduce the near wilderness character of the area with the exception of the Allagash Wilderness Waterway. Acquisition of riparian habitat for the endangered Furbish lousewort will protect and perpetuate the existence of the species. Stream maintenance for fisheries management will maintain brook trout biomass at those levels prior to project implementation.

b. ADVERSE ENVIRONMENTAL EFFECTS: Acquisition and management of approximately 112,370 acres of terrestrial habitat will be removed from commercial forest ownership and production to be managed to maximize wildlife habitat value, adversely affecting the marketability and supply of commercial forest products. Forest industry landowners would lose returns on investments in forest management plans and timber treatment and suffer capital gains tax losses upon sale of the land.

The forest habitat management plan and associated logging road system would reduce the expanse of mature spruce-fir forest and the near-wilderness character of the area. Wildlife species which utilize expanses

of mature forest and/or are sensitive to increased human interference may be adversely affected. Wilderness recreation opportunities will be reduced over part of the mitigation area.

Logging road construction and frequent logging operations within forest stands will cause some increase in soil erosion, compaction, and sediment transport. Minor reductions in terrestrial and aquatic productivity will result from the above mentioned impacts.

4. ALTERNATIVES: The following alternatives to the proposed mitigation plan were considered:

- a. No Federal Action
- b. U.S. Fish and Wildlife Service Conservation and Development Report
- c. Consultant's Terrestrial Mitigation Plan
- d. Deer Yard Management Plan

5a. COMMENTS REQUESTED:

Department of the Interior
Department of Energy
Department of Housing and Urban Development
Department of Commerce
Department of Health, Education and Welfare
Department of Agriculture
Department of State
Department of Transportation
Department of Defense
Environmental Protection Agency
Federal Energy Administration
Advisory Council on Historic Preservation
U.S. Geological Survey
Federal Energy Regulatory Commission
New England River Basins Commission
Federal Regional Council of New England

Maine State Planning Office
Maine Department of Conservation
Maine Department of Inland Fisheries and Wildlife
Maine Office of Energy Resources
Maine State Clearinghouse - A-95
New England Governors' Conference
New England Regional Commission
Maine State Historic Preservation Office
Northern Maine Regional Planning Commission, ME
Androscoggin Regional Planning Commission, ME
North Kennebec Regional Planning Commission, ME
Penobscot Valley Regional Planning Commission, ME

Town Manager, Fort Kent, ME
Chamber of Commerce, Fort Kent, ME
Board of Selectmen, St. John Plantation, ME
Board of Selectmen, St. Francis, ME
Selectmen, Allagash, ME
Town Manager, Wallagrass Plantation, ME
Town Manager, New Canada Plantation, ME
Board of Selectmen, Madawaska, ME
Selectmen, Frenchville, ME

Boise Cascade Corporation, ME
Brown Paper Company, NH
Dead River Company, ME
Diamond International Corporation, ME
Dunn Heirs, ME
G. Pierce Webber, ME
Georgia-Pacific Corporation, ME
Great Northern Paper Company, ME
J.M. Huber Corporation, ME
International Paper Company, ME
Prentiss and Carlisle Company
St. Regis Paper Company, ME
Scott Paper Company, ME
Seven Islands Land Company, ME
James W. Sewall Company, ME
Maine Forest Products Council
Society of American Foresters, ME

Associated General Contractors of Maine
Carpenter's Local 621, ME
Economics Resource Council, ME
Maine State Chamber of Commerce
Northern New England District Council of Carpenters
Industrial Development Council of Maine

American Association of University Women, ME
American Rivers Conservation Council, Washington, D.C.
Audubon Society of Maine
Audubon Society of New Hampshire
Appalachian Mountain Club, MA
Appalachian Mountain Club of Maine
Bates Outing Club, ME
Colby Environmental Council, ME
Northwestern University Center for Urban Affairs
Conservation Law Foundation of New England, ME
Dartmouth College
Environmental Defense Fund
Friends of the Earth
Friends of the St. John, MA
Institute of Natural and Environmental Resources, Univ. of New
Hampshire

Izaak Walton League of America
Garden Club Federation of Maine
Harvard Environmental Law Society
Land Use Foundation of New Hampshire
Land and Water Resources Institute, Univ. of Maine, Orono
League of Women Voters, ME
Maine Public Interest Research Group
Maine Citizens for Dickey-Lincoln
Maine Association of Planners
Maine State Biologists' Association
Maine Archaeological Society
Midcoast Audubon Society, ME
National Audubon Society, Inc., Washington, D.C.
National Parks and Conservation Association
National Wildlife Federation, Washington, D.C.
Penobscot Paddle and Chowder Society, ME
Sierra Club, MA
Simon's Rock Early College, MA
Sportsman's Alliance of Maine
Sunhaze Chapter of Trout Unlimited, ME
The Association of Aroostook Indians, Inc.
Unity College, ME
United Fly Tyers, Inc.
Valley Residents Against Dickey-Lincoln, ME
Wildlife Management Institute

Bangor Hydroelectric Company, ME
Central Maine Power Company, ME
Eastern Maine Electric Coop.
Eastern Utilities Associates Service Corporation, ME
Debouoise and Liberman
Mr. Charles Dibner
Mr. Frank Christ
Maine Public Service Company, ME
Chas. T. Main, Inc.
Mr. and Mrs. Brian Pinette
Mr. Edward Spear

Honorable Edmund S. Muskie
Honorable William S. Cohen
Honorable David F. Emery
Honorable Olympia J. Snowe
Governor Joseph E. Brennan
Honorable John L. Martin
Honorable Joseph Sewall

PREFACE

This Draft Supplement to the Revised Draft Environmental Impact Statement will address the environmental impacts of the Fish and Wildlife Mitigation Plan proposed in Appendix K of the Environmental Impact Statement for the Dickey-Lincoln School Lakes Project.

This draft impact statement 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. A report on Fish and Wildlife Mitigation (hereinafter referred to as the Report) to be submitted to Congress for purposes of authorization is being issued simultaneously with the Supplemental Draft EIS. Appendix K of the EIS is referred to as Attachment I of the Report. Copies of this draft, and the report have been distributed throughout the six New England States and may be seen at the following repositories:

Connecticut

Hartford Storrs	State Library University of Connecticut
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Maine

Allagash	Town Hall
Ashland	Town Council
Augusta	Natural Resources Council State House Law & Legislative Library
Auburn	Androscoggin Regional Planning Commission
Bangor	Public Library U.S. Department of Energy Penobscot Valley Regional Planning Commission
Biddeford	McArthur Public Library
Brunswick	Bowdoin College - Longfellow Library
Caribou	Northern Maine Regional Planning Commission
Castine	Maine Maritime Academy - Nutting Memorial Library
Farmington	University of Maine, Documents Library
Fort Kent	Chamber of Commerce University of Maine, Documents Library
Jackman	Town Hall
Lewiston	Bates College, Documents Library
Machias	University of Maine, Documents Library
Madawaska	First Selectman
Orono	University of Maine - Raymond H. Fogler Library
Portland	Public Library University of Maine - Center of Research - Advanced Study University of Maine - Law Library University of Maine - Documents Library
Presque Isle	University of Maine - Documents Library
Springvale	Nasson College - Anderson Learning Center Library

St. Francis	First Selectman
Unity	Unity College - Documents Library
Waterville	Public Library
	Colby College - Miller Library
Winslow	North Kennebec Regional Planning Commission

Massachusetts

Amherst	University of Massachusetts
Boston	Boston Public Library
	Department of Energy
	State Library - Fingold Library
Cambridge	Harvard Graduate School of Design - Gund Hall
	Harvard Widner Library
	Massachusetts Institute of Technology
Chestnut Hill	Boston College, Babst Library
Lowell	University of Lowell - Alumni Memorial Library
Waltham	Brandeis University - Goldfarb Library
	U.S. Army Corps of Engineers - New England
	Division
Worcester	Worcester Polytechnical Institute - Gordon Library

New Hampshire

Concord	State Library
Durham	University of New Hampshire - Ezekiel W. Diamond
	Library
Franconia	North Country Council
Groveton	Public Library
Hanover	Dartmouth College - Baker Library
Hudson	Hills Memorial Library
Manchester	City Library

Rhode Island

Kingston	University of Rhode Island
Providence	Brown University
	State Library

Vermont

Burlington	University of Vermont - Guy W. Bailey Memorial
	Library
Essex Junc.	Chittenden County Regional Planning Commission
Montpelier	Central Vermont Regional Planning Commission
	State Library
	The Free Library
St. Johnsbury	Northeast Vermont Development Association
	St. Johnsbury Athenaeum
So. Royalton	Vermont Law School Library

Copies of the Supplement Draft EIS and Report have been sent to all agencies, groups and individuals that have commented on drafts of the plan, participated in workshops, or otherwise expressed an interest in the mitigation plan or the SDEIS, and to those who have specifically requested the EIS or have a statutory responsibility to review these documents. Copies 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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APPENDICES TO THE REVISED DRAFT
ENVIRONMENTAL IMPACT STATEMENT

Appendix C, Supplement No. 2, Social and Economic Assessment, CE 1980
Appendix J, Supplement No. 2, Coordination with Other Agencies and Public Involvement, CE 1980
Appendix K, Proposed Fish and Wildlife Mitigation Plan, CE 1980

Introduction Purpose and Scope of the Supplement

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 Environmental Impact Statement for the proposed project.

The purpose of this Draft Supplement (SDEIS) to the Revised Draft Environmental Impact Statement (RDEIS) 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 (Appendix K, RDEIS and 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 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 supplement is organized according to the format used in the RDEIS, expanding upon the information provided in that document as necessary.

Section 1.00

Proposed Mitigation Plan Description

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 Appendix K of the RDEIS and 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

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 (Appendix K, 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 (Appendix K, 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 (Appendix K, 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 (Appendix K, 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

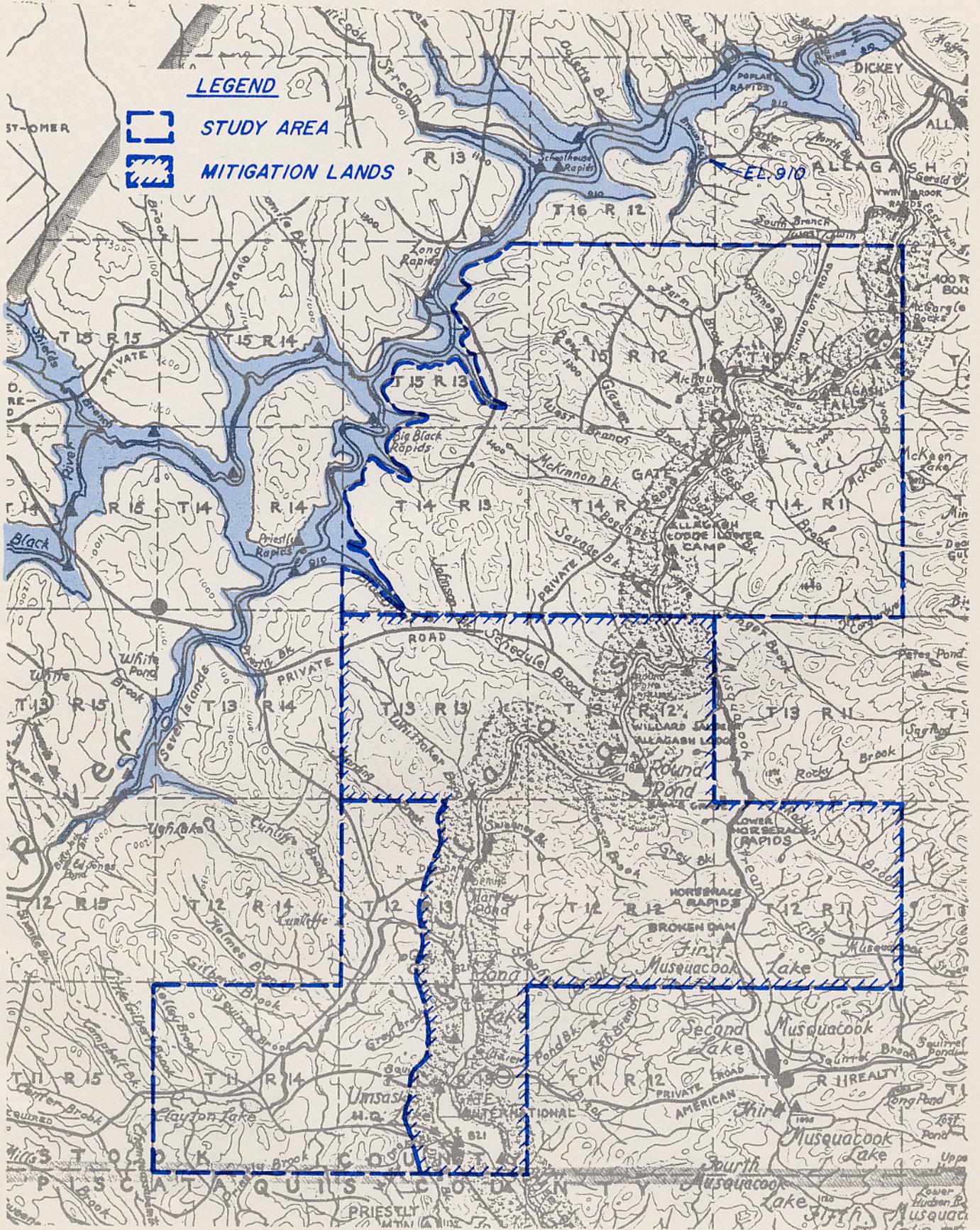
LEGEND



STUDY AREA



MITIGATION LANDS



construction activities shall be reviewed by, and coordinated with, these authorities.

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, equipment operators and a secretary. The total work force would include 21 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 \$30,887,200 and a total annualized cost of \$1,535,400 at the authorized rate of 3-1/4 percent and \$2,725,800 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 Appendix K and Attachment 1 of the Report.

TABLE 1-1

Cost and Income Summary (1979 Dollars)

	3-1/4%	7-1/8%
<u>Terrestrial Mitigation Cost Summary</u>		
<u>Total Investment</u>		
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	200,000	200,000
Personnel	<u>1,749,800</u>	<u>1,572,500</u>
Total First Costs	29,189,800	29,012,500
Interest during Construction	<u>1,316,000</u>	<u>2,884,925</u>
Total Investment	30,505,800	31,897,400
Capital Recovery Factor	.03388	.07132
<u>Annual Costs</u>		
Interest and Amortization	1,033,500	2,274,900
Annual Costs (O&M):		
Major Replacements		
Facilities	1,700	600
Capital Equipment	22,200	19,400
Road Maintenance	31,700	31,700
Personnel	325,500	272,600
Operating Costs	40,000	40,000
Research	9,400	9,900
Total Annual Costs (O&M)	430,500	374,200
Total Annual Costs (O&M and interest and amortization)	\$1,464,000	\$2,649,100
<u>Fisheries Mitigation Cost Summary</u>		
<u>Total Investment</u>		
First Costs:		
Building	\$50,000	\$50,000
Capital Equipment	40,000	40,000
Personnel	<u>216,400</u>	<u>194,500</u>
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%
<u>Annual Costs</u>		
Interest and Amortization	\$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

<u>Total Investment</u>		
First Costs:		
Land Acquisition	\$75,000	\$75,000
Total First Costs	75,000	75,000
Interest during Construction	---	---
Total Investment	75,000	75,000
<u>Annual Costs</u>		
Interest and Amortization	\$2,541	\$5,349
<u>Total Investment Costs</u>		
Terrestrial Mitigation	30,505,800	31,897,400
Fisheries Mitigation	306,400	284,500
Endangered Species Mitigation	75,000	75,000
Total	30,887,200	32,256,900
Capital Recovery Factor	.03388	.07132
<u>Total Annual Costs</u>		
Interest and Amortization	\$1,046,500	\$2,300,600
Annual Costs (O&M)		
Terrestrial Mitigation	430,500	374,200
Fisheries Mitigation	58,400	51,000
Endangered Species Mitigation	--	--
Total Annual Cost	\$1,535,400	\$2,725,800
<u>Annual Income</u>		
Net Stumpage Income* (Minimum)	\$248,900	\$248,900
Potential User Fee Income	8,000	8,000
Total Annual Income	256,900	256,900
<u>Net Annual Cost</u>	\$1,278,500	\$2,468,900

* Deduction of 25% of stumpage income to subsidize noncommercial and nonprofitable harvests has been included.

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 \$1,464,000 at the authorized 3-1/4 percent and \$2,649,100 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. This produces a net annual cost of \$1,207,100 at 3-1/4% and \$2,392,200 at 7-1/8%.

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 2.7 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, are 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° 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°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

discussed in detail in the RDEIS and in Appendix F (CE, 1977). The region is covered by extensive second growth forests characterized by a spruce-fir and broad-leaved hardwood association. Spruce-fir predominates along streams and low areas, with a northern hardwood community dominating on ridges. Aspen-birch is a pioneering hardwood type on disturbed lands. Northern white cedar is often found in wooded swamp habitats. The St. John region and the Allagash area are predominantly commercial spruce-fir forest. Shrub types, primarily alder, willow, and dogwood, are mainly along streams and rivers.

Wetlands comprise approximately two percent of the St. John and Allagash areas. Bogs and seasonally flooded flats along riverbanks are dominant wetland types. Present and past beaver ponds form another major component of the wetlands system.

The St. John River area is renowned for the rare and unusual plants which occur along its banks and in the islands within the river. Among these plant species is the endangered Furbish lousewort (*Pedicularis furbishiae*). A more detailed discussion of these plant species and their distribution can be found in the RDEIS and Appendix F (CE, 1977).

2.07.2 Wildlife

The St. John and Allagash areas serve as suitable habitat for 50 different species of mammals and numerous species of birds, reptiles, and amphibians. Appendix F contains comprehensive species lists.

Whitetail deer and moose attract the greatest amount of attention among mammals. Presently, moose populations are exhibiting a dramatic increase with shifts in population densities quite noticeable.

Population surveys for Wildlife Management Unit (WMU) 2, which encompasses both the St. John and Allagash areas, indicate that this area has one of the more significant increases in moose populations. This increase is apparently due to current forestry practices. Figure 2-1 indicates the location of the St. John region in relation to WMU 2.

Whitetail deer in WMU 2 have the lowest population density within the state. The most critical habitat requirement for deer in this region is that of winter range. This range includes specific stands of dense, spruce-fir forests along streams where deer traditionally congregate during the winter for relief from severe winter conditions. Deep, soft snow presents severe conditions for deer, coupled with the prolonging of winter conditions into spring. Current climatic trends and logging practices are believed responsible for an observed decline in the whitetail deer throughout the northern extent of its range.

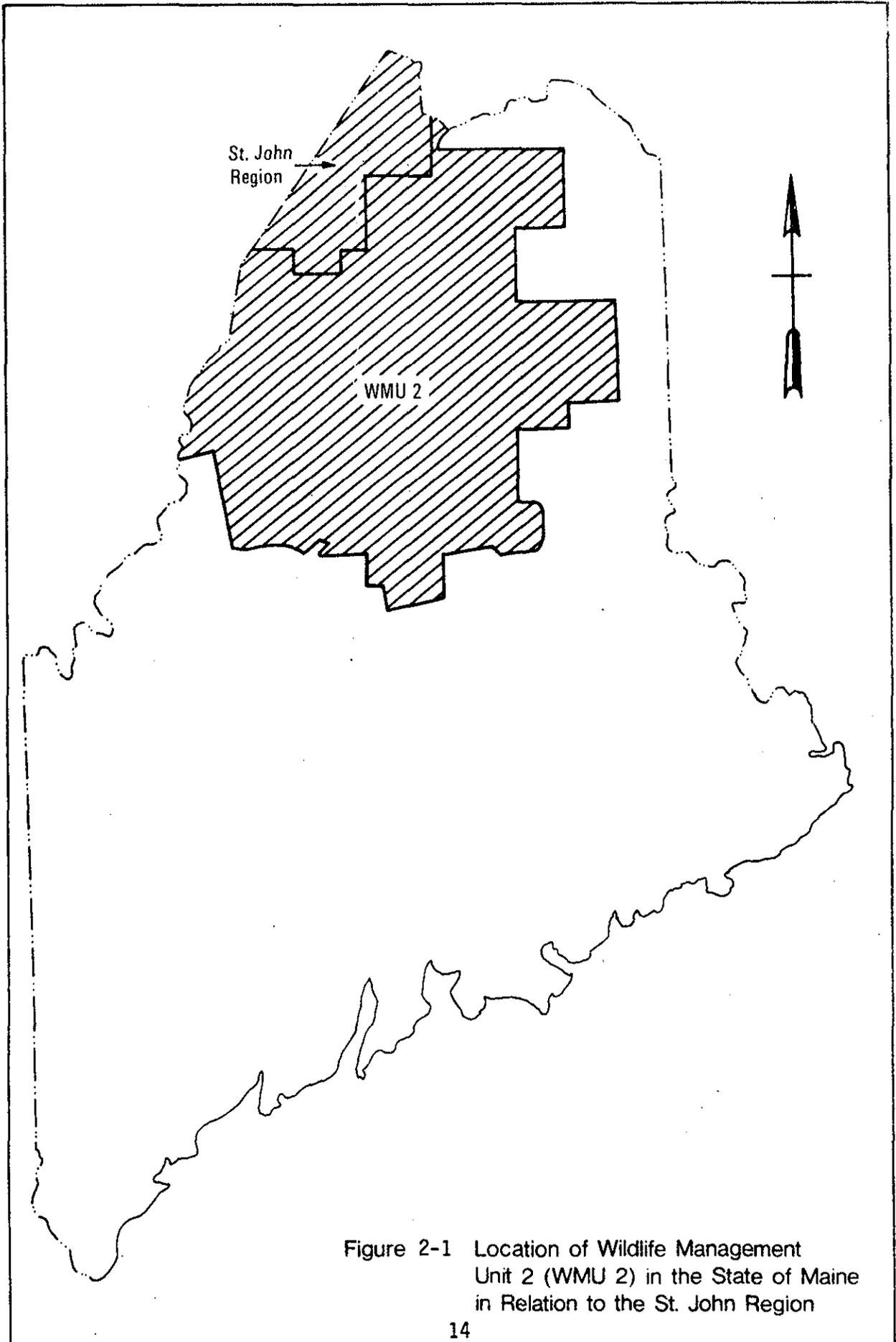


Figure 2-1 Location of Wildlife Management Unit 2 (WMU 2) in the State of Maine in Relation to the St. John Region

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, 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. (Appendix C Supplement No. 2, 1980).

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 Appendix K or 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)

<u>Township</u>	<u>Annual Volume</u> (in cords)	<u>Average Cords Per Acre</u>	<u>Market Location</u>	<u>Species</u>
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	spruce-fir
T12 R13	490	.04	Canada	cedar
T13 R12	10,500	.51	Maine	spruce-fir
T13 R13	8,000	.35	Canada	spruce-fir
T13 R13	1,000	.04	Canada	cedar
TOTAL	34,840 Cords			

Source: Kimball Forestry Consultants

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 spruce-fir harvested is transported to mills in Maine for processing, while Canadian mills process the remainder of the spruce-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

<u>Location</u>	<u>Type of Processing</u>	<u>Yearly Capacity</u>	<u>Quantity Drawn from Mitigation Lands</u>	<u>Percentage of Yearly Cap. from Mit. Lands</u>
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%
<u>SUB-TOTAL</u>		480,000 CORDS	15,500 CORDS	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%
<u>SUB-TOTAL</u>		364,000 CORDS	19,340 CORDS	5.3%
<u>TOTAL</u>		884,000 CORDS	34,840 CORDS	3.9%

SOURCE: Kimball Forestry Consultants

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 area 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 and 1980; and Appendix K or 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 (Appendix C, Supplement No. 2, 1980).

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 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 recommendation 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 resource.

(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 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 pH 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, isolation 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 macro invertebrates 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.

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, encourage 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, Appendix K).

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 (Appendix K, Section 2.2.2).

The increased frequency of logging operations within stands can adversely affect residual vegetation. Skidding and felling 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 (Appendix K, Section 2.2.2).

The management plan is primarily designed to increase the habitat carrying capacity for wildlife adapted to a diverse, frequently open, forest environment with considerable amounts of "edge" habitat. As a result, species such as moose, snow-shoe 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 interspersions 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 (Appendix K, 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 (Appendix K, 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 Rubus 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. A complete discussion of the impacts of the proposed mitigation plan on the existing forest resource is presented in Appendix C, Supplement No. 2, 1980.

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.

Impacts on the forest economy are discussed in detail in Appendix C, Supplement No. 2, 1980.

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. The use of recreational resources in the area, including recreational and sporting camps is not expected to be altered by the 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 activities 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 the loss of 53,990 acres of spruce-fir forest and the wildlife resources associated with that coniferous habitat. 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

The U.S. Fish and Wildlife 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 Appendix J and Supplements No. 1 and 2, RDEIS for complete text.) 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 Appendix K, RDEIS or Attachment I 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 methodology 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 Appendix K, Table 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 \$5,377,500 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:

	<u>Man days Fishing with the Project</u>	<u>Assigned Water Re-Resources day Value</u>	<u>Total Value of Fishing Benefit</u>
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 \$9,592,300 at the current 7-1/8% interest rate.

6.03 Consultants Terrestrial Mitigation Plan

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 Appendix K, RDEIS and 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

¹This 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 endangered 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

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 detail in Appendix C, supplement No. 2 of the EIS.

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, at a minimum. 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 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. In addition, 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 Appendix J (CE, 1977), the supplement to Appendix J (CE, 1978), Supplement No. 2 to Appendix J (CE, 1980), and Attachment 2 of the report. These appendices 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 Appendix K of the RDEIS. Contacts by environmental consultants are shown in the technical reports published as appendices.

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 Appendix J and its supplements of the RDEIS, and in the report.

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 Appendix J Supplement No. 2 and in Attachment 2, Section 4 of the report.

Several changes were made in Appendix K (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 of Appendix K.
- 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 Appendix K.
- Losses due to the project, particularly deer resource losses, are clarified.
- Management responsibility on the mitigation lands has been clarified. Section 2.6 of Appendix K 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.

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