


1977

Final Report on the Recreation Plan for Dickey-Lincoln School Lakes Project, Maine : Prepared for the Corps of Engineers, New England Division

Northern Maine Regional Planning Commission

Land Use Consultants, Inc

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NORTHERN MAINE REGIONAL PLANNING
COMMISSION.

FINAL REPORT ON THE RECREATION PLAN FOR
DICKEY-LINCOLN SCHOOL LAKES PROJECT,
MAINE.

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FINAL REPORT ON THE
RECREATION PLAN FOR
DICKEY-LINCOLN SCHOOL LAKES PROJECT, MAINE
MAY 9, 1977

Prepared for the

Corps of Engineers
New England Division

Under Contract No.
DACW33-76-C-0073

Submitted by

NORTHERN MAINE REGIONAL PLANNING COMMISSION
P.O. BOX 779, CARIBOU, MAINE

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TABLE OF CONTENTS

| | | |
|---------|--|----------------|
| I. | CHAPTER - Introduction | 1-1 to I-4 |
| 1.0 | Project Authorization | I-1 |
| 1.1 | Purpose and Scope | I-1 |
| 1.2 | Study Limitations | I-1 |
| 1.3 | Basic Assumptions | I-2 |
| 1.4 | History of Recreation in the Study Area | I-2 |
| II. | CHAPTER - Project Area Description | II-1 to II-18 |
| 2.0 | General | II-1 |
| 2.1 | Geographic Boundaries | II-1 |
| 2.2 | Climate | II-1 |
| 2.3 | Topography and Geology | II-5 |
| 2.4 | Biologic and Ecologic Features and Resources | II-5 |
| 2.4.1 | Vegetation | II-5 |
| 2.4.2 | Terrestrial Wildlife | II-6 |
| 2.4.3 | Existing Fishery | II-9 |
| 2.5 | Hydrology | II-10 |
| 2.5.1 | Existing River Hydrology | II-10 |
| 2.5.2 | Reservoir Hydrology | II-10 |
| 2.6 | Land Use | II-11 |
| 2.6.1 | Accessibility | II-11 |
| 2.6.2 | Environmental, Recreational and Cultural Conditions | II-11 |
| 2.6.3 | Land Ownership | II-12 |
| 2.6.3.1 | Study Area | II-12 |
| 2.6.3.2 | Project Area | II-13 |
| 2.6.4 | Existing Recreational Use | II-13 |
| 2.6.4.1 | Hunting | II-14 |
| 2.6.4.2 | Fishing and Canoeing | II-14 |
| 2.6.4.3 | Camping | II-15 |
| 2.6.4.4 | Day Activities | II-15 |
| 2.7 | Historical and Archeological Features | II-17 |
| 2.8 | Water Quality | II-17 |
| III. | CHAPTER - Project Data | III-1 to III-3 |
| 3.0 | Project Data Description | III-1 |
| 3.1 | Drainage Area at Dam Sites | III-2 |
| 3.2 | Reservoir Pool Data | III-2 |
| 3.3 | Dickey Res. Seasonal Pool Elevations | III-2 |
| 3.4 | Daily Water Level Fluctuations | III-3 |
| 3.5 | Construction Features | III-3 |
| 3.6 | Acquisition | III-3 |

| | | |
|---------|--|---------------|
| IV. | CHAPTER - Recreation Market Area | IV-1 to IV-15 |
| 4.0 | Introduction | IV-1 |
| 4.1 | Market Areas | IV-1 |
| 4.1.1 | Day-Use Zone | IV-1 |
| 4.1.2 | Weekend-Use Zone | IV-1 |
| 4.1.3 | Vacation-Use Zone | IV-3 |
| 4.2 | Population Growth Patterns | IV-3 |
| 4.3 | Socio-Economic Considerations | IV-5 |
| 4.3.1 | Age Characteristics of Day and Weekend-Use Zones | IV-5 |
| 4.3.2 | Age Characteristics of Extended-Use Zone | IV-6 |
| 4.3.3 | Income and Employment | IV-6 |
| 4.3.3.1 | Day-Use and Weekend-Use Zone | IV-6 |
| 4.3.3.2 | Extended-Use Zone | IV-6 |
| 4.3.4 | Activity Preferences Day-Use Zones | IV-7 |
| 4.3.5 | Activity Preferences of Other Users | IV-7 |
| 4.4 | Survey of Existing Alternative Recreational Areas | IV-7 |
| 4.4.1 | Introduction | IV-7 |
| 4.4.2 | Survey of Alternative Recreational Area | IV-8 |
| 4.4.3 | Formal and Informal Private and Public Recreation Areas | IV-8 |
| 4.4.4 | Survey of Most Similar Recreation Resources | IV-11 |
| 4.4.4.1 | Existing Use of Riverine Resources | IV-11 |
| 4.4.4.2 | Existing Use of Large Lake Resources | IV-13 |
| 4.4.5 | Nearby Canadian Recreation Areas | IV-13 |
| V. | CHAPTER - Project Area Outdoor Recreation Attendance | V-1 to V-12 |
| 5.0 | Introduction | V-1 |
| 5.1 | Analysis of Corps of Engineers Standard Methods | V-1 |
| 5.2 | Methodology | V-3 |
| 5.3 | Existing Demand for Outdoor Recreation | V-3 |
| 5.4 | Demand Projections: WITHOUT DICKEY-LINCOLN SCHOOL LAKES | V-4 |
| 5.5 | Demand Projections: WITH DICKEY-LINCOLN SCHOOL LAKES | V-5 |
| 5.5.1 | Day Activities | V-5 |
| 5.5.2 | Camping | V-5 |
| 5.5.3 | Fishing | V-6 |
| 5.5.4 | Hunting | V-6 |
| VI. | CHAPTER - Recommended Development Plan | VI-1 to VI-39 |
| 6.0 | Significance of Physical Resources to Recreation Use and Development | VI-1 |
| 6.1 | Geographic Boundaries | VI-1 |
| 6.2 | Climate | VI-1 |
| 6.3 | Topography and Geology | VI-1 |

| | | |
|--|---|---------------------|
| 6.4 | Biologic and Ecological Features and Resources | VI-1 |
| 6.4.1 | Vegetation | VI-1 |
| 6.4.2 | Terrestrial Wildlife | VI-2 |
| 6.4.3 | Fishery | VI-2 |
| 6.5 | Hydrology | VI-3 |
| 6.5.1 | Drawdown and Shoreline Characteristics | VI-3 |
| 6.5.2 | Wind and Wave Action | VI-4 |
| 6.6 | Floating Debris and Reservoir Clearing | VI-6 |
| 6.7 | Access | VI-6 |
| 6.8 | Water Quality in Dickey Lake | VI-6 |
| 6.9 | Recreation Potential Analysis | VI-8 |
| 6.9.1 | General | VI-8 |
| 6.9.2 | Analysis of Recreation Potential | VI-8 |
| 6.10 | Cultural and Demand Determinants for Recreational Facilities | VI-16 |
| 6.10.1 | Forestry | VI-16 |
| 6.10.2 | Projected Recreation Use | VI-16 |
| 6.11 | Determination of Recreation Facility Needs | VI-18 |
| 6.11.1 | Introduction | VI-18 |
| 6.11.2 | Determining the Peak Number of Users | VI-18 |
| 6.11.3 | Design Criteria | VI-20 |
| 6.11.4 | Recreation Facilities Needed | VI-21 |
| 6.12 | Recommended Development Plan | VI-26 |
| 6.12.1 | Recreation Concept | VI-26 |
| 6.12.2 | Alternative Plans | VI-28 |
| 6.12.3 | Recommended Recreation Plan | VI-28 |
| 6.12.3.1 | Intensive-Use Area Plan | VI-28 |
| 6.12.3.2 | Development Plan | VI-29 |
| 6.13 | Land Acquisition for Recreation | VI-35 |
| 6.13.1 | Intensive-Use Area | VI-35 |
| 6.13.2 | Primitive and Group Campsites | VI-35 |
| 6.13.3 | St. John and Allagash Canoe Takeout Areas | VI-35 |
| 6.13.4 | Trails and Overlooks on Private Lands | VI-35 |
| 6.14 | Fish and Wildlife Enhancement | VI-35 |
| 6.14.1 | General | VI-35 |
| 6.14.2 | Fish Hatchery and Stocking | VI-37 |
| 6.14.3 | Inventory and Regulation of Important Habitats | VI-37 |
| 6.14.4 | Cuttings and Plantings | VI-37 |
| 6.14.5 | Waterfowl Enhancement Opportunities | VI-38 |
| 6.14.6 | Recreational Facilities and Use | VI-38 |
| 6.15 | Forest Management Opportunities | VI-38 |
| VII. CHAPTER - Individual and Agency Coordination | | VII-1 to VII-2 |
| 7.0 | Introduction | VII-1 |
| 7.1 | Citizen Participation | VII-1 |
| 7.2 | State of Maine | VII-1 |
| 7.3 | Federal Government | VII-2 |
| VIII. CHAPTER - Special Problems, Recommendations and Additional Considerations | | VIII-1 to VIII-4 |

| | | | |
|------|--|-------|----------------|
| 8.0 | Introduction | ..... | VIII-1 |
| 8.1 | Impact on the Allagash Wilderness Waterway | .... | VIII-1 |
| 8.2 | Canadian Access from Quebec Province | ..... | VIII-2 |
| 8.3 | Lincoln School Lake Fluctuations | .... | VIII-2 |
| 8.4 | Probable Alternative Recreation Developments | ..... | VIII-2 |
| 8.5 | Conflict with Other Plans | ..... | VIII-3 |
| 8.6 | Other Issues for Consideration in Design | .... | VIII-3 |
| | 8.6.1 Traffic Movement | ..... | VIII-3 |
| | 8.6.2 Security Measures | ..... | VIII-4 |
| | 8.6.3 Protection of Resources | .. | VIII-4 |
| | 8.6.4 Provisions for Handicapped and Elderly | .... | VIII-4 |
| IX. | CHAPTER - Management and Cost Sharing | ..... | IX-1 |
| X. | CHAPTER - Environmental Quality | ..... | X-1 to X-3 |
| | 10.0 Introduction | ..... | X-1 |
| | 10.1 Siting Considerations | .... | X-1 |
| | 10.2 Treatment of Disturbed Areas | ... | X-2 |
| | 10.3 Vegetation | ... | X-2 |
| | 10.4 User Traffic | ..... | X-2 |
| | 10.5 Architecture | .... | X-3 |
| XI. | CHAPTER - Cost Estimate | ..... | XI-1 to XI-14 |
| XII. | CHAPTER - Benefits | ..... | XII-1 to XII-6 |

EXHIBIT I - NMRPC Lakes Study Phase I Report

LIST OF TABLES

| <u>Table No.</u> | | <u>Page</u> |
|------------------|--|-------------|
| CHAPTER II | | |
| II-1 | Summary of Monthly Climate Data for Fort Kent, Maine | II-4 |
| II-2 | 1975 Recreational Use by Activity for the Project Area | II-14 |
| CHAPTER IV | | |
| IV-1 | 1975 Population in Extended Vacation - Use Market Area | IV-3 |
| IV-2 | Population Projections for Aroostook County by Age: 1970, 1980, 1990 | IV-5 |
| IV-3 | Allagash Peak Season Use History | IV-12 |
| CHAPTER V | | |
| V-1 | 1975 Recreational Use (Visitor Days) of the Project Area | V-4 |
| V-2 | Development of Recreation Demand Projections Project Area WITHOUT DICKEY-LINCOLN SCHOOL LAKES | V-8 |
| V-3 | Recreation Demand Projections - Project Area WITHOUT DICKEY-LINCOLN SCHOOL LAKES .. | V-10 |
| V-4 | Estimating Initial Demand for Day Activities WITH DICKEY-LINCOLN SCHOOL LAKES | V-11 |
| V-5 | Recreation Demand Projections - Visitor Day WITH DICKEY-LINCOLN SCHOOL LAKES | V-12 |
| CHAPTER VI | | |
| VI-1 | Width of Area Exposed Along Shoreline During Reservoir Drawdown | VI-4 |
| VI-2 | Determination of Wave Heights for Dickey Lake | VI-5 |

LIST OF TABLES (Cont.)

| <u>Table No.</u> | | <u>Page</u> |
|------------------|---|-------------|
| | CHAPTER VI (Cont.) | |
| VI-3 | Recreation Potential Analysis Criteria for Recreational Quality Points | VI-9 |
| VI-4 | Recreational Potential Analysis Quality Point Distribution | VI-12 |
| VI-5 | Recreational Potential Analysis Quality Point Frequency Distribution | VI-13 |
| VI-6 | Recreation Potential Analysis Recreation Use Potential | VI-14 |
| VI-7 | Peak Day Use Assumptions by Activity | VI-19 |
| VI-8 | Peak Day Number of Users by Activity | VI-20 |
| VI-9 | Facility Need Calculations | VI-21 |
| VI-10 | Recreation Facility Needs for Selected Years | VI-24 |
| VI-11 | Comparison of Alternate Plans | VI-31 |
| VI-12 | Development Phasing | VI-34 |
| | CHAPTER XI | |
| XI-1 | Scenic Turnout | XI-2 |
| XI-2 | Visitor Center | XI-3 |
| XI-3 | St. John Canoe Takeout | XI-4 |
| XI-4 | Allagash Canoe Takeout | XI-5 |
| XI-5 | Picnic Area | XI-6 |
| XI-6 | Destination Campground | XI-7 |
| XI-7 | Group Campsites | XI-8 |
| XI-8 | Primitive Campsites | XI-9 |
| XI-9 | Boat Launch Ramp and Facilities | XI-10 |

LIST OF TABLES (Cont.)

| <u>Table No.</u> | | <u>Page</u> |
|----------------------|---|-------------|
| | CHAPTER XI (Cont.) | |
| XI-10 | Beach Area | XI-11 |
| XI-11 | Hiking Trail Construction | XI-12 |
| XI-12 | Land Cost | XI-13 |
| XI-13 | Cost Summary of Recreation Plan for Dickey-Lincoln School Lakes | XI-14 |
| | CHAPTER XII | |
| XII-1 | Value of Recreation Activities .. | XII-1 |
| XII-2 | Average Annual Recreation Use and Benefits WITHOUT DICKEY-LINCOLN SCHOOL LAKES ... | XII-2 |
| XII-3 | Average Annual Recreation Use and Benefits WITH DICKEY-LINCOLN SCHOOL LAKES | XII-3 |
| XII-4 | Present Value of Recreation Benefits WITHOUT DICKEY-LINCOLN SCHOOL LAKES | XII-4 |
| XII-5 | Present Value of Recreation Benefits WITH DICKEY-LINCOLN SCHOOL LAKES | XII-5 |
| XII-6 | Comparison of Recreation Benefits | XII-6 |

EXHIBITS

EXHIBIT I - Northern Maine Regional Planning Commission
Lakes Study - Phase I Report 1972

CHAPTER I

INTRODUCTION

1.0 Project Authorization

The Dickey-Lincoln School Project was authorized by the Flood Control Act of 1965, Public Law 89-298, 89th Congress, 27 October, 1965, which reads in part as follows:

"The Dickey-Lincoln School project, St. John River, Maine, is hereby authorized as approved by the President on July 12, 1965, and sub-stantially in accordance with the plans included in the report of the Department of the Interior and the Corps of Engineers, dated, August, 1964....

1.1 Purpose and Scope

The purpose of this report is to evaluate and describe the existing recreational use and resources of the project area and the encompassing study area and to project the future use of those resources both with and without the Dickey-Lincoln School Lakes Project. The primary impact area of the proposed project (project area) includes the St. John River watershed upstream of the proposed damsites to the confluence of Nine-mile Brook. The area is bounded by the watershed divide with the Allagash River on the east and the Canadian Border on the west. Major tributaries of the St. John affected by the proposed dams and included in the project area are the Big Black River and Little Black River. Recreation use of the St. John River watershed above Nine-mile Brook would also be affected, and although this area is not contained in the project area, it is considered within the scope of this study. This study develops and evaluates a concept plan for the recreation potential of the Dickey-Lincoln School project and assesses the recreational impact of this recommended concept plan.

1.2 Study Limitations

Measurement of "demand" for outdoor recreation is still in its infancy. Because of the many factors influencing people's participation in outdoor recreation, there is no flawless method of predicting with absolute certitude the number of people who will utilize a given resource. The best that can be expected is that this study will provide decision makers with an indication of the order of magnitude of what can be expected to occur if the Dickey-Lincoln School Lakes are built.

Recreation planners have devised sophisticated multivariate models, which require large quantities of reliable data, and a whole range of other techniques for estimating demand. This study attempted to synthesize the significant features of several such methods and incorporate them into the Army Corps of Engineers methodology for estimating reservoir recreation use.

A report entitled Assessing Demand for Outdoor Recreation, prepared for the U.S. Department of the Interior, Bureau of Outdoor Recreation by the National Academy of Sciences (1975) clearly states that the problem with assessing recreation demand is not which method is better than the other, but which method is most appropriate to the situation or specific resource being evaluated.

1.3 Basic Assumptions

In the development of this appendix, it was necessary to make assumptions regarding the present and future recreational demand in Northern Maine. Following consultation with numerous sources, we submit that the following assumptions are justified.

1. The demand for recreational activities of the type presently found in the project area will increase with population growth, increasing amounts of leisure time, and increasing disposable income. Additionally, it appears likely that the number of recreationists desiring "wilderness" or "semi-wilderness" activities will increase significantly as resources capable of providing such activities become less available.

2. Commercial development of land at, or adjacent to the impoundment area would be prohibited by the ownership characteristics of that property.

3. The water quality of the proposed Dickey reservoir would meet State water quality standards for swimming.

4. Water quality and fisheries management would combine to provide a fishing experience in Dickey Lake, the quality which may equal those of other deep, cold, oligotrophic lakes in Maine.

5. Development of post-project recreational facilities would be guided by a policy of nondegradation of the quality of the existing environment.

1.4 History of Recreation in the Study Area

Until the mid-1900's, public recreational use of the unorganized areas of Maine, except for fringes around settlements, was very low in volume due to inaccessibility. Therefore, intensive management and administration for public recreation was not necessary.

In the latter part of the 1800's, the "Sportsmen's Lodge" became popular, offering comparatively luxurious remote hunting and fishing. Very often the sportsmen's lodge was sited on a remote woodland farm. Encouraged by the landowners, these establishments represented some "back country" people management whereby recreationists were concentrated in specific places, rather than dispersed throughout the woods.

In 1908 the Maine Forestry District was formed; this constituted a statutory approach to landowner self-taxation to support the activities of the Maine Forest Service in the unorganized lands. In the 1920's, the Forestry Authorized Campsite Program was initiated, providing campers with a comfortable, fire-safe primitive campsite at popular, high-use spots, funded by the Maine Forestry District tax.

In 1947, the Fire Permit Law was initiated, giving the forestry rangers discretion in allowing fires at certain sites and at certain times, but requiring that everyone have a fire permit for a cooking and warming campfire in the Maine Forestry District.

All these rules, regulations, and programs were designed to accommodate growing numbers of people without increased fire hazard.

By the late 1960's, the logging road system had become extensive, and each individual forest landowner had a different policy regarding public access. The need for a cooperative system with uniform administrative practices led to the formation of the North Maine Woods Association. The function of the organization, funded entirely by the private landowners, is to oversee public use of the road system, along with the provision of designated campsites, on a fee basis, for recreationists desiring to enjoy this resource as the most extensive contiguous forest land area in the northeast.

In the 1960's, there was general recognition that State property such as public waters, fish and wildlife, must be cooperatively managed along with the commercial forest and public use of the private road system. In 1970, the responsible State agencies, such as the Department of Conservation, began participating in the North Maine Woods Association planning efforts.¹

From this brief background, it can be seen that sophistication in the recreational use and management of the private timberland holdings encompassing the Maine "Big Woods" is in a formative process. At the present time, the North Maine Woods Association is proceeding to develop its own comprehensive recreation plan for the area.

It is necessary to interject the history of the proposed Dickey-Lincoln School Lakes Project and its recreational potential into the above scenario. Prior to the latest interest and efforts concerning Dickey-Lincoln, which began in the early 1960's, numerous reports and publications were produced considering several versions of a hydro-electric power facility on the Upper St. John River. Few dealt in detail with the recreational aspects of the impoundments. With the establishment of the National Environmental Policy Act in 1969, and the renewed funding of Dickey-Lincoln by the Public Works Appropriation Act for Fiscal Year 1975, a detailed study of the impacts upon recreation caused by the dams became necessary.

CHAPTER II

DESCRIPTION OF PROJECT AREA

2.0 General

The project area, as defined in the introduction of this report, is included in the largest stretch of uninhabited forest land in the northeastern United States. Non-mechanized, extensive recreational activities are the most common types occurring here. These are itemized below and include camping, canoeing, fishing, hunting as major pursuits; day activities such as picnicking, hiking, swimming and sightseeing are secondary.

While the presence of roads and on-going logging activities prevent this area from being called a true wilderness, it has the potential for remaining an informal, "semi-wilderness" under continued wise management.

2.1 Geographic Boundaries

The Southwest Branch of the St. John River originates in Little St. John Lake on the international boundary between the Province of Quebec, and the State of Maine. The Baker Branch of the St. John River originates in First Upper St. John Pond in the United States. The two branches flow northerly to their junction 50 miles downstream of Little St. John Lake in the United States. From this confluence, the St. John River flows through northwestern Maine, into New Brunswick, and eventually empties into the Bay of Fundy at St. John, New Brunswick.

The portion of the St. John River above the confluence with the St. Francis River at St. Francis, Maine, is commonly referred to as the Upper St. John River. The Dickey Dam in Allagash, Maine, and the Lincoln School Dam in St. Francis, Maine, would be located on the Upper St. John River in northwestern Aroostook County, Maine. Portions of the Dickey reservoir would extend into Quebec along the Little Black River and Big Black River drainages. The St. John River drains approximately 2,725 square miles at the Dickey damsite which is located about 1 mile upstream from the mouth of the Allagash River. The drainage area at the Lincoln School damsite, about 11 miles further downstream from the Dickey site, is approximately 4,086 square miles. The entire project area lies within the Appalachian Highlands physiographic province. Figure 1 is a Location Plan showing the project's relationship to major United States and Canadian cities.

2.2 Climate

The project area has a humid continental climate generally typified

by short, cool summers and long, cold, windy winters. Summer daily temperatures average between 50^o and 60^o Fahrenheit (F) and winter temperatures average between 10^o and 20^o F. Recorded seasonal extremes in temperature range from -42^o to 97^o F. Subzero temperatures occur approximately 50 times each year.

Short, frequent periods of precipitation are distributed rather evenly throughout the year, averaging 2 to 4 inches per month and about 36 inches annually. A small but definite peak in precipitation occurs during June, July and August. Winter precipitation is nearly all in the form of snowfall, averaging near 100 inches per year. Snow cover may reach 40 inches by late March. A summary of monthly temperatures, precipitation, snowfall, and snow cover from Fort Kent, Maine, is presented in Table II-1.

Prevailing winds are from the west at 7 to 11 miles per hour. As a result, the project area is frequently affected by storms traveling down the St. Lawrence River from the Great Lakes. Less frequently, severe Atlantic coastal storms pass through the area from the south. Unsettled, windy weather may persist for several days as storms slow down near the Gulf of St. Lawrence.

Figure 1

Location Plan

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3
4

TABLE II-1
SUMMARY OF MONTHLY CLIMATIC DATA
FOR FORT KENT, MAINE

| <u>Month</u> | <u>32 Yrs. of Record</u> <u>TEMPERATURE (°F)</u> | | | <u>38 Yrs. of Record</u> <u>PRECIPITATION (inches)</u> | | | <u>39 Yrs.</u> <u>AVERAGE</u> <u>SNOWFALL</u> <u>(inches)</u> | <u>AVERAGE</u> <u>SNOWCOVER</u> <u>(inches)</u> |
|--------------|---|----------------|----------------|---|----------------|----------------|--|---|
| | <u>Mean</u> | <u>Maximum</u> | <u>Minimum</u> | <u>Mean</u> | <u>Maximum</u> | <u>Minimum</u> | | |
| January | 10.9 | 57 | -42 | 2.17 | 4.63 | 0.38 | 20.8 | 30" |
| February | 12.7 | 53 | -42 | 2.12 | 4.09 | 0.88 | 21.0 | 30" |
| March | 24.0 | 77 | -31 | 2.37 | 5.86 | 0.55 | 16.5 | 24" |
| April | 37.6 | 83 | - 9 | 2.25 | 4.90 | 0.74 | 6.3 | 12 - 18" |
| May | 51.4 | 91 | 17 | 2.82 | 5.87 | 0.81 | 0.6 | 4" |
| June | 61.6 | 95 | 29 | 3.56 | 6.86 | 0.47 | 0 | 0 |
| July | 66.4 | 96 | 33 | 4.18 | 10.51 | 1.42 | 0 | 0 |
| August | 63.9 | 97 | 33 | 3.94 | 9.97 | 0.85 | 0 | 0 |
| September | 55.7 | 91 | 19 | 3.47 | 7.28 | 0.41 | T | 0 |
| October | 44.6 | 83 | 7 | 3.27 | 5.77 | 0.48 | 1.5 | 4" |
| November | 30.9 | 73 | -14 | 2.86 | 7.00 | 0.21 | 8.6 | 6 - 10" |
| December | 16.2 | 56 | -28 | 2.77 | 5.24 | 0.07 | 19.9 | 18 - 24" |
| Annual | 39.7 | 97 | -42 | 35.78 | 49.58 | 25.49 | 95.2 | ----- |

2.3 Topography and Geology

The Upper St. John River basin is a maturely dissected upland area influenced by glaciation. The upstream portion of the project area falls in a region of low topographic relief, with a broad plain sloping gently upland from both sides of the river. Much of this area is poorly drained. Relief becomes increasingly complex downstream through the project area. The area near the two damsites, including the Little Black River and Allagash River drainages, is characterized by steep sided, irregularly shaped hills and ridgelines that confine the river to a deep, narrow valley.

The St. John River Valley itself is an alluvial flood plain bordered by low terraces of alluvial and glacial outwash materials, and higher terraces of gravel and glacial till. Side slopes are covered with varying depths of glacial till overlying bedrock. Exposed bedrock is frequently found on ridgetops and localized areas along the banks of the St. John River and its tributaries. Bedrock formations consist primarily of Devonian-Silurian rocks, namely: slate, graywacke, and arkose. Other formations found locally conglomerate, orthoquartzite, and greenstone. Axes of folding in these formations are generally oriented northeasterly.

2.4 Biologic and Ecologic Features and Resources

2.4.1 Vegetation

Vegetation in the project area is a mixture of spruce-fir and northern deciduous forest types, typical of the transitional zone between the Boreal Forest Formation and Eastern Deciduous Formation. Distribution of vegetation in the project area is strongly influenced by soil and moisture conditions as well as past logging, insect and disease outbreaks and fire.

Pure red spruce and balsam fir stands typical of commercial forests in the region cover 67 percent of the project area.² Primary sites for the spruce-fir type are poorly drained soils, or thin glacial till soils. Little or no understory growth exists under dense spruce-fir canopies except for advanced spruce-fir regeneration. Ground cover species were found to be typical of spruce-fir forests elsewhere with mosses predominating. Other softwood associate species include northern white cedar, black spruce, and tamaracks which occur on even wetter sites, and remnant, mature white pine left during early timber harvesting in the region.

Spruce-northern hardwood communities composed of spruce-fir, sugar maple, yellow birch, beech, and white ash cover 10 percent of the project area. The yellow birch-spruce subtype occurs on fertile, moist, well drained soils of side-slopes bordering on the lowland spruce "flats" The sugar maple-spruce subtype is found even further upslope bordering on the northern hardwood covertime. Ground cover in this spruce-hardwood type tends to have more ferns and herbs and less moss than the spruce-fir type, plus a layer of

understory shrubs.

The northern hardwood, or maple-beech-birch cover type is found mainly on the well drained ridgelines and hilltops largely above the 910 foot Dickey Lake maximum pool elevation. This type only covers 1 percent of the project area.

The spruce-fir-pioneer hardwood type, which includes red spruce and balsam fir in association with white, gray and yellow birch, cherry, and aspen, covers another 8 percent of the project area. This type is an early to intermediate successional stage following forest disturbances. Another 2 percent of the project area is covered by the pure, pioneer hardwood type, dominated by aspen and birch. This aspen-birch type may be found in all but the wettest moisture conditions, but is almost always found in areas subject to recent logging or fire.

Speckled alder dominates the riparian shrub communities along portions of the Upper St. John River and its tributaries, with redosier dogwood as an associate species. Seasonally flooded flats, islands and embankments of the river are frequently covered by a border of grasses, sedges, herbs and small shrubs such as alder, sweet gale, leatherleaf and meadowsweet. These shrub and river types cover 9 percent of the project area. These same areas serve as habitat for several rare and endangered species. The Furbish lousewort (Pedicularis furbishiae) is endemic to the St. John River Valley. Once thought extinct, and known to be endangered, the plant was found at six locations within the project area.

Wetland vegetative types cover less than 2 percent of the project area. A variety of life-forms and species including submergents, floating emergents, and shrub and tree types occur in these wetlands. Clearcuts, abandoned and active logging activities, as well as waterbodies together cover the remaining 1% of the project area.

2.4.2 Terrestrial Wildlife

The dense, mature spruce-fir forests covering much of the project area favor "climax" type species such as marten, fisher, black bear, spruce grouse, and Canada jays. However, logging activities have opened up the forest canopy, and created habitat more favorable to "edge" species such as deer and ruffed grouse. Moose have also responded favorably to timber harvesting operations. The important game species within the project area include snowshoe hare, ruffed grouse, white tailed deer, moose, black bear, bobcat, beaver, otter, muskrat, mink, marten, and fisher. Other species in the project area include red squirrel, chipmunk, woodchuck, porcupine, skunk, weasels, the red fox, coyote, Canada Lynx, spruce grouse, several species of ducks including mergansers, and possibly the endangered eastern cougar. Several raptors use the area including the bald eagle, osprey, red shouldered hawk, Cooper's hawk, broad-winged hawk, sparrow hawk, goshawk, marsh hawk, barred owl, Saw-whet owl, and Great Horned owl. A wide variety of passerine birds in-

Figure 2
Existing Wildlife & Fisheries

cluding warblers, finches, thrushes, chickadees, wrens, woodpeckers, jays and crows are present.

Important game species population densities tend to be low in Aroostook County compared to the rest of Maine. However, the St. John River region has densities for deer from 2.2-8.6 deer per square mile which is significantly above county averages for deer, estimated at 1.2-4.8 deer per square mile. Most available habitats within the project area are occupied at or near existing carrying capacity with the exception of moose.

Some 50 percent of the deer yards in the Upper St. John Region (27 townships) exist within the proposed flooded area⁴. Deer seek protection and cover in yarding areas for winter survival. Deer reproductive potential the following spring depends upon their condition in the yards during the winter. Figure 2 (Existing Wildlife and Fisheries Map) shows the locations of deer yards within the project area.⁵

2.4.3 Existing Fishery

Excluding the Allagash River drainage, the St. John River watershed above the proposed Dickey-Lincoln School Lakes Project includes approximately 1,972 miles of intermittent and continuously flowing streams, numerous lakes and ponds, and many small ponds and beaver impoundments.⁶

During the summers of 1975-76, Normandeau Associates, Inc., studied streams and lakes in that portion of the St. John watershed lying between the proposed Lincoln School Dam site and Ninemile Bridge within the U.S., and also the reaches of the St. John River downstream to Fort Kent. The study included 135 miles of the 429 miles of named tributary streams and 10 of the 27 named lakes and ponds within the study area.⁷

Both cold and warm-water fish species were found in the St. John River watershed upstream and downstream of the damsites. Cold water species included brook trout, landlocked salmon, whitefish, dace and chubs. These were found primarily in major streams near cold inflows, in tributary stream headwaters, in lower portions of tributaries where sufficient cover was present to prevent excessive summer warming, and in deeper lakes. Warm-water forms, such as bullheads, perch, and suckers, were found in major streams, lower portions of tributaries, and in most of the lakes and ponds within the project area.

The brook trout was the most important game species of the eighteen fish species found. Because of the greater importance of the brook trout, the study looked at their population density, growth rates, food habits, and the physical and chemical features of habitats to evaluate the quality of brook trout habitat within the project area. This information is also valuable to the trout fisherman and in assessing the value of the fishery for recreation.

Stream brook trout in the project area are typical of trout from other under-exploited stream populations elsewhere in the Northeast. Brook trout from project area streams were generally small (averaging 3.9 in.), slow-growing (averaging about 2.0 in/year after one year), early maturing (most are mature following their second summer), and short lived (2-3 year life span) when compared with populations from larger water bodies with higher exploitation rates.

Typically, brook trout in the project area remain in larger streams and rivers until water temperatures warm to 70° F., then the trout move upstream into portions of smaller tributary streams where vegetative cover and springs provide cooler water. Streams found to have especially high brook trout densities include: Conner's Brook, Ouellette Brook, Fox Brook, Brown Brook, Johnson Brook, Hafey Brook, Little Hafey Brook, Whitney Brook, and the upstream portions of Rocky and Campbell Brooks. Figure 2 (Existing Wildlife and Fisheries Map) shows fishing potential in the streams surveyed.

Brook trout were also captured from the Negro Lakes and Falls Pond which are the deepest lakes in the project area. Warm-water species, including minnows and chubs, which compete with trout for food, were also collected from many of the smaller ponds within the project area.

2.5 Hydrology

2.5.1 Existing River Hydrology

The St. John River Watershed upstream from Fort Kent has a rectangular shape, with a length of 115 miles and an average width of about 50 miles. Approximately 230 miles of river system wind through the Dickey-Lincoln project area, consisting of the St. John River and its major tributaries the Big Black River, Little Black River, Allagash River, and the St. Francis River. Numerous other small streams enter the St. John River at many locations within the project area.

The records from six gauging stations in the St. John River watershed provide stream flow data. Three stations are located on the St. John River at Ninemile Bridge, Dickey, and Fort Kent. The other three are at the mouths of the Allagash, St. Francis, and Fish Rivers. Peak discharges occur during April through June resulting from snowmelt or a combination of snowmelt and precipitation. Ice jams during this period contribute to peak river flows. The less frequent peak streamflows during the summer and fall months are usually associated with Atlantic coastal hurricanes. Fort Kent has experienced ten major floods since the U.S.G.S. gauging station was installed in 1930, the most recent occurring in May 1961, May 1969, April 1973, May 1974 and August 1976. However, the Corps has recently completed a dike in Fort Kent to protect against future flooding. Limited upstream water storage areas gives the St. John River a "flashy" nature. Unit hydrographs prepared by the U.S. Army Corps of Engineers for the St. John River at Nine-Mile Bridge show that peak flows during significant floods are reached from 24-60 hours after the most intense precipitation, and the return to pre-flood flows occurs 6-10 days after the start of precipitation.

2.5.2 Reservoir Hydrology

The Dickey Dam would create a lake on the St. John River about 55 miles long, averaging 1.2 miles wide, with about 390 miles of shoreline. The river's strength would be harnessed to provide peak period hydroelectric power. The Dickey Reservoir would also provide flood control for downstream areas, and lake oriented recreation opportunities.

A computer simulation study has been conducted to identify the extent of water level fluctuations in the reservoir. During a normal year, the reservoir would be allowed to fill rapidly from April to June to provide flood control. A minimum of 1,000,000 acre-feet of storage capacity would be available in the Dickey Reservoir each spring.

This is equivalent to more than 6 inches of runoff from the 2,725 square mile watershed. From June-October, the water level would normally drop between 1 to 2 feet, (about elevation 905-903). The maximum drawdown in any one year is projected to be 4.5 feet. This limited drawdown would minimize the amount of bare lake bottom exposed by the drawdown and thereby avoid detracting from water oriented recreational activities. Drawdown would continue more rapidly through the winter until the annual minimum pool level is reached, usually in March. This winter drawdown would average 23 feet (from elevation 905-882), ranging from 7-33 feet depending upon weather and power production conditions.

2.6 Land Use

2.6.1 Accessibility

The dams would be built about 28 miles west of Fort Kent, Maine. Access to the damsites over public roads is confined to State Route 161 via Fort Kent. Fort Kent is accessible from Clair, New Brunswick via Canadian Route 20, and from points in the U.S. via Interstate Route 95 and State Route 11 or by U.S. Route 1

Access to other parts of the project area is limited to private, gravel logging roads leading from Ashland, Portage, and Deboullie Mountain in Maine, and St. Pamphile, Daaquam, Estcourt, and Landry Siding in Canada. Circulation within the project area is by means of these same logging roads with road use controlled on a fee basis. User fees are collected at gates operated and maintained by the North Maine Woods Association.

2.6.2 Cultural, Environmental and Recreational Conditions, Assets, and Attractions

Forestry is the primary land use of the project area. Much of the private forestland is under common and undivided ownership, and managed by foresters from both Canadian and United States timber interests. Forestry management is based upon selective harvesting and maintaining uneven aged timber growth. All species are harvested for a variety of wood products, with softwood pulp predominating.

Forest and river oriented recreation is the second most important land use in the project area. The Upper St. John River and Allagash Wilderness Waterway are the primary recreational attractions in the project area. Part of the enjoyment and attractiveness of recreational activities in the project area is attributed to an expansive, contiguous area remote from urbanization and capable of handling large numbers of users at relatively low densities. The Upper St. John River is the last lengthy segment of a large, free-flowing, near wilderness river remaining in the densely populated northeastern United States. Difficult access has and should continue to protect the remote character of this area. This combination of

wilderness, a free flowing wild river, and limited access near major northeastern population centers makes the Upper St. John River unique as a wilderness recreational opportunity.

The local economy is closely tied to forestry operations and outdoor recreation, with resulting seasonal employment and below average income levels. Emigration of young adults from the towns in search of more stable employment was observed by Ploch and LeRay (1968) during a study of the socio-economic impact of the Dickey-Lincoln School Lakes project.⁸ This population decline has continued at least through 1970 according to the 1970 U.S. Census.⁹

Human populations in the project area are small (totaling 1,267 in the 1970 U.S. Census), centered in the Towns of Allagash (1970 population 456), and St. Francis (1970 population 811) along Route 161. The remainder of the project area includes nearly 800,000 acres of unpopulated forestland in a semi-wilderness state. True wilderness qualities have been eliminated by construction of a gravel logging road network, and timber harvesting activities. The project area may best be classified as a "Natural Environmental Area of Outdoor Recreation in Maine."¹⁰ Natural environmental areas are characterized as being remote from population centers, having extensive weekend and vacation recreation opportunities, and possessing a high quality, natural environment.

2.6.3 Land Ownership

The proposed project area lies within a larger area known as the North Maine Woods. A general overview of land ownership is necessary and beneficial to understanding this report on recreation.

2.6.3.1 Study Area

There are two and a half million acres included in the North Maine Woods, owned by approximately ten major landowners including large corporations, individuals and the State of Maine. The actual ownerships (% of total) are as follows:

| | |
|--|-------------|
| Pingree Heirs (Managed by Seven Islands Land Co.) | 27% |
| Irving Limited (Managed by Seven Islands Land Co.) | 10% |
| Great Northern Paper Company | 26% |
| International Paper Company | 15% |
| Prentiss & Carlisle Timberlands | 7% |
| Dunn Timberlands | 5% |
| Diamond International | 2% |
| Huber Corporation | 1% |
| H.S. Coe | 1% |
| State of Maine (Public Lots) | 6% |
| | <u>100%</u> |

Title to this large land mass results from a type of private ownership unique in the United States today. The "common and undivided ownership" of unorganized territories arose primarily because property values were

so low in the very early days of Maine's history that it was uneconomical to survey individual parcels of land. Each landowner in the unorganized townships has title to a percentage of the land. No mapped boundaries exist within the townships; the landowner with the greatest percentage of ownership manages the land for the others.¹¹ Today most unorganized townships continue to be owned by different combinations of owners, each sharing proportionate shares of the legal and taxation responsibilities.

This same cooperative ownership pattern prompted the organization of the North Maine Woods Association under the concept of multiple-use management of commercial forest lands. The organization's primary purpose is the management of public use within the area.

2.6.3.2 Project Area

At the present time, approximately 79% of the land area to be flooded is managed by Seven Islands Land Company. Their land holdings are concentrated in the Little Black River area and upstream on the main stem of the Upper St. John River from Longs Rapids to the head of the proposed Dickey-Lincoln Impoundment at Seven Islands. Also included in the flooded lands is the Big Black River area.

Great Northern Paper Company and International Paper Company are the two other primary landowners affected by the proposed impoundment. Their land holdings are concentrated in the area proposed for the damsites at the confluence of the Little Black River and the St. John, and that stretch of the river between Poplar Island Rapids and Chimenticook Stream.

The above landowners would also own or manage lands which would abut the boundaries of the Dickey-Lincoln impoundment area. Their policy with regard to recreation would be of particular importance to the recreation development plan proposed and the estimate of recreation use which is presented in this appendix.

2.6.4 Existing Recreational Use

Existing recreational use is typically non-mechanized, and extensive in nature. Primary activities include hunting, fishing, canoeing, and camping. Other activities within the project area are picnicking, hiking, sightseeing and swimming.

Table II-2 shows that recreational use in the project area during 1975 totaled 17,867 visitor-days. The recreational use data was compiled by the Northern Maine Regional Planning Commission and reflects the primary purpose of the recreation trip. This information was derived from a questionnaire utilized by the North Maine Woods Association.

TABLE 1I-2

1975 Recreation Use by Activity in the Project Area
(Visitor Days)

| | Total | Camping | Fishing | Hunting | Canoeing | Day Activity |
|--------------|--------|---------|---------|---------|----------|--------------|
| Non-Resident | 9,442 | 817 | 1,592 | 4,914 | 1,881 | 238 |
| Resident | 8,425 | 892 | 2,821 | 3,378 | 447 | 887 |
| Total | 17,867 | 1,709 | 4,413 | 8,292 | 2,328 | 1,125 |

2.6.4.1 Hunting

Hunting is the most important recreational activity in the project area with 8,292 visitor-days during 1975. It is concentrated during October and November. Non-resident hunters, largely from Quebec and Massachusetts, accounted for 4,914 visitor days (59%). This high percentage of non-residents indicates the unique experience that can be found in the project area. Resident hunters accounted for the remaining 3,378 (41%) hunting visitor-days in 1975, of which 2,313 visitor-days (68%) were by Aroostook County residents.

Even though hunting is the most important recreational activity, according to Maine Inland Fisheries and Wildlife personnel, hunting pressure is light when compared with the rest of Maine. As a result, most of the important game species are underharvested. Hunting effort is directed primarily toward white-tailed deer, ruffed grouse and black bear. Snowshoe hare are also plentiful but kill estimates are low.¹² All of these species could withstand significantly increased harvests although the quality of the hunting experience may decline with increased hunting pressure.

2.6.4.2 Fishing and Canoeing

Fishing and canoeing, the second and third most important recreational activities in the project area during 1975, usually begin in May, peak in June, then taper off through the summer until ending with the colder weather of September and October. Fishing ends early in August with the closing of the legal trout season. Canoeing usually becomes difficult after late June as river levels drop.

The numerous gravel-bottomed, spring-fed brooks within the project area support abundant populations of native brook trout, the most popular sport fish in the project area. A creel census conducted during the 1976 fishing season (May-August) by the Maine Cooperative Fisheries Research Unit indicated that stream fishing for brook trout was preferred over all other types of fishing by anglers in the project area.¹³

Anglers were typically residents familiar with the project area through several years of experience. According to the Northern Maine Regional Planning Commission analysis of data for 1975, Aroostook County residents accounted for 1,637 (37%) of the 4,413 fishing visitor-days. Other Maine residents accounted for 1,184 (25%) fishing visitor-days, and the remaining 1,592 (36%) fishing visitor-days were by non-residents.

The remoteness and undisturbed character coupled with some of the most challenging whitewater river segments in the Northeast makes a canoe trip down the Upper St. John River a memorable experience. Canoeing useage figures for 1975 again illustrate the uniqueness of the canoeing experience afforded by the river with 1,881 (81%) of the 2,328 canoeing visitor-days accounted for by non-residents who must travel considerable distances just to get to the area. Maine residents from all over the state accounted for the remaining 447 (19%) canoeing visitor-days.

2.6.4.3 Camping

Camping use of the project area occurs throughout the May-November period in conjunction with other activities or as a separate activity, and dominates recreational uses during July and August. In 1975, camping use was split almost evenly between non-resident and resident campers. Non-residents accounted for 817 (48%) camping visitor-days, while residents accounted for 892 (52%) of the total 1,709 camping visitor-days during 1975. The North Maine Woods Association maintains 74 campsites within the project area, and nearly all of the camping activity in the project area occurred in these campsites. Figure 3 shows the locations of existing recreational facilities within the project area.¹⁴

2.6.4.4 Day Activities

Use figures for hiking, swimming, picnicking, and sightseeing totaled 1,125 visitor-days during 1975. Use data is not available by individual activities. Aroostook County residents accounted for 790 visitor-days (70%), other Maine residents for 97 visitor-days (9%). and non-residents for 238 visitor-days (21%) of the total for "day" activities.

Although no actual hiking trails exist within the project area, abandoned logging roads provide easy access into different areas. Hikers are generally seeking remoteness, and are often involved in nature study or photography. Most participants in these day use activities are local residents who travel over public roads to the northern portion of the project area to engage in their activity.

Extreme winter weather, and the availability of alternative winter recreation sites closer to major population centers limit winter recreational use of the project area, such as snowmobiling, snowshoeing, and cross-country skiing.

Figure 3

Existing Recreational Facilities

2.7 Historic and Archaeological Features

Little data is available for pre-historic human activities within the project area although it is believed that Abnaki Indians did use this area on a transient basis. Early French settlers preferred to move up the St. Francis and Madawaska Rivers into Quebec rather than travel up the St. John. After the Civil War the need for new virgin forests generated interest in the region upstream from St. Francis.

Lumbering has been the major focus of human use since the early 19th century. A continuous settlement at Seven Islands existed until 1930 serving forest harvesting activities. The combination of good agricultural land and a location in the center of 19th century lumbering activities made this a natural focal point. At Seven Islands, agricultural products were grown to supply the lumbermen and their work animals. From Seven Islands, supplies and personnel moved up and down the St. John River on large barges drawn by horses walking on the river banks.¹⁵ In addition, several homesteads were scattered along the St. John River including Castonia Farm, Ouellette Farm and Caron Farm.

In 1976 a study to identify and locate sites with historic and archaeological significance within the impoundment area was undertaken by the University of Maine at Orono.¹⁶ The study found about 40 sites, most of which were of prehistoric age, located along the St. John River and the Big Black River. The majority of these sites were small with little variety indicating prehistoric use on an essentially transient basis. The St. John River was an important highway through the spruce-fir forest between the St. Lawrence River and the more populated, lower St. John Valley, and to the Penobscot and Kennebec River Valleys in the opposite direction. One site at the confluence of the Big Black and St. John River is thought to represent a major habitation and another such site probably existed at the mouth of the Allagash River. The Big Black site has already been placed on the National Register of Historic properties. Seven of the sites located during this study are felt to warrant National Register status, this including the Big Black site. In addition, the Seven Islands area collectively is felt to warrant nomination as a Historic District. Complete or partial excavation of individual sites within the reservoir area was recommended as mitigating measures.

2.8 Water Quality

A water quality sampling program was conducted in the Upper St. John River basin during 1976 to obtain data for inclusion in the Water Quality Design Memorandum No. 5 for the proposed Dickey-Lincoln project.

The data shows that water quality in the Upper St. John River basin is high due to limited industrial and human development within the watershed. Recreationists in the project area can generally drink the water safely from the small tributaries within the watershed. In addition,

the cool, clear, usually well oxygenated waters within the project area provide ideal conditions for a self-sustaining brook trout fishery, and a pleasant setting for other recreational activities such as camping, canoeing, hiking, and nature study. Thus the high quality water in the Upper St. John region is an asset to existing recreational use.

Logging activities within the watershed do occasionally result in stream sedimentation in localized areas. Spruce-budworm control activities may also cause pesticides to enter surface waters in generally small quantities.

The future water quality of the proposed Dickey Lake will be discussed in Chapter VI of this appendix in regards to its influence on recreational use at the project area.

CHAPTER III

PROJECT DATA

3.0 Project Data Description

The listing of project data which follows is based upon information contained in the various Design Memoranda prepared by the Corps of Engineers. The list includes highlights of data found to be particularly important to the recreation analysis. Much of this information has already been included in Chapter II, while more detailed explanations of the significance of this data to recreational use and development is contained in Chapter VI.

The project includes two major dams; one at Dickey, Maine, and the other near the Lincoln School in St. Francis, Maine. Five smaller dikes are associated with the Dickey impoundment. Dickey Dam and the Falls Brook, Hafey Brook, Campbell Brooks, Cunliffe Brook and South dikes will create a lake of 86,024 acres with 390 miles of shoreline (including islands) when at the 910 foot m.s.l. maximum pool elevation. The smaller Lincoln School Dam will create another lake immediately downstream from the Dickey Dam of 2,150 acres and 32 miles of shoreline when at the 620.0 foot m.s.l. maximum pool

Dickey Dam would be 335 feet high and 10,300 feet long, making it one of the largest dams in the world. The five dikes on the Dickey impoundment would prevent flooding from extending into watersheds adjacent to the St. John watershed. The Lincoln School Dam would be 95 feet high and 2,200 feet long. The reservoir it creates would be to even out the otherwise erratic releases of water resulting from peak load hydro-electric power generation.

Current plans are to acquire land within and surrounding the Dickey and Lincoln School impoundments. This acquisition would involve all the land below the 915 foot m.s.l. elevation or within 300 feet horizontal distance of the 910 foot maximum pool elevation, whichever is greater. All the land within 300 feet of the maximum Lincoln School impoundment at elevation 620 or to elevation 625 m.s.l., whichever is greater would also be acquired in fee. Additional land needed for recreational development and fish and wildlife enhancement may also be acquired.

3.1 DRAINAGE AREA AT DAMSITES

| | |
|--------------------|-----------------|
| Dickey Dam | 2,725 sq. miles |
| Lincoln School Dam | 4,086 sq. miles |

3.2 RESERVOIR POOL DATA

| <u>Pool Stage</u> | <u>Pool Elevation</u> | <u>Acres</u> | <u>Shoreline Miles</u> | <u>Annual Chance of Occurance (%)</u> |
|--------------------------|-----------------------|--------------|------------------------|---------------------------------------|
| Dickey Reservoir | | | | |
| Maximum Pool | 910.0 | 86,024 | 390 | 50% (1X/2 yrs) |
| Minimum Pool | 868.0 | 53,680 | 250 | 2.5% (1X/40 yrs) |
| Lincoln School Reservoir | | | | |
| Ultimate Maximum Pool | 620.0 | 2,619 | 32 | 100% (Each yr.) |
| Initial Minimum Pool | 612.0 | 2,239 | 31 | 100% (Each yr.) |

3.3 DICKEY RESERVOIR SEASONAL POOL ELEVATIONS BASED UPON A 30-YEAR SIMULATION PERIOD

| <u>Period</u> | <u>Maximum</u> | <u>Pool Elevations</u> | | <u>Average</u> |
|----------------------|----------------|------------------------|--|----------------|
| | | <u>Minimum</u> | | |
| April - May | 910.0 | 877.0 | | 897.5 |
| June - August | 910.0 | 890.0 | | 908.0 |
| September - November | 910.0 | 890.0 | | 907.0 |
| December - March | 910.0 | 868.0 | | 894.0 |

3.4 DAILY WATER LEVEL FLUCTUATIONS

Dickey Reservoir 1/4 inch
Lincoln School Reservoir 5 - 8 feet

3.5 CONSTRUCTION FEATURES

| | <u>Top Elevation</u> <u>(m.s.l.)</u> | <u>Maximum</u> <u>Height (ft)</u> | <u>Length</u> <u>(ft)</u> |
|--------------------|---|--------------------------------------|------------------------------|
| Dickey Dam | | | |
| North Dam | 925.0 | 335 | 4,650 |
| South Dam | 925.0 | 260 | 5,050 |
| South Dike | 925.0 | 25 | 950 |
| Lincoln School Dam | 630.0 | 95 | 2,200 |
| Dikes | | | |
| Falls Brook | 925.0 | 145 | 1,500 |
| Hafey Brook | 924.0 | 70 | 2,300 |
| Cunliffe Brook | 924.0 | 25 | 900 |
| Campbell Brook | 925.0 | 5 | 550 |

3.6 ACQUISITION LINE (subject to purchase agreements)

Dickey Reservoir - 915' m.s.l. or 300' horizontal
 from maximum pool elevation

Lincoln School Reservoir - 625' m.s.l. or 300' horizontal
 from maximum pool elevation

CHAPTER IV
RECREATION MARKET AREA

4.0 Introduction

The purpose of this market area analysis is to delineate the characteristics of the region which will influence the magnitude of public demand for the recreation resources offered at the project area, either with or without construction of the Dickey-Lincoln School Lakes project.

4.1 Market Areas

The recreation market area for the Dickey-Lincoln School Lakes project may be divided into three zones: a day-use zone, a weekend-use zone and an extended vacation-use zone. The day-use and weekend-use zones extend 75 and 150 highway miles, respectively, from the dam sites. The vacation-use zone extends 500 miles radially from an approximate center point in the project area.

4.1.1 Day-Use Zone

Day-use visitors are expected to come from communities within 75 miles highway distance from the dam sites. (See Figure 4) The day-use zone includes the northern part of Aroostook County, Maine, Madawaska County, New Brunswick and part of Temiscouata County, Quebec. The 1975 population within this zone is approximately 85,700. Residents of the State of Maine, the Province of New Brunswick and the Province of Quebec account for 39,300, 32,600 and 13,800 of the total, respectively. It is estimated that approximately 80 percent of the day-use visitors to the project area in 1975 originated from this zone.

4.1.2 Weekend-Use Zone

The range for weekend or other two and three-day visitors is expanded to a 150 mile highway distance zone from the project area. (See Figure 4). This zone includes all of Aroostook County, Maine, all of Madawaska, Carleton, Victoria and part of Restigouche County, New Brunswick, all of Temiscouata, Kamouraska, Riviere-du-Loup and part of L'Islet and Rimouski County, Quebec. The 1975 population within this zone is approximately 316,800. Residents of the State of Maine, the Province of New Brunswick and the Province of Quebec account for 94,500, 85,100 and 137,200 of the total, respectively.

QUEBEC

N

150 MILE RADIUS

75 MILE RADIUS

NEW BRUNSWICK

QUEBEC CITY

ESTCOURT

ST. JOHN RIVER

FORT KENT

CALLAGASH

ST. PAMPELON

PRESQUE ISLE

ALLAGASH RIVER

DAQUAMON

CHAMBERLAIN LAKE

TELOS

MOULTON

FREDERICTON

ST. AURELIE

MONTREAL

MAINE

NOVA SCOTIA

BANGOR

VERMONT

AUGUSTA

2

95

PORTLAND

NEW HAMPSHIRE

LEGEND

- POINTS OF ENTRY
- PRIVATE MAINE WOODS ROADS

DAY USE AND WEEKEND USE ZONES
PROJECT AREA

DICKEY LINCOLN SCHOOL LAKES PROJECT
RECREATION PLAN
 DEPARTMENT OF THE ARMY
 NEW ENGLAND DIVISION CORPS OF ENGINEERS

FIGURE

4

SCALE: 1" = 50 MILES 0 2.5 50

Northern Maine Regional Planning Commission
 Land Use Consultants, Inc.

4.1.3 Vacation-Use Zone

Extended visits of up to two weeks or longer can be expected to originate from a zone extending 500 miles west to the Province of Ontario, south to include all of Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, and part of New York, Pennsylvania and New Jersey. east to Cape Breton Island and Nova Scotia and north to Newfoundland. (See Figure 5). The 1975 population of these states and provinces is listed in Table IV-1.

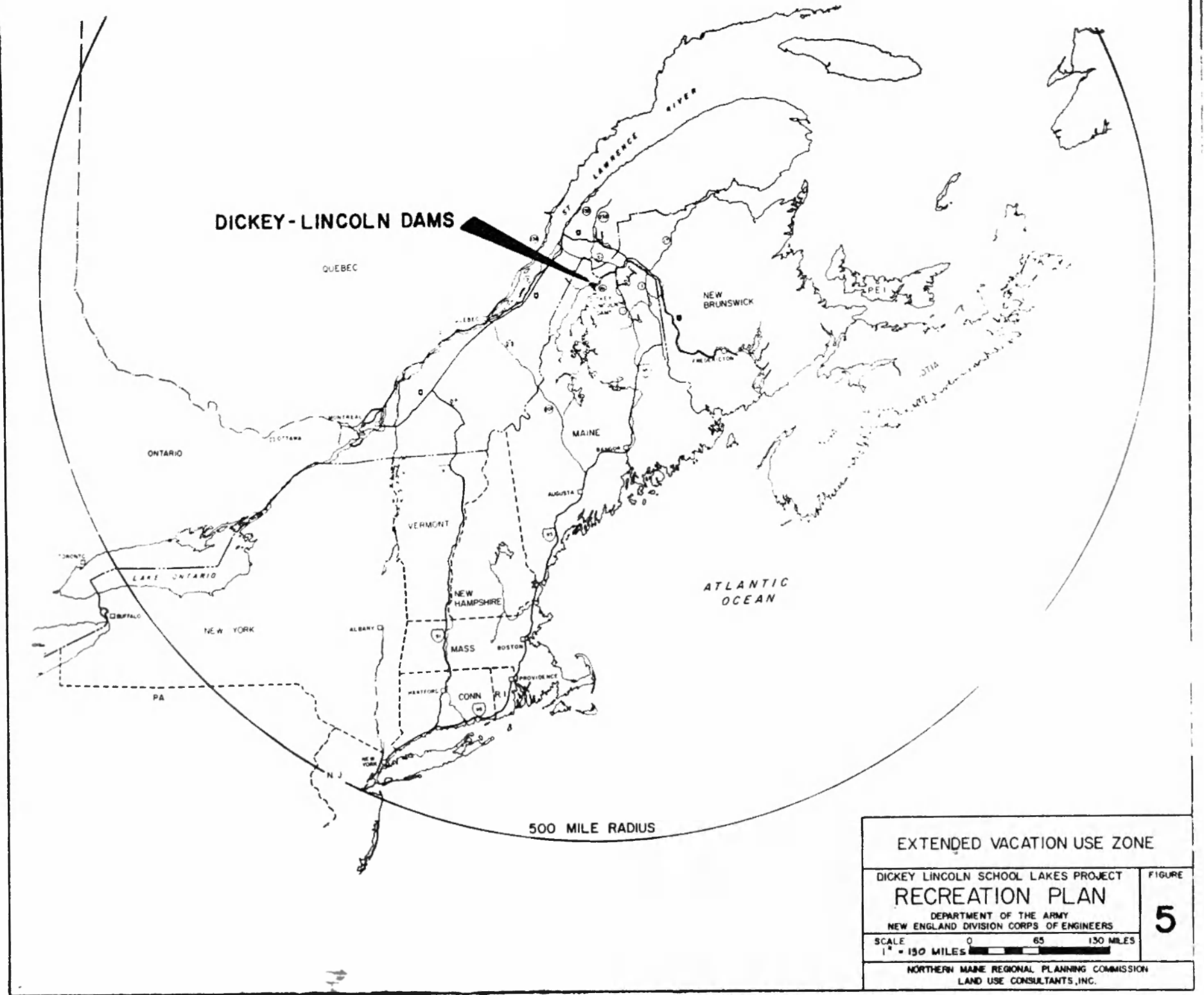
4.2 Population Growth Patterns

The population growth and distribution characteristics of the various market areas are of basic importance in estimating future recreation visitor attendance at the project area. The population within the day-use zone is projected to increase from 85,700 to 90,000 in the year 2000, representing about a 5 percent increase. Within the weekend-use zone population will increase from 316,800 to 332,600 in the year 2000, representing about a 5 percent increase. Population projections for the states and provinces included in the market area of potential vacation visitors are shown in Table IV-1.

TABLE IV-1

Population in Extended Vacation-Use Market Area

| | <u>1975¹</u> | <u>2000²</u> | <u>% CHANGE</u> |
|----------------------|-------------------------|-------------------------|-----------------|
| Vermont | 471,000 | 550,000 | 17 |
| New Hampshire | 818,000 | 989,000 | 21 |
| Massachusetts | 5,828,000 | 7,457,000 | 28 |
| Rhode Island | 927,000 | 1,192,000 | 29 |
| Connecticut | 3,095,000 | 4,030,000 | 30 |
| New York | 18,120,000 | 22,438,000 | 24 |
| Pennsylvania | 11,827,000 | 13,994,000 | 18 |
| New Jersey | 7,316,000 | 9,694,000 | 32 |
| Maine | 1,025,000 | 1,122,000 | 9 |
| Quebec | 6,141,000 | 6,383,000 | 4 |
| Ontario | 8,343,000 | 11,629,000 | 39 |
| Nova Scotia | 799,000 | 804,000 | 1 |
| New Brunswick | 652,000 | 677,000 | 4 |
| Prince Edward Island | 114,000 | 123,000 | 8 |
| TOTAL | 57,133,000 | 69,453,000 | 22 |



DICKEY-LINCOLN DAMS

QUEBEC

ATLANTIC OCEAN

500 MILE RADIUS

| | |
|---|----------------|
| EXTENDED VACATION USE ZONE | |
| DICKEY LINCOLN SCHOOL LAKES PROJECT | |
| RECREATION PLAN | |
| DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS | |
| SCALE 1" = 150 MILES | 0 65 130 MILES |
| NORTHERN MAINE REGIONAL PLANNING COMMISSION LAND USE CONSULTANTS, INC. | |

FIGURE
5

4.3 Socio-Economic Considerations

In addition to population growth, various demographic and socio-economic factors such as age, income, occupation and leisure time have been found to be correlated with participation in many outdoor recreation activities. It is expected that these factors will influence future levels of demand for recreation in the project area.

4.3.1 Age Characteristics of Day-Use And Weekend-Use Zone

The age characteristics of the population have a great influence on outdoor recreation participation. An area in which there is a high ratio of persons between the ages of 18 and 45 is usually considered to be one with a good potential preference for the less intensive forms of outdoor recreation, including camping, fishing, hunting, canoeing and day activities.¹⁹

The change in age distribution for Aroostook County to the year 1990 is given in Table IV-2. For the purpose of this study, the Aroostook County statistics are considered as a proxy measure of the day-use and weekend-use market areas.

TABLE IV-2

Population of Aroostook County by Age: 1970, 1980, 1990²⁰

(Thousands of Persons)

| <u>Year</u> | <u>0-4</u> | <u>5-17</u> | <u>18-21</u> | <u>22-24</u> | <u>45-64</u> | <u>65+</u> | <u>Total</u> |
|-------------|-------------|-------------|--------------|--------------|--------------|-------------|--------------|
| | <u>yrs.</u> | <u>yrs.</u> | <u>yrs.</u> | <u>yrs.</u> | <u>yrs.</u> | <u>yrs.</u> | |
| 1970 | 9 | 28 | 7 | 26 | 16 | 8 | 94 |
| 1980 | 10 | 23 | 8 | 30 | 17 | 9 | 97 |
| 1990 | 10 | 26 | 7 | 34 | 15 | 10 | 102 |

A review of Table IV-2 indicates that the number of persons 18-21 is not expected to increase at the same rate as the population as a whole, resulting in a proportionate decline in this age group. This pattern is the result of the expected continued emigration of this age group from the area due in part to the limited employment opportunities available. Concurrently, the number of persons between the ages of 22 and 41 will increase faster than the total population. The net effect of these concurrent trends should result in a population group with a significant potential demand for the less intensive recreation activities mentioned previously.

4.3.2 Age Characteristics of Extended-Use Zone

The size and diversity of the geographic area encompassed by the extended vacation market area precludes a concise report of age distribution. It is assumed that national trends, as reported in the 1970 U.S. Census of Social and Economic Characteristics, and the 1972-2001 Population Projections for Canada and the Provinces will prevail. Also, this study's use of the National Recreation Survey, ORRRC Study Report 19, and the Canadian Outdoor Recreation Demand Study, CORD Technical Note 22, in projections of participation in outdoor recreation account for projected national trends indicating an increased demand for outdoor recreation. Such trends can be expected to prevail in the extended market area.

4.3.3 Income and Employment

As previously indicated, income and employment data add insight into an area's potential participation in outdoor recreation activities. People in lower income categories, for example, account for comparatively less participation than their share of total population, for some activities which require higher levels of expenditure.

4.3.3.1 Day-Use and Weekend Zone

Aroostook County income and employment data are indicative of conditions prevailing in the day-use and weekend-use market area. Employment in the agricultural and forestry sectors is prevalent in this area. Seasonal unemployment in these activities and the lack of a diversified economic base result in severe economic impacts. Aroostook's per capita income of \$2,052 is the lowest of all Maine counties and is nearly 20 percent below the overall state average of \$2,550. In Aroostook, 3,636 or 16.3 percent of all families have incomes below the poverty level. The county's total of 1,702 families receiving public assistance represents 12.7 percent of the Maine total of 13,362, although the county represents only 9 percent of the total state population.²¹ State and regional planning forecasts indicate that these economic conditions will improve slightly, but not significantly, through the year 2000.

4.3.3.2 Extended-Use Zone

In the extended vacation market area, income, productivity, leisure time, and mobility are expected to increase with the dissolution of the recessionary trend of recent years. The initiation of certain energy conservation policies in both Canada and the United States may increase preferences for regionally accessible recreation opportunities. In conjunction with these policies, people may be expected to manifest a greater interest in activities which draw them to the natural environment, which they will perceive as a diminishing resource.²²

4.3.4 Activity Preferences Day-Use Zone

A profile of activity preferences among residents of the day-use market area is available as a result of a survey conducted by the Edward C. Jordan Company in conjunction with their economic impact study of the Dickey-Lincoln School Lakes project. The E.C. Jordan Company survey provides an indication of local attitudes regarding outdoor recreation. Nearly half of the households surveyed indicated that they participated in outdoor recreation activities in the project area. Fishing and hunting were the most popular activities. A great number of the respondents expressed an attitude that the "natural environment" of the area was important to them. This sentiment is amplified in the common use of the area over the lifetime of many of these people.

4.3.5 Activity Preference of Other Potential Users

Out-of-state visitors and those from the weekend-market area most often travel to the project area to experience either of two special attractions: the St. John River canoe trip or the fall hunting season.

The remoteness and natural character of the Upper St. John River make the canoe trip memorable; tricky rapids and whitewater are a challenge. Fishing along the way at the mouths of the numerous small brooks which flow into the main stream often occurs in conjunction with canoeing. Recreation-related flying services in the area frequently ferry canoeing parties directly to designated launching sites along the river

White-tailed deer are abundant in the project area due to the mixed habitat, food and cover opportunities afforded both by the timber harvesting operations and the natural land characteristics. The deer hunting season annually attracts sportsmen from more populated areas with sparse game resources. Increases in the out-of-state license fees, however, may affect future use of the area by this group.

4.4 Survey of Existing Alternative Recreation Areas

4.4.1 Introduction

Participation in recreation is, in part, a function of the availability of the particular recreational experience being sought. Analysis of this availability involves consideration of general socio-economic factors, the physical characteristics and supply of the recreational resources in the market area.

To examine the potential impact that the proposed Dickey-Lincoln School Lakes project might have on the overall recreation supply/demand system of Northern Maine, an analysis was made of alternative or intervening recreation resources in nearby areas of Canada and Northern Maine. This was undertaken in order to:

- (i) Determine present and future rates of visitation to various recreation resources similar to the proposed Dickey-Lincoln School Lakes and in the same markets.
- (ii) Estimate the number of visitor-days that the Dickey-Lincoln development may attract and the extent to which this use represents a shift in visitation from presently developed areas.

The emphasis of this analysis is upon those resources that provide types of recreation activities similar to those that may be expected at the Dickey-Lincoln School Lakes.

4.4.2 Survey of Alternative Recreation Areas

This portion of the study considers four significant alternative recreation areas. These include:

- A. Formal and informal private and public recreation areas in Northern Maine, including the North Maine Woods and the Fish River Chain of lakes,
- B. The Allagash Wilderness Waterway.
- C. Moosehead Lake,
- D. Nearby Canadian recreation areas, particularly Lac Temiscouata in Quebec, Canada.

Information on recreational utilization of these areas was gathered in detail wherever possible. Though analysis of all recreational supply/demand was made difficult by lack of accurate visitation records, it did lend valuable insight into this study.

4.4.3 Formal and Informal Private and Public Recreation Areas

In what has been defined earlier as the weekend-use market zone, encompassing all of Aroostook County, there exists a wealth of public and private recreational facilities ranging from motels and campgrounds with all conveniences and amenities, to semi-wilderness tenting sites, such as those located in the "North Maine Woods" There are an estimated six hundred designated camping sites available in the area.²³

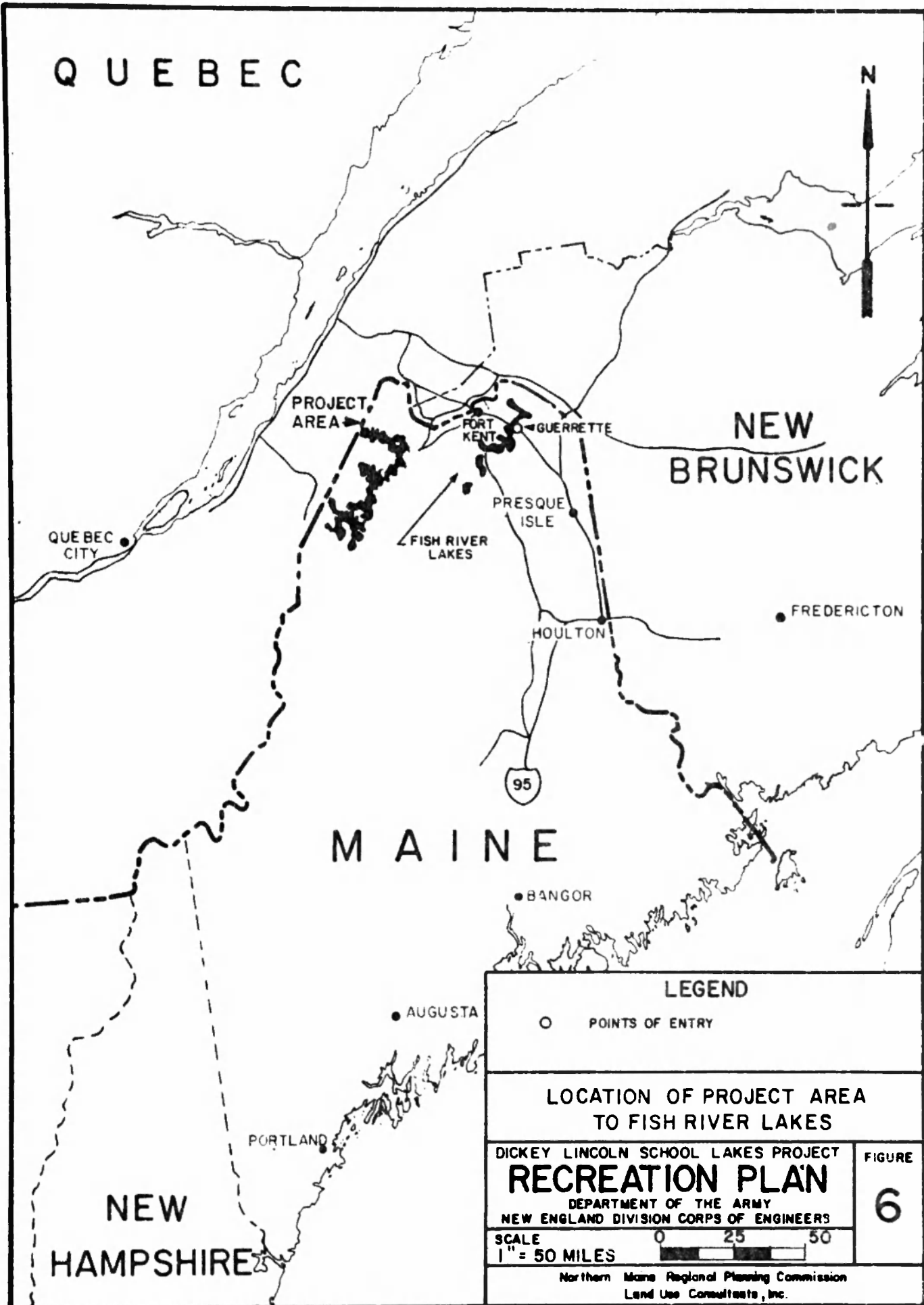
In the Northern Maine region, there exist over one hundred and six lakes of sufficient size to support some form of recreational use. The recreational development potential of these lakes is diverse, ranging from average to outstanding. An inventory of the lakes, is found in Exhibit I of this Appendix.²⁴ Twenty-six are deemed to have above average to outstanding recreational potential. An additional sixty are considered to have average potential for recreational development and 20 others are of sufficient size to support some form of recreational use. Improvements to the existing road system will significantly affect the future use of these resources. Those lakes adjacent to or accessible from paved roads will tend to be more highly used than those lakes accessible only by private gravel "logging roads" Yet, all of these lakes do serve as a considerable potential source of recreational supply when considered together

The capacity of all, or any one, of these lakes for recreational use is difficult to quantify. It is necessary to rely on intuitive judgements derived from observation and discussions with individuals familiar with the area. Presently, the majority of these resources are under-utilized and over-crowding is unlikely to occur in the near future.

Within the scope of this study, a group of eight lakes known as the Fish River Chain of Lakes was selected for survey. These lakes are located approximately 50 miles east of the project area and lie within day-use driving distance of the primary population centers of Northern Maine. (See Figure 6). The Chain of Lakes is very popular with area residents and local day-use accounts for approximately 50 percent of all recreation visitor days.

Shoreline development at the more popular lakes in the chain, Long, Eagle, Cross, St. Froid and Portage, attracts participation in family-oriented activities such as swimming, powerboating and fishing. Public recreation facilities (picnic tables, boat launching areas, beaches, etc.) are available, but, there is evidence that the supply of these facilities needs to be expanded. Vacation homes and commercial campgrounds serve as modes of accommodation for overnight visitors.

Activities at the more inaccessible lakes in the chain tend towards such pursuits as sport fishing, hunting and canoeing. Their relative remoteness and lack of facilities render these lakes less desirable for family activities. Sportsmen's Camps and wilderness tenting sites are the primary source of overnight accommodations.



| | |
|--|-----------------------|
| LEGEND | |
| ○ | POINTS OF ENTRY |
| LOCATION OF PROJECT AREA TO FISH RIVER LAKES | |
| DICKEY LINCOLN SCHOOL LAKES PROJECT RECREATION PLAN DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS | |
| SCALE 1" = 50 MILES | 0 25 50 |
| Northern Maine Regional Planning Commission Land Use Consultants, Inc. | |
| FIGURE | 6 |

The approximate distribution of all 1975 recreation visitor-days in Northern Maine is presented below.²⁵

| | |
|---|---------|
| A. Upper St. John River (Project Area) | 17,867 |
| B. North Maine Woods (excluding Allagash Wilderness Waterway) | 97,590 |
| C. Allagash Wilderness Waterway | 43,507 |
| D. Fish River Chain of Lakes | 233,240 |
| E. All Other Aroostook County | 317,707 |
| TOTAL VISITOR-DAYS | 709,911 |

4.4.4 Survey of Most Similar Recreation Resources

Having generally surveyed the recreation opportunities available in Northern Maine in the previous section, it is appropriate to now focus on a specific resource most similar to the Upper St. John River as it exists now without the dams, and then a resource which is expected to be most similar to the proposed impoundments.

The Allagash Wilderness Waterway was selected as a riverine system comparable to the Upper St. John River because of (a) its semi-wilderness character, (b) its locational setting in a remote section of Northern Maine, and (c) the similar characteristics of its user group.

In much the same manner, Moosehead Lake was selected to serve as a basis for comparison with the proposed Dickey-Lincoln School Lakes.

4.4.4.1 Existing Use of a Riverine-Type Resource

Visitation to the Allagash Wilderness Waterway, which is located just to the east of the project area, was analyzed and compared with that of the Upper St. John River. A review of the user characteristics and activity preferences of the Allagash group reveals significant similarities. In addition, the market area of the two rivers is the same. (See Figure 4).

Since its State designation in 1966 as a Wilderness Waterway, the Allagash River has accommodated an increasing demand for remote wilderness recreation pursuits. The primary activities for visitors to the Allagash are canoeing, fishing and camping. Table IV-3 shows a part of the historical trend in use of the Allagash and clearly indicates that the recent use of the area has been at or near its current maximum level of accommodation, which is 50,000 visitor days.²⁶

It is expected that the supply of facilities (canoe launching sites, group camping areas, etc.) at Allagash will be expanded in the future

TABLE IV-3

ALLAGASH PEAK SEASON USE HISTORY

| YEAR | # PARTIES | PERCENT INCREASE OR DECREASE | AVERAGE PARTY SIZE | TOTAL # VISITORS | PERCENT INCREASE OR DECREASE | AVERAGE LENGTH OF STAY (DAYS) | TOTAL # VISITOR DAYS | PERCENT INCREASE OR DECREASE |
|------|-----------|------------------------------|--------------------|------------------|------------------------------|-------------------------------|----------------------|------------------------------|
| 1966 | 1,011 | - | 4.09 | 4,141 | - | 6.52 | 27,008 | - |
| 1967 | 1,065 | +5 | 4.26 | 4,539 | +10 | 5.91 | 26,831 | -1 |
| 1968 | 884 | -16 | 4.28 | 3,786 | -17 | 6.85 | 25,921 | -3 |
| 1969 | 1,134 | +22 | 4.25 | 4,820 | +27 | 6.17 | 29,720 | +15 |
| 1970 | 1,251 | +9 | 4.36 | 5,460 | +13 | 6.83 | 37,303 | +26 |
| 1971 | 1,492 | +19 | 4.25 | 6,345 | +16 | 5.72 | 36,274 | -3 |
| 1972 | 1,579 | +6 | 5.23 | 8,258 | +30 | 5.20 | 49,952 | +18 |
| 1973 | 1,877 | +19 | 4.43 | 8,315 | +1 | 6.06 | 50,361 | +17 |
| 1974 | 1,672 | -11 | 4.26 | 7,128 | -14 | 6.07 | 43,292 | -14 |
| 1975 | 2,430 | +45 | 3.89 | 9,447 | +32 | 4.61 | 43,507 | +1 |

SOURCE: Allagash Peak Season Use History, Maine Bureau of Parks and Recreation, 1975.

so as to accommodate an increasing demand. Until such time as this action is forthcoming, however, excess demand may be expected to shift to the Upper St. John River

4.4.4.2 Existing Use of a Large Lakes Resource

Moosehead Lake is located on the border of Somerset and Piscataquis Counties, approximately 150 miles south of the Project Area. It also lies relatively closer to the New England market area. (See Figure 7). The physical characteristics of the lake, a maximum of 40 miles long, 20 miles wide and 246 feet in depth, are comparatively similar to those of the proposed Dickey Lake.

Good fishing and beautiful scenery have attracted vacationers to Moosehead for nearly fifty years. The lake is wooded all around, with the towns of Greenville and Rockwood located near the south end. The numerous commercial facilities established in these communities to accommodate tourism are a primary economic resource in the area. The relatively undeveloped northern end of the lake is the setting for remote camping and extended fishing and hunting trips.

Unlike the situation at the Fish River Chain of Lakes, the local population accounts for only 15-percent of the recreation use at Moosehead.²⁷ Day-use facilities are limited and alternative recreation resources are available. Baxter State Park and the Allagash Wilderness Waterway are located less than 50 miles to the northeast. Lily Bay State Park, which is located on the eastern shore of Moosehead, is near its camping capacity on weekends and peak holidays, but is generally under-utilized on weekdays. The park accounted for 37,700 visitor-days in 1976, down slightly from previous years.

The greater part of recreation use at Moosehead appears to be generated by non-local visitors, who may also be attracted by the other outstanding recreation resources in the area. In recent years, many of the overnight lodging places previously favored by this group, have suffered financially due to the increased popularity and cost attractiveness of camping.

The Moosehead Lake area accounted for approximately 210,000 recreation visitor-days in 1976.

4.4.5 Nearby Canadian Recreational Areas

Although Canadian visitation to the project area, in any significant amount, is now evident only during the early spring fishing season and the late fall hunting season, it is possible that a significant number of Canadians traveling on the Trans-Canada Highway will be potential visitors to the Dickey-Lincoln School Lakes. The Trans-Canada Highway is the major artery connecting central and western Canada with the Maritimes, and it passes within 50 miles of the project area.

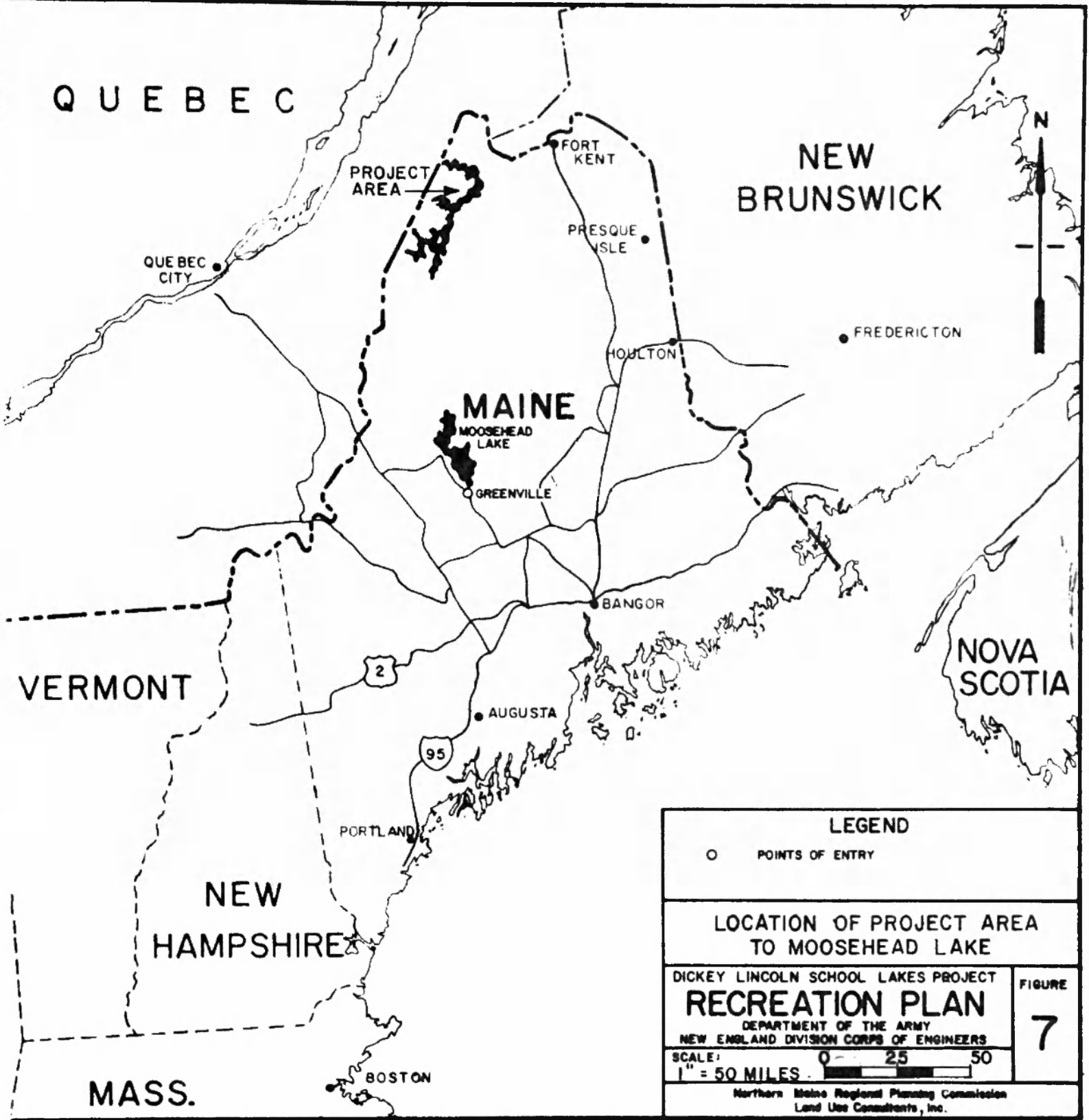
To estimate the demand that could be expected from this Canadian group, a survey of recreation use at the Lac Temiscouata Reservoir was undertaken. Lac Temiscouata is located approximately 70 miles north of the project area in Quebec Province and it lies adjacent to the Trans-Canada Highway. There is little recreational development except near the Town of Cabano.

Few travelers on the Trans-Canada have either Lac Temiscouata or Northern Maine as their primary destination.²⁸ However, many "enroute" vacation travelers stop at Cabano for a short time and make use of the available recreation facilities. The area is serviced by approximately 150 camping sites for both camper trailers and tents, and a small number of boat access and picnic facilities.

In addition to the facilities available at Lac Temiscouata, there are four New Brunswick provincial parks which are located within the day-use market of the project area. These parks also offer "enroute" travelers and local residents various recreation opportunities and camping facilities. A total of 180 camping sites are available at these areas.

Visitation to the Cabano municipal campground and four New Brunswick provincial parks in 1975 is presented below:²⁹

| | |
|--------------------|---------------|
| A. Cabano | 11,500 |
| B. St. Leonard | 66,900 |
| C. St. Basile | 51,800 |
| D. Les Jardins | 29,300 |
| E. Lac Baker | <u>56,000</u> |
| TOTAL VISITOR-DAYS | 215,500 |



CHAPTER V

ESTIMATING OUTDOOR RECREATION ATTENDANCE

5.0 Introduction

Models for projecting the level of participation at a specific recreation area vary in complexity from very simple linear trend forecast to multivariate regression analysis. Often it is possible to submit collected data to a programmed technique which has been standardized through the application of similar data from other research efforts. The choice, however, of an appropriate methodology rests on the identification of those factors which distinguish one research project from another. If data is scarce or unreliable, then use of a sophisticated multivariate analysis may result in forecasts which are not valid. Furthermore, if the parameters of the study area deviate significantly from those incorporated in a predictive model, then the use of that model is not justified.

5.1 Analysis of the Corps of Engineers Procedure for Estimating Recreation Use

The U.S. Army Corps of Engineers' "most similar project" concept is a standardized methodology for estimating initial recreational use of reservoir areas. It is clearly described in ER 1120-2-403, and in essence it consists of the following steps:

1. Identifying a similar Corps project,
2. Obtaining its per capita visitation/distance rate for day users,
3. Determining the populations of counties within the day-use market area and the road distances of their population centers from the project,
4. Estimating day-use attendance by applying the per capita visitation rates obtained from the similar project to the population/distance statistics of the project day-use area itself,
5. Estimating over-night use as a percentage of day-use.

This is a simple and pragmatic methodology which has "evolved from a concentration on standardization in order to avoid undesirable variation in collecting similar kinds of data"

Aroostook County is clearly a unique location, however, and does not easily conform to any standard schemes.

The "most similar project" method involves identifying an existing reservoir that is most comparable in size, operation, and anticipated recreation-use characteristics. Relating recreation-use rates from an existing reservoir to a reservoir under study, provides the basis for the use estimating technique.

The Corps of Engineers' methodology provides comparative data for existing reservoir projects in only three geographic regions. These are: (1) Middle South - seven projects in Georgia, South Carolina, Tennessee, Kentucky; (2) Southwest - 31 projects in Texas, Oklahoma, Arkansas, Missouri, Kansas; (3) West - 14 projects in California, Oregon.

Although geographical location in itself should not preclude the use of this methodology, it does create serious constraints to the methodology's application in this research effort. Also, the majority of the Corps projects are within day-use range of major regional cities, such as Nashville, Fort Worth and Sacramento, and a majority of the water-oriented recreation areas which are competitive with the Corps projects, are similar man-made reservoirs. Aroostook County is relatively remote from any large urban centers and is abundant with uncrowded natural water areas. This latter feature is significant because some categories of recreation users may show a preference for natural and wilderness areas, rather than man-made sites.

An important feature of the Corps methodology is its emphasis on day-users of recreation areas. An estimate of over-night use is derived, but it is simply calculated as a percentage of day-use. In fact, three primary categories of outdoor recreation participants in Aroostook County may be delineated, specifically day-use visitors, weekend visitors, and extended-stay vacation visitors.

Because day-use visitors represent only a part of the recreation group, the conventional Corps methodology is likely to produce an unrealistic estimate of total user demand and, therefore, total recreation benefits. A revised methodology has been instituted which will more accurately predict visits to the proposed reservoirs by a diverse group of recreation users, and which is more sensitive to the unique characteristics of Aroostook County, thus minimizing bias in the estimates.

5.2 Methodology

The general methodology employed to estimate the future level of demand for outdoor recreation in the project area is composed of three phases. Phase One establishes the existing recreation use in the project area and serves as a base for future estimates. Phase Two is a projection of recreation demand in the project area which would be expected without construction of the dams. Phase Three is a projection of recreation demand expected in the project area with construction of the dams and creation of the Dickey-Lincoln School Lakes. A detailed explanation of each phase follows.

5.3 Existing Demand for Outdoor Recreation

This phase consists of simply compiling data on existing recreation use in the project area. Statistical information regarding visitation to the project area in 1975 has been derived from three sources:

1. North Maine Woods Visitation Data
2. International Paper Company Visitation Data
3. Survey of Northern Maine Flying Services

The project area is included within the 2.5 million acres of forest land which is managed by the North Maine Woods Association. A computer tabulation of visitation data collected from questionnaires distributed at entrance gates was provided by the Association. Data was presented in the form of visitor days of participation by origin and by primary purpose of recreation trip.

Some visitors gain access to the project area via the International Paper Company's St. Aurelie Gate. Visitation data collected at this site in 1975 provided an additional count of visitors and their primary recreation purpose.

Finally, information regarding visitors who fly in to the project area via seaplane, was obtained from a survey of nine flying services in the Northern Maine region. The survey was conducted within the scope of this study. An approximate count of visitors, their origin and their primary recreation purpose was derived from the survey.

A summary of recreation use in the project area in 1975 is presented in Table V-1.

TABLE V-1

1975 Recreation Use by Activity in the Project Area
(Visitor Days)

| | Total | Camping | Fishing | Hunting | Canoeing | Day Activities |
|--------------|--------|---------|---------|---------|----------|-------------------|
| Non-Resident | 9,442 | 817 | 1,592 | 4,914 | 1,881 | 238 |
| Resident | 8,425 | 892 | 2,821 | 3,378 | 447 | 887 |
| Total | 17,867 | 1,709 | 4,413 | 8,292 | 2,328 | 1,125 |

5.4 Demand Projections: Without Dickey-Lincoln School Lakes

The projections described in this phase are estimates of outdoor recreation use at the project area if the dams are not constructed.

The basic approach of this projection methodology is to estimate the future level of demand as a function of current demand for the particular recreation activities offered at the project area. An initial estimate of demand in the year 2000 is calculated for each recreation activity and defined origin group. In calculating this estimate, it is assumed that rates of participation in outdoor recreation will increase and that the project area will receive a part of this increase proportional to its current share of the market. Table V-2 shows the development of the recreation demand projection for the year 2000.

The year 2000 estimates become the basis for calculating a growth multiple and interpolating the level of recreation demand in other selected years. The levels of demand which result from applying the annual growth rates presented below are shown in Table V-3.

Annual Growth Rate

| | |
|----------------|------|
| Camping | 4.5% |
| Fishing | 2.9% |
| Hunting | 1.9% |
| Canoeing | 3.7% |
| Day Activities | 4.3% |

The formula that is used for interpolating is: $S = P (1+i)^n$

where S represents a future level of demand at the end of n years.

P represents a present level of demand in 1975.

i represents an annual growth rate.

n represents a number of years.

5.5 Demand Projections: With Dickey-Lincoln School Lakes

The purpose of this phase of the general methodology is to estimate the level of recreation demand in the project area which would be expected with construction of the dams. The Corps of Engineers recommended procedure for estimating initial reservoir recreation use has been applied to the projections of demand for day activities, which includes sightseeing, boating, picnicking, swimming and hiking. Projections of demand for camping, fishing and hunting are derived pursuant to a different estimating procedure. Each of the estimating procedures is described in detail in the following sections.

5.5.1 Day Activities

The estimate of initial demand for day activities is derived pursuant to the procedure described in ER 1120-2-403. The local population centers, their respective distances from the project and the per capita visitation rates obtained from a "similar" project which have been utilized in the projection procedure are presented in Table V-4. The group of "enroute" vacation travelers on the Trans-Canada Highway has been designated as a local potential source of day visitors.

It is expected that sightseeing and picnicking will account for approximately 70 percent of the recreation demand for day activities with boating, swimming and hiking accounting for the remaining 30 percent.

Estimates of recreation demand for day activities in future selected years are derived by assuming a 5 percent growth factor in each 5 year period. These estimates are shown in Table V-5

5.5.2 Camping

The projection method employed to estimate demand for camping is the "peak day-peak season" approach described in the 1977 Maine Statewide Comprehensive Outdoor Recreation Plan.³⁰ This method is a measure of expected use of facilities. A period

of 25 peak days is defined for the camping facilities which would be available in the project area. During this time an average of four people would occupy each campsite. This peak period represents 35 percent of the total use during the camping season.

It can be reasonably expected that approximately 100 new campsites would be developed by the Maine Department of Conservation.³¹ The campsites would be designated as primitive, group and destination type, and would most likely be developed in a phased process contingent on their actual use following project completion. Some 32 of the 74 existing primitive campsites in the project area would remain following impoundment. These sites would be located at comparatively more distant and remote locations from the dam sites and not likely to be well utilized initially. In the interim period between impoundment and project completion, these 32 sites would be the only available camping facilities in the project area.

Estimates of demand for camping in future selected years are derived by applying the "peak day-peak season" method to the expected supply of camping facilities. These estimates are shown in Table V-5.

5.5.3 Fishing

The estimated level of demand for fishing is a function of the potential fishery yield of Dickey Lake, which is expected to be approximately 0.2 lbs. per acre per year. It is assumed that fishing pressure will be maintained at a level sufficient to sustain, but not to exceed this natural yield.³² It is further assumed that fish taken from Dickey Lake will average 2 lbs. in weight. From this data it is calculated that the maximum level of demand for fishing which can be supported is 10,000 visitor-days. If the Lake should provide a greater yield, then demand would be expected to increase.

The successful development of a good fishery resource presumes a limited harvest in the initial years after species are introduced. For this reason, a low estimate of the level of fishing demand is projected for several years following project completion. In this interim period, fishing will continue to be available in some tributary brooks. The estimates of demand for selected years are shown in Table V-5.

5.5.4 Hunting

As with fishing, hunting is affected by imposed limits on wildlife resources which may set an upper limit less than

estimated future demand. The impoundment would be expected to reduce the deer population in the project area from approximately 5,100 to 3,400. Consequently, the maximum allowable level of pressure is expected to be approximately 14,500 man-days of hunting.³³ This limit will be reached by the year 2005 assuming that the deer population remains at approximately 3,400 and that hunting pressure increases at the same rate as for the case without the dams. Estimates of demand for selected years are shown in Table V-5.

TABLE V-2

Development of Recreation Demand Projections

WITHOUT DICKEY-LINCOLN SCHOOL LAKES

| ACTIVITY: | POPULATION (1000s) | | RATE OF PARTICIPATION (percent) | | TOTAL VISITOR DAYS (1000s) | | VISITOR DAYS ALLOCATED TO PROJECT AREA | |
|-----------------|-----------------------|--------|---------------------------------------|------|----------------------------------|-----------|--|---------------|
| | 1975 | 2000 | 1975 | 2000 | 1975 | 2000 | 1975 | 2000 |
| CAMPING | | | | | | | | |
| New England | 12,164 | 15,340 | 19.0 | 36.1 | 24,267 | 82,516 | 1450 | 4630 |
| Middle Atlantic | 37,263 | 46,126 | 12.7 | 24.1 | 49,759 | 155,624 | 150 | 310 |
| Quebec | 6,141 | 6,383 | 18.0 | 34.2 | 15,081 | 32,527 | --- | --- |
| Maritimes | 1,565 | 1,604 | 13.0 | 24.7 | 1,073 | 2,338 | 100 | 200 |
| | | | | | | | <u>1700</u> | <u>5140</u> |
| FISHING | | | | | | | | |
| New England | 12,164 | 15,340 | 23.3 | 31.7 | 26,673 | 65,164 | 3565 | 7755 |
| Middle Atlantic | 37,263 | 46,126 | 20.4 | 27.7 | 65,012 | 148,213 | 150 | 270 |
| Quebec | 6,141 | 6,383 | 30.0 | 35.0 | 19,168 | 25,917 | 600 | 820 |
| Maritimes | 1,565 | 1,604 | 30.0 | 35.0 | 2,361 | 3,176 | 100 | 200 |
| | | | | | | | <u>4415</u> | <u>9045</u> |
| HUNTING | | | | | | | | |
| New England | 12,164 | 15,340 | 7.7 | 7.7 | 8,507 | 15,471 | 5275 | 9365 |
| Middle Atlantic | 37,263 | 46,126 | 7.6 | 7.6 | 23,179 | 38,917 | 975 | 1630 |
| Quebec | 6,141 | 6,383 | 10.0 | 10.0 | 6,090 | 7,082 | 1840 | 2120 |
| Maritimes | 1,565 | 1,604 | 20.0 | 20.0 | 1,537 | 1,768 | 200 | 230 |
| | | | | | | | <u>8290</u> | <u>13,345</u> |
| CANOEING | | | | | | | | |
| Northeast | 49,428 | 61,466 | 3.7 | 5.0 | 8,912 | 22,125 | 2205 | 5470 |
| Quebec | 6,141 | 6,383 | 8.0 | 10.0 | 482 | 638 | --- | --- |
| Maritimes | 1,565 | 1,604 | 3.0 | 4.0 | 19 | 27 | 125 | 250 |
| | | | | | | | <u>2330</u> | <u>5720</u> |
| DAY ACTIVITIES | | | | | | | | |
| New England | 12,164 | 15,340 | 49.6 | 60.0 | 281,366 | 500,000 | 960 | 2730 |
| Middle Atlantic | 37,263 | 46,126 | 48.5 | 60.0 | 696,586 | 1,000,000 | 100 | 285 |
| Quebec | 6,141 | 6,383 | -- | -- | -- | -- | --- | --- |
| Maritimes | 1,565 | 1,604 | -- | -- | -- | -- | 65 | 185 |
| | | | | | | | <u>1125</u> | <u>3200</u> |

TABLE V-2
(continued)

NOTE

New England: Maine, New Hampshire, Vermont, Massachusetts,
Rhode Island, Connecticut

Middle Atlantic: New York, New Jersey, Pennsylvania

Canadian Maritimes: New Brunswick, Nova Scotia, Prince
Edward Island, Canada

REFERENCES

The 1970 Survey of Outdoor Recreation Activities: Preliminary Report, Bureau of Outdoor Recreation, U.S. Department of the Interior, 1972.

Trends in Participation in Outdoor Recreation Activities: Preliminary Report, Canadian Outdoor Recreation Demand Study, Technical Note Number 22, 1973.

TABLE V-3

Recreation Demand Projections

VISITOR DAYS OF RECREATION
WITHOUT
DICKEY-LINCOLN SCHOOL LAKES

| | 1975 | 1980 | 1985 | 1988 | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Camping | 1,700 | 2,100 | 2,600 | 3,000 | 3,300 | 4,100 | 5,100 | 6,400 | 7,900 | 9,900 | 12,300 | 15,400 | 19,100 |
| Fishing | 4,400 | 5,100 | 5,900 | 6,400 | 6,800 | 7,800 | 9,000 | 10,400 | 12,000 | 13,800 | 15,900 | 18,400 | 21,200 |
| Hunting | 8,300 | 9,100 | 10,000 | 10,600 | 11,000 | 12,100 | 13,300 | 14,600 | 16,000 | 17,600 | 19,400 | 21,300 | 23,400 |
| Canoeing | 2,300 | 2,800 | 3,300 | 3,700 | 4,000 | 4,800 | 5,700 | 6,800 | 8,200 | 9,800 | 11,800 | 14,200 | 17,000 |
| Day Activities | 1,100 | 1,400 | 1,700 | 1,900 | 2,100 | 2,600 | 3,200 | 3,900 | 4,800 | 5,900 | 7,300 | 9,000 | 11,100 |
| TOTAL | 17,800 | 20,500 | 23,500 | 25,600 | 27,200 | 31,400 | 36,300 | 42,100 | 48,900 | 57,000 | 66,700 | 78,300 | 91,800 |

TABLE V-4

Estimating Initial Demand for Day Activities

WITH DICKEY-LINCOLN SCHOOL LAKES

| AREA | ROAD MILES | PER CAPITA RATE ³⁴ | POPULATION | TOTAL VISITOR DAYS |
|---------------------------------|------------|----------------------------------|------------|-----------------------|
| Maine | | | | |
| Fort Kent | 30 | .8 | 8,208 | 6,566 |
| Madawaska | 50 | .3 | 8,625 | 2,588 |
| Van Buren | 75 | 1 | 4,701 | 470 |
| Caribou | 75 | 1 | 11,498 | 1,150 |
| Ashland | 75 | 1 | 6,277 | 628 |
| New Brunswick: | | | | |
| Clair | 30 | .8 | 4,529 | 3,623 |
| Edmunston | 50 | .3 | 20,646 | 6,194 |
| Green River | 60 | .2 | 4,380 | 876 |
| St. Leonard | 75 | 1 | 3,019 | 302 |
| Quebec: | | | | |
| St. Jean | 50 | .3 | 1,309 | 393 |
| Degelis | 60 | .2 | 5,900 | 1,180 |
| Riviere-Bleue | 60 | .2 | 3,497 | 700 |
| Cabano | 75 | 1 | 3,063 | 306 |
| Trans-Canada Vacation Group: | 50 | .3 | 19,000 | <u>5,700</u> |
| | | | TOTAL: | 30,676 |
| | | | ROUND TO: | 30,700 |

TABLE V-5

Recreation Demand ProjectionsVISITOR DAYS OF RECREATION
WITH
DICKEY-LINCOLN SCHOOL LAKES

| | 1975 | 1980 | 1985 | 1988 | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Camping | 1,700 | 2,100 | 1,000 | 5,000 | 10,000 | 15,000 | 20,000 | 25,000 | 30,000 | 32,500 | 35,000 | 37,500 | 40,000 |
| Fishing | 4,400 | 5,100 | 2,000 | 2,000 | 2,700 | 6,000 | 7,800 | 8,900 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Hunting | 8,300 | 9,100 | 10,000 | 10,600 | 11,000 | 12,100 | 13,300 | 14,600 | 14,600 | 14,600 | 14,600 | 14,600 | 14,600 |
| Canoeing | 2,300 | 2,800 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day Activities | 1,100 | 1,400 | 1,700 | 29,200 | 30,700 | 32,200 | 33,800 | 35,500 | 37,300 | 39,200 | 41,200 | 43,300 | 45,500 |
| TOTAL | 17,800 | 20,500 | 14,700 | 46,800 | 54,400 | 65,300 | 74,900 | 84,000 | 91,900 | 93,800 | 95,800 | 97,900 | 100,100 |

NOTE: Impoundment commences in 1985, with project expected to be on line in 1988.

CHAPTER VI
RECOMMENDED DEVELOPMENT PLAN

6.0 Significance of Physical Resources to Recreation Use and Development

6.1 Geographic Boundaries

The proposed project would be remote from major U.S. and Canadian cities. The only point of entry to the project area over public roads would be from Fort Kent, Maine unless access is provided to the lake over private, gravel roads controlled by the North Maine Woods Association. This remoteness factor could limit recreational use of the project area, especially day use activities such as picnicking, swimming and sightseeing. Although access would also exist over private, gravel logging roads, it is expected that their use would be insignificant.

6.2 Climate

The cool climate in the project area causes the summer recreation season to be short. Activities such as boating, swimming, picnicking, camping, and sightseeing would occur primarily from late June through July and August when there is reasonable assurance that nighttime temperatures would stay above freezing.

Primitive campsites may be necessary near remote portions of the lake to accommodate boaters that become stranded because of unsafe water conditions during stormy weather. Probable wind and wave conditions are discussed in Section 6.5.2.

6.3 Topography and Geology

The generally flat, often poorly drained area upstream of Blue Brook, and in the upstream reaches of the Big Black and Little Black River drainages is not conducive to recreational development. In contrast, downstream areas are more conducive to recreational use as they are generally better drained and have topographic and shoreline variability which contribute to scenic quality. Localized steep slopes and poor soil conditions in this downstream area are significant considerations in determining the location of recreational facilities.

6.4 Biologic and Ecologic Features and Resources

6.4.1 Vegetation

Forest vegetation would provide the setting for camping, picnicking, hiking, nature study, hunting and sightseeing in the project area. Unique or unusual plant species hold special value for nature study

and photography. Vegetation also provides valuable food and cover for wildlife.

The spruce-fir stands found on flat, lower slopes indicate poor soil drainage conditions that would limit development of campsites, picnic areas, restroom facilities, pit privies, hiking trails, roads, and boat launch areas. The spruce-fir stands found on ridgetops indicate shallow soils and steep slopes where automobile access would be difficult if not impossible, erosion hazards are present, and excavations would be difficult and expensive. The hardwood stands occurring on upper slopes indicate favorable soil depth and drainage conditions, exposure, air circulation, and light penetration conducive to recreational development. Therefore, hardwood stands are to be favored in selecting recreational development sites. Mixed wood stands indicate marginal conditions for recreation facility development and therefore, should be examined as secondary recreational development areas.

6.4.2 Terrestrial Wildlife

During the fall and winter seasons, hunters would be seeking whitetail deer, black bear, ruffed grouse, woodcock, and snowshoe hare in forested portions of the project area; and ducks and perhaps geese in wetlands and along streams and lake shores. In the event that the Maine Legislature establishes a moose season in the state, the St. John region would certainly attract a sizeable number of moose hunters.

Additionally, all recreationists can enjoy observing both game and non-game wildlife species throughout the year. Those species of birds and mammals such as the bald eagle, osprey, moose, black bear, bobcat, lynx, spruce grouse, Canada Jay, jarten, fisher, beaver, and otter which generally avoid human population concentrations would be of special interest. Wildlife observation and photography is likely to be an important secondary activity for project area recreationists.

Important wildlife habitats such as deer yards, waterfowl nesting areas, osprey and potential eagle nesting sites, and den trees should be avoided whenever possible during construction of recreation facilities. Light recreational use near such habitats can be encouraged with hiking trails. Heavy use, especially during winter stress periods or spring nesting seasons, should be discouraged so that wildlife would not be subjected to additional, undue stress during these periods. Because of potential conflicts between native wildlife and domestic pets owned by recreationists, all pets must be either leashed, under direct owner control, or excluded from the project area entirely. Also, trash disposal regulations and techniques must be strictly enforced to avoid potentially damaging man-wildlife encounters.

6.4.3 Fishery

Fishermen in the project area would be able to enjoy both stream and lake fishing for native brook trout in the project area. In addition, the deep water landlocked salmon and/or lake trout fishery that is likely to be established will provide an additional fishing opportunity

during the spring and summer seasons. Winter ice-fishing for smelt on Dickey Lake could also become possible. It would take several years to grow catchable size salmon or lake trout in Dickey Lake. Therefore salmon and/or lake trout fishing may not be allowed during the first several years of project operation.

Brook trout fishermen could use existing logging roads and developed hiking trails, or walk along the lake shore to their fishing site. These fishermen would only require a safe place to park their car before starting out on foot. Boat access sites would be required for deep-water fishermen so that they can launch their boats easily. Tributary streams would have to be kept clear of obstructions and the gravel bottom stream segments used for trout spawning must be protected from damage.

6.5 Hydrology

Recreational canoeists seeking the challenges offered by the large size and flashy, uncontrolled hydrology of the Upper St. John River are attracted to the river as it now exists. In fact, anyone venturing near the river can sense its power and wildness. Harnessing this power by the Dickey-Lincoln project would eliminate those hydrologic features which attract canoeists during the spring and early summer when water levels remain high enough for canoeing. The river would be replaced by an expansive lake with its own recreation attractions.

Reservoir water level fluctuations, and wind and wave action on the lake would partially determine the type and quality of recreation that would occur on the lake, and where and how recreational facilities are to be provided.

6.5.1 Drawdown and Shoreline Character

The impact of reservoir drawdown is a function of shoreline slope. Table VI-1 shows that the steeper the shoreline, the less the area exposed; and the less the shoreline slope, the greater the area exposed. In Table VI-1, the 2-foot and 4-foot drawdowns are what may occur during the summer recreation season. In any one summer, the 2-foot drawdown may be from 910' - 908' m.s.l. while the following summer it may be from 904' - 902' m.s.l. because of variations in the annual maximum pool elevation in successive years. This would give the impression of an 8-foot drawdown rather than just a 2-foot drawdown. Obviously, with greater drawdowns and variations in successive annual maximum pool levels, the effects of summer drawdown could limit recreational use of Dickey Lake periodically.

Abrasion of the shoreline by ice and waves would prevent the establishment of woody vegetation in this periodically flooded zone, leaving bare soil exposed. The soils present in this zone of flooding would therefore determine the shoreline character in a given area. Wave action and periodic flooding on glacial till and bedrock deposits would leave a stony and bouldery shoreline mixed with exposed bedrock outcroppings. Wave action on glacial outwash, poorly drained till, and alluvial soils would produce muddy shoreline conditions. The

area near the dam would have a steeply sloping, stone and bouldery shoreline where drawdown would be little noticed. Conversely, the upstream portions of the reservoir near Seven Islands, upstream reaches of the Little Black and Big Black arms of Dickey Lake, and coves at the mouths of tributary streams would likely to have unattractive mud flats exposed even during the recreation season from June to September when drawdown is being minimized.

TABLE VI-1

Width of Area Exposed Along Shoreline During Reservoir Drawdown

| <u>Reservoir Drawdown (in feet)</u> | <u>1% Slope</u> | <u>5% Slope</u> | <u>20% Slope</u> |
|---|-----------------|-----------------|------------------|
| 2 | 200' | 40' | 10' |
| 5 | 500' | 100' | 25' |

6.5.2 Wind and Wave Action

Because of Dickey Lake's large size, periodic windy weather could create hazardous boating conditions, particularly for small craft such as canoes, small sailboats, and car-top outboard motor boats. Canoeists on the St. John River upstream from the reservoir should be discouraged from entering the impoundment area to avoid the necessity of ending their trip with many miles of potentially dangerous flat water paddling. Only localized canoeing along the lake shoreline would be appropriate on Dickey Lake. It is predicted that winds during June and July averaging 11-13 m.p.h. would create waves of 1-2 feet in height. Small craft operation under these conditions would be possible, but difficult. Stormy weather such as summer thunderstorms would create waves from 2 to 4 feet in height that are dangerous for small craft including high-powered motor boats. Table VI-2, illustrates wave heights under varying wind velocities.

The impact of waves on the shoreline would cause some shoreline erosion and muddying of water in shoreline areas exposed to the prevailing winds, which may be unattractive to some recreationists. In addition, trees growing along the shoreline of the reservoir would be affected by erosion, wind, and root system saturation that could result in blowdown. Clearing to 3 feet above the 910' maximum pool elevation should significantly reduce the chances of blowdown, however

Table VI-2

Determination of Wave Heights for Dickey Lake

| | Average Wind Velocity and Direction | | Required Wind Duration For Wave Stabilization | | Stabilized Wave Height (feet) | |
|-----------------|---|-------------------|--|-------------|-------------------------------------|-------------|
| | <u>June (WSW)</u> | <u>July (WNW)</u> | <u>June</u> | <u>July</u> | <u>June</u> | <u>July</u> |
| | Seven Islands | 10 mph | 10 mph | 40 min | -- | 0.5 | 0.5 |
| Big Black | 10 mph | 10 mph | 95 min | 120 min | 1.1 | 1.3 |
| Dickey Dam | 10 mph | 10 mph | 200 min | 80 min | 1.8 | 0.95 |
| Little Black | 10 mph | 10 mph | 100 min | 170 min | 1.1 | 1.6 |
| | Maximum Wind Velocity and Direction | | Required Wind Duration For Wave Stabilization | | Stabilized Wave Height (feet) | |
| | <u>June (WSW)</u> | <u>July (WNW)</u> | <u>June</u> | <u>July</u> | <u>June</u> | <u>July</u> |
| | Seven Islands | 40 mph | 40 mph | -- | 18 min | -- | 2.3 |
| Big Black | 40 mph | 40 mph | 50 min | 65 min | 4.2 | 5.5 |
| Dickey Dam | 40 mph | 40 mph | 110 min | 45 min | 7.5 | 4.0 |
| Little Black | 40 mph | 40 mph | -- | 95 min | -- | 7.0 |

6.6 Floating Debris and Reservoir Clearing

Floating debris resulting from reservoir clearing operations during construction could limit recreation, especially power boating, during the first 3-4 years of project operation. Intensive debris removal operations would be undertaken to minimize this problem during reservoir filling. Trees growing along tributary streams may be washed into the reservoir during the annual spring freshet. This debris may represent an annual but temporary hazard to recreation which could be reduced with annual location and removal of debris accumulations in the lake.

Trees left standing below the minimum pool elevation would be an obstacle to fishermen in shoreline portions of the reservoir, particularly during seasons of low water level. During the summer recreation season, there would normally be at least 40-50 feet of water covering the trees, and salmon or lake trout would remain well above the submerged trees in the water column throughout the year. Submerged trees would be closest to the surface near the shoreline. The distance out from the lakeshore that submerged trees could be a problem to fishermen increases with decreasing shoreline slope. Although these submerged trees may discourage fishermen who are reluctant to snag their lines, these same trees would provide productive fish habitat in shoreline areas. These submerged trees would provide cover for fish, and a substrate for attaching algae which would in turn attract animal forage species used by brook trout and other fish.

6.7 Access

Remoteness of the project, travel time involved in getting there, and population levels within the market radius of the project suggest that day use of the site would be limited and destination oriented. Those who travel to and from the project on a day use basis would have a specific purpose for making the trip: boating, fishing, hunting, swimming or sightseeing. Because of the nature of access over Route 161, the only public road with a distance of approximately thirty miles from Fort Kent, it is expected that most day use of the project would be concentrated in and around the immediate area of the Dickey Dam. Therefore, in order to be attractive to as many people as possible, it is important that day use facilities be easily accessible in the least amount of time after entering the project area.

The limited potential for large volumes of day use, and the scale of the project itself, indicate that recreational use of the project would likely be more attractive for weekend and longer periods of stay with users participating in a wide range of activities during their visit. Thus, for the project to be a significant recreation resource, development of recreation facilities must focus upon high quality destination facilities with a variety of supporting day use activities.

6.8 Water Quality in Dickey Lake

The water-oriented recreation expected to occur at the proposed Dickey

Lake would be influenced by water quality. Water quality is important in maintaining fish populations, determining whether the water would remain clean enough to drink or even to swim in, whether the water would be warm enough for swimming, and whether the water would appear visually attractive to the recreationist.

The greatest changes in water quality at Dickey Lake would occur during and for 6-9 years following the filling of the reservoir. During this period, suspended terrestrial materials such as soil particles and organic matter would begin to settle or would decompose. As this occurs, the apparent color of the water in Dickey Lake would change from a yellowish-brown to yellow to greenish-yellow. Thus, over time, the water would become more visually attractive to recreationists. The dissolved oxygen content of the water in Dickey Lake is expected to increase to 5 mg/l in the hypolimnion by two years after complete filling of the reservoir. This is the minimum concentration needed for the survival of most cold water fish species. This increase would result from a reduction in the Biological Oxygen Demand of organic matter in Dickey Lake, and more complete mixing and stratification of lake waters. Water temperature likewise is not expected to exceed 70° F. in the hypolimnion after a few years of filling, so a coldwater fishery would probably not be limited by water quality once the reservoir is filled.

Water quality in the reservoir is expected to stabilize within 6-9 years after filling of Dickey Lake. Once stabilized, water color (apparent) in Dickey Lake would vary seasonally with changes in suspended materials such as clay, silica, and phytoplankton from greenish-yellow to greenish-blue. This range of color is generally visually attractive. Spring and fall blooms of diatoms would produce increases in the apparent yellowish color of the water while summer blooms of green and blue-green algae would produce the greenish-yellow to greenish-blue colors. Dissolved oxygen in Dickey Lake once stabilized, is expected to be near saturation in the epilimnion, and at or above 6 mg/l in the hypolimnion at the end of the summer stratification period which should be adequate to maintain a productive cold water fishery. However, the dissolved oxygen content may be lower in shallow coves and embayments dependent upon weather conditions which may influence the distribution of fish within Dickey Lake at certain times in the summer.

Water temperature and bacteria levels of the water influence swimming. The cool waters of Dickey Lake may discourage some recreationists from swimming. Fecal coliform bacteria counts are expected to be well within the 1,000 colonies/100 m.l. limit suggested for contact and non-contact recreational uses of water. The water quality sampling program conducted in 1976 showed that with the exception of just two stations in the Big Black River watershed, maximum total coliform counts in the water that would enter Dickey Lake are well within 1,000 colonies/100 m.l. Furthermore, the effects of impounding water are usually beneficial from a public health and recreational standpoint, since bacterial concentrations are significantly reduced during storage. Mean bacterial levels would be different for open water areas than for coves and embayments. Open water areas would have lower bacteria levels than coves and embayments affected by littoral influences of the

shoreline and tributary streams.

6.9 Recreation Potential Analysis

6.9.1 General

Analysis of the recreation potential of Dickey Lake is based upon site investigation, analysis of available natural resource data, and upon the Northern Maine Regional Planning Commission's investigation and analysis of the natural resource base for outdoor recreation. The scale of this project and of available resource data was such that only broad area assessments were possible. Selection of specific sites for selected recreational facilities must take place during future site planning activities when more site specific data can be obtained.

To facilitate quantitative and qualitative analysis necessary to this Recreation Plan, a methodology was developed which enabled a systematic and consistent analysis of the recreational significance of available data. The nature of that methodology and the results obtained follow.

6.9.2 Analysis of Recreation Potential

The land mass surrounding the proposed Dickey Lake was divided into twenty-eight areas of similar physiographic character. Each of these areas were then evaluated on the basis of their potential for recreational use.

Available data enabled the isolation of eight natural resource components as being primary determinants of an areas potential for recreational use and development. These components are: ground slope, vegetation, horizontal drawdown, surficial geology, shoreline composition, scenic potential, exposure to the sun, and potential deer yard conflicts.

Criteria were then established based upon the suitability of the varying characteristics of each resource component to outdoor recreation. Those characteristics were then assigned "quality points" ranging from one to three depending upon whether a favorable, average or unfavorable condition for recreation were to exist. Table VI-3 contains the criteria established for each resource component and the quality points assigned.

Quality points were then assigned to each resource component based upon its predominant character in each of the twenty-eight areas. Table VI-4 contains distribution of quality points and the total quality points for each area.

As a means of ranking the areas as to their relative suitability for recreational use, a frequency distribution was performed of the total quality points for each area. Table VI-5 indicates the results of the frequency distribution and the resulting categories.

The results of the above analysis are illustrated graphically in Figure 8, Recreational Potential

TABLE VI-3

RECREATION POTENTIAL ANALYSIS
CRITERIA FOR RECREATIONAL QUALITY POINTS

| <u>Resource Component</u> | <u>Quality Points</u> | | |
|---------------------------|---|---|---|
| | <u>1</u> | <u>2</u> | <u>3</u> |
| Slope | 5-20% | Variable | <5% >20% |
| Vegetation | Hardwood | Mixed Wood | Softwood |
| Horizontal drawdown | <250' | 250-500' | 500' |
| Surficial geology | Eskers, Kames Kame terraces | Outwash Till | Wet Till Alluvium Bedrock |
| Shoreline Composition | Cobble, Boulders | Intermediate or Bedrock Outcrop | Mud |
| Scenic Potential | Good Topo Variability Very Irregular Shoreline | Moderate Variability Irregular Shoreline | Little Variability Uniform Shoreline |
| Exposure | South | East West | North |
| Deeryards | None Identifiable | Small Yards | Extensive Yards |

Each area was then evaluated as to its suitability for the various types of public outdoor recreation included in the 1977 Maine State-wide Comprehensive Outdoor Recreation Plan and in keeping with this project. Table VI-6 contains an assessment of the recreational facilities appropriate to each of the twenty-eight areas on Dickey Lake.

An explanation of the terms used in Table VI-6 and as used in subsequent sections of this report follows:

Access

Road Access by public road or summer private roads as designated on maps published by Seven Islands Land Company.

Water - Potential for boat access.

Visitor Center - Visitor information center

Overlook - Points of high elevation offering especially good points of view of the dam and the impoundment.

Camping

Destination - Destination campground with the general characteristics of a State Park campground and providing those facilities and utilities necessary to relatively intensive levels of use.

Primitive - Remote campsite with tent site or lean-to, fireplace, table, and pit privy.

Swimming Beach - Improved beach with restrooms and picnic tables.

Boat Launch - Developed ramp for launching boats and related parking.

Boat Landing - Cleared space on shore or logs placed on shoreline to enable loading and unloading of boats at primitive campsites.

Trails - Cleared trail with minimal alteration for erosion control and safety.

Scenic - Scenic character of area as evidenced by topography and shoreline variability.

Picnic - Sites with road access to shoreline or at trail heads where day use picnicking is likely.

Wildlife - Potential for wildlife viewing. Usually confined to shallow areas providing habitat for waterfowl and moose.

TABLE VI-4

RECREATION POTENTIAL ANALYSIS
QUALITY POINT DISTRIBUTION

| Area | Quality Points | | | | | | | | Potential Deeryard Conflicts | Total |
|------|----------------|------------|----------|---------|--------------------------|---------------------|----------|---|------------------------------------|-------|
| | Slope | Vegetation | Drawdown | Geology | Shoreline Composition | Scenic Potential | Exposure | | | |
| 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 11 | |
| 2 | 2 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 12 | |
| 3 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 12 | |
| 4 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 13 | |
| 5 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 13 | |
| 6 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 14 | |
| 7 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 15 | |
| 8 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 20 | |
| 9 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 23 | |
| 10 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 22 | |
| 11 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 18 | |
| 12 | 1 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 19 | |
| 13 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 19 | |
| 14 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 14 | |
| 15 | 1 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 17 | |
| 16 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 3 | 14 | |
| 17 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 3 | 13 | |
| 18 | 2 | 3 | 3 | 2 | 2 | 3 | 1 | 3 | 19 | |
| 19 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 13 | |
| 20 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 13 | |
| 21 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 13 | |
| 22 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 19 | |
| 23 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 3 | 13 | |
| 24 | 1 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 14 | |
| 25 | 2 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 12 | |
| 26 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 11 | |
| 27 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 10 | |
| 28 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 12 | |

TABLE VI-5

RECREATION POTENTIAL ANALYSIS
QUALITY POINT FREQUENCY DISTRIBUTION

| <u>Quality Points</u> | <u>Area</u> | <u>Recreation Potential</u> |
|-----------------------|--------------------|-----------------------------|
| 9 | | |
| 10 | 27 | |
| 11 | 1,26 | Good |
| 12 | 2,3,25,28 | |
| <hr/> | | |
| 13 | 4,5,17,19,20,21,23 | |
| 14 | 6,14,16,24 | Fair |
| 15 | 7 | |
| <hr/> | | |
| 16 | | |
| 17 | 15 | |
| 18 | 11 | |
| 19 | 12,13,18,22 | Poor |
| 20 | 8 | |
| 21 | | |
| 22 | 10 | |
| 23 | 9 | |
| 24 | | |

Table VI-6

RECREATION POTENTIAL ANALYSIS
RECREATION USE POTENTIAL

+ Prime Potential!
 Secondary or Conditional
 Potential

| Areas | Access | | Facilities-Activities | | | | | | | | | | Comments | |
|----------------|--------|-------|-----------------------|----------|---------------------|-------------------|----------------|-------------|--------------|--------|--------|--------|----------|--|
| | Road | Water | Visitor Center | Overlook | Camping/Destination | Camping/Primitive | Swimming Beach | Boat Launch | Boat Landing | Trails | Scenic | Picnic | | Wildlife |
| Good Potential | | | | | | | | | | | | | | |
| 1 | + | + | + | + | + | - | + | + | - | + | + | + | | Area 1 Prime site for Visitor Center and Destination Camping. |
| 2 | - | + | - | + | - | + | - | - | + | + | + | + | | |
| 3 | | + | | | | + | | | + | + | + | - | | |
| 25 | | + | | | | + | | | + | - | + | | | |
| 26 | | + | | + | | + | | | + | + | + | - | | |
| 27 | | + | | - | | + | | | + | + | + | - | | |
| 28 | | + | | + | | - | | | - | + | + | - | | |
| Fair Potential | | | | | | | | | | | | | | |
| 4 | - | + | - | | - | + | - | - | - | - | - | - | | Area 2 Best alternative to Area 1 for Destination Camping and related facilities |
| 5 | - | + | | | | - | | | - | - | - | - | | |
| 6 | - | - | | | | - | | | - | - | - | - | | Area 25 Road Access from Estcourt |
| 7 | + | - | | | | - | | | - | - | - | - | | |
| 14 | | + | | | | + | | | + | | - | - | | |
| 16 | - | + | - | | | + | | | - | + | - | - | | Area 28 With Road Access across dam, prime location for Overlook |
| 17 | - | + | | | | + | | | + | + | - | - | | |
| 19 | - | + | | | | + | | | + | - | + | - | | |
| 20 | | + | | | | + | | | + | + | + | - | | |
| 21 | | + | | | | + | | | + | + | + | - | | |
| 23 | + | + | | | | + | | | - | + | - | - | | Areas 4 & 16 Ferry to West Side might necessitate contact station and related facilities |
| 24 | + | + | | | | - | | | - | - | - | - | | |
| Poor Potential | | | | | | | | | | | | | | |
| 8 | + | - | | | | - | | | - | | | - | | |
| 9 | - | - | | | | | | | | | | - | | Areas 13, 15-22 Relocation of road from St. Pamphile or Estcourt would provide road access to West Side. |
| 10 | + | - | | | | | | | - | | | - | | |
| 11 | | - | | | | - | | | - | | | - | | |
| 12 | + | - | | | | - | | | - | | | - | | |
| 13 | - | - | | | | - | | | - | | | - | | |
| 15 | - | - | | | | - | | | - | | | - | | Area 16 Ferry to West Side might necessitate contact station and some Intensive Facilities |
| 18 | - | - | | | | - | | | - | | | - | | |
| 22 | - | - | | | | - | | | - | | | - | | |

Area 23-24 Road Access from Estcourt

Figure 8
Recreational Potential

6.10 Cultural and Demand Determinants for Recreational Facilities

6.10.1 Forestry

Forestry is generally very compatible with outdoor recreation, and is often associated with many recreational activities. Ownership and management of project area lands by timber interests has, and would continue to preserve the remote character of the project area which is so important to all forms of recreation within the area. The selective harvesting method of forest regeneration now used in the project area is one of the most compatible methods that can be used on and near recreation lands. Overall recreational use in the project area is not likely to be limited by forest harvesting operations. On-going cutting operations at specific sites would limit recreational use on a local basis for safety reasons.

Because of the importance of the forest industry to the culture and economy of Northern Maine, a forest management demonstration area is planned as part of the trail system in the intensive use area. Its primary purpose would be to familiarize project visitors with sound forest management principles and techniques employed in professional forest management. This would be accomplished by dividing an area of forest into blocks of approximately equal size (2-5 acre blocks). Different types of timber cutting practices would be prescribed for selected blocks, such as selective cutting, clearcutting, shelter-wood, and seed tree cutting systems. These management techniques and appropriate cutting schedules would then be applied in selected demonstration blocks so that visitors could easily observe and compare the results. The visitors should be able to see the effect which the various practices have and to observe natural ecological succession. This would serve as an important interpretation of forestry in Northern Maine. Descriptive signs and brochures would be necessary to help visitors interpret what they are seeing.

6.10.2 Projected Recreation Use

Existing patterns in recreational use of the project area would change to a considerable degree if the proposed dams are built. Non-mechanized, extensive types of uses such as hunting, stream fishing, primitive camping, and canoeing would increase less than more intensive water-oriented activities such as lake fishing, pleasure boating, swimming, picnicking, family camping, and sightseeing. Table V-5 shows the recreational use of the project as projected by the Northern Maine Regional Planning Commission.

Following impoundment day activities, such as sightseeing, picnicking, hiking and boating, would become the most popular activities in the project area. Camping would be the next most popular activity. Hunting would become the third most popular activity and fishing would be the fourth most popular activity.

The day activities of sightseeing, picnicking and recreational boating would occur primarily from June - August on Dickey Lake. The main

attractions for these recreationists include the large, deep lake, and one of the largest dams in the world. A large proportion of these recreationists would engage in the above activities as part of an extended vacation trip during which they would stay for one or more nights at the project before leaving for their next destination. Therefore, a sizeable number of recreationists engaged in day use activities may in fact live well outside the boundaries of the day use market area.

Camping use would shift from the existing primitive type of camping toward the "family" type of camping, although both primitive and family camping would occur in the project area. Camping use would also peak in the June - August period, but would begin in May and extend through November because it would provide an important means of accomodation for fishermen in the spring and summer, and hunters during the fall.

Fishing would be more lake oriented than at present, with many fishermen using boats. Stream fishing for native brook trout would still be likely to remain popular even though stream fishing opportunities would be reduced as streams are flooded by the impoundment. Early season fishing would be likely to increase slightly, associated with ice-out on the lake.

Hunting would remain similar in character to that presently existing with upland game species such as deer, bear, grouse and woodcock preferred. Waterfowl hunting may increase in importance as waterfowl habitat is created in shallow, shoreline portions of Dickey Lake. The loss of over 86,000 acres of forestland including nearly half of the existing deer yards and the corresponding reductions in wildlife populations would result in the concentration of hunters in a smaller area, competing for less game than is now available. The reduction in the quality of the hunting experience due to the impoundment would result in few hunting visitor-days than would occur without the project over the long run.

White-water canoeing as it now exists would virtually be eliminated within the project area. Limited but relatively insignificant canoe tripping may continue to exist on the St. John River above Nine-Mile Bridge. Dickey Lake would be unsuited to canoe tripping, and only localized, in-shore use of canoes would be safe.

With the increased recreational use which is anticipated if the project is built, recreation facilities must be provided to meet the new demand for convenience in recreation. An information area and easily accessible scenic overlook areas would be needed to accommodate sightseers, and picnic tables, parking lots, hiking and nature interpretation trails would be needed to support these other facilities. Swimmers would need a beach area with toilet and changing areas, and recreational boaters and fishermen would need boat ramps and parking to gain access to the lake. A destination campground would be needed to serve the family type of campers including the conveniences of restrooms, hot and cold running water, electrical hookups, and solid waste stations.

Remote, or outpost campsites would also be needed to serve wilderness enthusiasts, replace lost North Maine Woods Association campsites and provide emergency shelter during stormy weather. These remote sites should be sited on or near the lake shoreline so they are readily accessible by boat. All of these facilities must be designed to protect the health and safety of the general public while minimizing potential environmental impacts.

6.11 Determination of Recreation Facility Needs

6.11.1 Introduction

Recreational facility needs have been determined based upon recreational use projections compiled by the Northern Maine Regional Planning Commission. Facilities are designed to support the maximum number of users expected at any one time on an average peak day during the recreation season, that is the peak number of users. A peak day is that day when participation is at a maximum. There may be several peak or near-peak days during any one season.

This approach to recreation facility planning is consistent with that utilized by the Maine Bureau of Parks and Recreation in its Statewide Comprehensive Outdoor Recreation Plan (S.C.O.R.P.) for Maine. The method assumes that it is unreasonable to try to meet the maximum possible use of a particular facility, but that it is practical to meet the expected peak use on an average peak day. This way, the facilities would only be crowded on a very few days during the season. A detailed description of how the methodology works and the rationale behind it can be found in the Maine Statewide Comprehensive Outdoor Recreation Plan published by the Bureau of Parks and Recreation.

6.11.2 Determining the Peak Number of Users

The peak number of users for a given facility depends upon the projected number of visitor-days for the season, the percentage of visitors using a given facility, the number of peak days in the season, the percentage of seasonal use which occurs on peak days, and the daily turnover factor for that facility or activity. The daily turnover factor is the number of times during a day that the user population at a facility is replaced by new individuals. Table VI-7 gives the values for the number of peak days, percent of use on peak days, percent of use on an average peak day, and daily turnover factors by activity. These were the values used to determine the peak number of users expected at project area facilities.

TABLE VI-7

PEAK DAY USE ASSUMPTIONS BY ACTIVITY

| <u>Activity</u> | <u>Number of Peak days</u> | <u>Percent of Use on Peak Days</u> | <u>Percent of Use on Average Peak Days</u> | <u>Daily Turn-Over Factor</u> |
|---------------------|----------------------------|------------------------------------|--|-------------------------------|
| Camping | 25 | 35 | 1.4 | 1.0 |
| Swimming | 10 | 34 | 3.4 | 3.0 |
| Boating | 10 | 33 | 3.3 | 2.0 |
| Fishing | 14 | 33 | 2.4 | 2.0 |
| Picnicking | 10 | 25 | 2.5 | 3.0 |
| Sightseeing & Other | 10 | 25 | 2.5 | 6.0 |

No peak use assumptions were provided for hiking because projected hiking use could not be isolated from the "Day Activities" category in the recreation use projections with the impoundment. Those hiking facilities proposed are intended to provide safe, well marked routes for foot travel between developed recreation facilities rather than to meet a projected demand for hiking trails.

No peak season standards were available for hunting from the Maine Statewide Comprehensive Outdoor Recreation Plan or the Maine Department of Inland Fisheries and Wildlife. Therefore, hunting was not included as part of these facility need projections. However, because hunting occurs during the fall season after the summer recreation peak, and hunters would require only camping and perhaps boat launching facilities already provided for other recreationists, leaving hunters out of the analysis does not affect the final facility need projections.

Peak number of users were determined for project facilities by using the above values in the following general equation:

$$\text{Peak Number of Users} = \frac{\text{Projected Use for the Activity} \times \text{Percent of Recreationists Using the Facility} \times \text{Percent of Use on Peak Days}}{\text{Number of Days} \times \text{Daily Turnover Factor}}$$

The peak day assumptions used generally conform to those presented in the most recent 1977 Draft Statewide Comprehensive Outdoor Recreation Plan

for Maine. In a few instances, daily turnover factors were adjusted from those provided in the S.C.O.R.P. to meet conditions which would prevail at the project area if conditions are significantly different from the average for Maine.

Table VI-8 gives the projected peak day number of users by activity for the project area. Table VI-10 in Section 6.4.9 includes the equations used to make the projections shown in Table VI-8.

Those activities considered in Table VI-8 are the activities for which adequate data were available to make projections.

TABLE VI-8
PEAK DAY NUMBER OF USERS BY ACTIVITY
 Dickey-Lincoln with the Project

| Activity | 1988 | 1995 | 2000 | 2010 | 2020 | 2030 |
|---|------|------|------|------|------|------|
| Camping | 108 | 200 | 400 | 420 | 420 | 420 |
| Swimming | 181 | 227 | 261 | 326 | 392 | 458 |
| Boating: | | | | | | |
| Recreational | --- | 99 | 116 | 145 | 175 | 205 |
| Fishermen | --- | 57 | 74 | 94 | 94 | 94 |
| Sightseeing (Visitor Center & Overlook) | 83 | 142 | 167 | 208 | 250 | 292 |
| Picnicking | 42 | 71 | 83 | 104 | 125 | 146 |

6.11.3 Design Criteria

Once the peak number of users is known, the actual facility requirements to satisfy the recreation needs at the project area could be calculated by applying the Bureau of Parks and Recreation design criteria contained in the S.C.O.R.P.

The criteria used in determining project area facility requirements are as follows:

| <u>Activity</u> | <u>Standard</u> |
|-----------------|--|
| Camping | 4.0 campers/site 3.5 campsites/acre |

| <u>Activity</u> | <u>Standard</u> |
|----------------------------------|---|
| Camping (Cont.) | 2.0 supporting acres per developed acre |
| Swimming | 2.0 swimmers/foot of beach 4.0 swimmers/car 450 sq. ft./car 25% swimmers will use picnic tables 1.5 turnover factor on picnic tables near beach 4.0 acres of land/100 ft. of beach |
| Boating | 3.0 recreational boaters/boat 80% of fishermen will use boats 2.5 fishermen/boat 40 cars or boats/ramp 1.0 acres/ramp (minimum) |
| Visitor Center and Overlook Area | 3.3 sightseers/car |
| Picnicking | 25% of sightseers will picnic 3.3 picnickers/car 450 sq. ft./car 1 picnic unit/car 10 picnic units/developed acre 10 supporting acres/developed acre |

The above design criteria were used in the equations shown in Table VI-9 to calculate facility needs for selected years at the proposed Dickey-Lincoln project.

6.11.4 Recreation Facilities Needed

The results of the equations used to convert peak number of users to facility requirements with the preceding design criteria are presented as follows:

TABLE VI-9

FACILITY NEED CALCULATIONS

A. Camping Facilities

$$\text{Design No. Campers} = \frac{\text{Projected Camping Use} \times 0.35}{25 \text{ peak days}} \quad \text{(percent of activity on peak days)}$$

A. Camping Facilities (cont.)

$$\begin{aligned} \text{No. Campsites Needed} &= \frac{\text{Design No. Campers}}{4 \text{ campers/campsite}} \\ \text{No. Developed Acres} &= \frac{\text{No. Campsites needed}}{3.5 \text{ campsites/acre}} \\ \text{No. Supporting Acres} &= \text{No. Developed Acres} \times 20 \text{ Supporting Acres per developed acre} \\ \text{Total Acres Needed} &= \text{No. Developed Acres} + \text{No. Supporting Acres} \end{aligned}$$

B. Swimming Facilities

$$\begin{aligned} \text{Design No. Swimmers} &= \frac{\text{Projected Swimming Use} \times 0.34 \text{ (percent of activity on peak days)}}{10 \text{ Peak days} \times 3.0 \text{ Daily Turnover Factor}} \\ \text{Feet of Beach Needed} &= \frac{\text{Design No. Swimmers}}{2 \text{ swimmers/foot of beach}} \\ \text{Parking Spaces} &= \frac{\text{Design No. Swimmers}}{4 \text{ swimmers/car}} \\ \text{Picnic Units} &= \frac{\text{Parking Spaces} \times 0.25 \text{ (percent of swimmers to use picnic tables)}}{1.5 \text{ picnic table turnover factor}} \\ \text{Acres Beach Area Needed} &= \text{Feet of Beach Needed} \times \frac{4 \text{ acres land}}{100 \text{ Ft. of Beach}} \\ \text{Acres Parking Area} &= \frac{\text{Parking spaces} \times 450 \text{ sq. ft./space}}{43,560 \text{ sq. ft./acre}} \\ \text{Total Acres Needed} &= \text{Acres Beach Area Needed} \div \text{Acres Parking Area} \end{aligned}$$

C. Boating Facility Need Calculations

$$\begin{aligned} \text{Design No. Boaters} &= \frac{\text{Projected Boating Use} \times 0.33 \text{ (percent of activity on peak days)}}{10 \text{ peak days} \times 2.0 \text{ daily turnover factor}} \\ \text{Design No. Boat Fishermen} &= \frac{\text{Projected Fishing Use} \times 0.80 \text{ percent of fishermen using boats} \times 0.33 \text{ (Percent of activity on peak days)}}{14 \text{ peak days} \times 2.0 \text{ daily turnover factor}} \end{aligned}$$

C. Boating Facility Need Calculations (Cont.)

$$\begin{aligned} \text{Parking Spaces} &= \frac{\text{Design \# Boaters}}{3.0 \text{ boaters/car or boat}} + \frac{\text{Design No. Boat Fishermen}}{2.5 \text{ Fishermen/car or boat}} \\ \text{Boat Launch Ramps} &= \frac{\text{Parking Spaces}}{40 \text{ cars or boats/boat ramp}} \\ \text{Acres Needed Minimum} &= \text{Boat Launch Ramps} \times 1.0 \text{ Acres (minimum) boat ramp} \end{aligned}$$

D. Visitor Center and Overlook Area Facilities

$$\begin{aligned} \text{Design No. Sightseers} &= \frac{\text{Projected Sightseeing Use} \times 0.25 \text{ (percent of activity on peak days)}}{10 \text{ peak days} \times 6.0 \text{ daily turnover factor}} \\ \text{Parking Spaces} &= \frac{\text{Design No. Sightseers}}{3.3 \text{ sightseers/car}} \end{aligned}$$

E. Picnic Area Facility Need Calculations

$$\begin{aligned} \text{Design No. Picnickers} &= \frac{\text{Projected Sightseeing Use} \times 0.25 \text{ (percent of sightseers that will picnic)} \times 0.25 \text{ (percent of activity on peak days)}}{10 \text{ peak days} \times 3.0 \text{ daily turnover factor}} \\ \text{Parking Spaces or Picnic Units} &= \frac{\text{Design No. Picnickers}}{3.3 \text{ picnickers/car}} \\ \text{Developed Acres} &= \frac{\text{Picnic Units}}{10 \text{ picnic units/acre}} \\ \text{Supporting Acres} &= \text{Developed Acres} \times 10 \text{ supporting acres/developed acre} \\ \text{Total Acres} &= \text{Developed Acres} + \text{Supporting Acres} \end{aligned}$$

The results of the facility needs calculations for the proposed Dickey Lincoln project are presented in Table VI-10. These facility need projections are summarized for selected years following impoundment.

TABLE VI-10

Recreation Facility Needs for Selected Years

Project Area with the Dam

| Year | 1988 | 1995 | 2000 | 2010 | 2020 | 2030 |
|--------------------------------|-------------|--------|--------|--------|--------|--------|
| Type Facility | Formula No. | | | | | |
| <u>A. Campground</u> | | | | | | |
| Total Visitor Days | 5,000 | 15,000 | 20,000 | 30,000 | 30,000 | 30,000 |
| Design No. Campers* (1) | 70 | 200 | 280 | 420 | 420 | 420 |
| No. Campsites Needed (2) | 18 | 53 | 70 | 105 | 105 | 105 |
| No. Developed Acres (3) | 5 | 15 | 20 | 30 | 30 | 30 |
| No. Supporting Acres (4) | 100 | 300 | 400 | 600 | 600 | 600 |
| Total Acres Needed (5) | 105 | 315 | 420 | 630 | 630 | 630 |
| <u>B. Swimming</u> | | | | | | |
| Total Visitor Days | 9,636 | 10,626 | 11,054 | 12,309 | 13,516 | 15,015 |
| Design No. Swimmers* (1) | 109 | 120 | 126 | 140 | 154 | 170 |
| Feet of Beach Needed (2) | 55 | 60 | 63 | 70 | 77 | 85 |
| Parking Spaces (3) | 27 | 30 | 32 | 35 | 39 | 43 |
| Picnic units (4) | 5 | 5 | 5 | 6 | 6 | 7 |
| Acres Beach Area (5) | 2 | 2 | 3 | 3 | 3 | 3 |
| Acres Parking Area (6) | 1 | 1 | 1 | 1 | 1 | 1 |
| Total Acres Needed (7) | 3 | 3 | 4 | 4 | 4 | 4 |
| <u>C. Boating</u> | | | | | | |
| Total Boating Visitor Days | | 3,220 | 3,380 | 3,730 | 4,120 | 4,550 |
| Total Fishing Visitor Days | | 6,000 | 7,800 | 10,000 | 10,000 | 10,000 |
| Design No. REc. Boaters*(1) | | 53 | 56 | 62 | 68 | 75 |
| Design No. Boat Fishermen* (2) | | 57 | 74 | 94 | 94 | 94 |
| Parking Spaces (3) | | 44 | 48 | 58 | 60 | 63 |
| Boat Launch Ramps (4) | | 1.0 | 1.0 | 1.0 | 2.0 | 2.0 |
| Acres needed (minimum) (5) | | 1.0 | 1.0 | 1.0 | 2.0 | 2.0 |
| <u>D. Visitor Center</u> | | | | | | |
| Total Visitor Days | 16,644 | 18,353 | 19,266 | 21,261 | 23,484 | 25,935 |
| Design No. Sight-seers* (1) | 69 | 76 | 80 | 89 | 98 | 108 |
| Parking Spaces (2) | 21 | 23 | 24 | 27 | 30 | 33 |

Recreation Facility Needs for Selected Years (Cont.)

Project Area with the Dam

| Year | 1988 | 1995 | 2000 | 2010 | 2020 | 2030 |
|---------------------------|----------------|-------|-------|-------|-------|-------|
| Type Facility | Formula No. | | | | | |
| <u>E. Picnicking</u> | | | | | | |
| Total Visitor Days | 4,161 | 4,588 | 4,817 | 5,315 | 5,871 | 6,484 |
| Design No. Picnickers*(1) | 35 | 38 | 40 | 44 | 49 | 54 |
| Parking Spaces (2) | 11 | 12 | 12 | 13 | 15 | 16 |
| Picnic Units (3) | 11 | 12 | 12 | 13 | 15 | 16 |
| Developed Acres (4) | 1.1 | 1.2 | 1.2 | 1.3 | 1.5 | 1.6 |
| Supporting Acres (5) | 11 | 12 | 12 | 13 | 15 | 16 |
| Total Acres Needed (6) | 12 | 13 | 13 | 14 | 16 | 17 |

* Design Number = peak number expected to use given facilities at any one time on an average peak day during the peak season

6.12 Recommended Development Plan

As the character of the St. John River would change within the project area, so would its recreational potential. Recreation would change from "roughing it with the boys" and meeting nature on its own terms to family activities utilizing the technology and projects of an urban society. Recreationists would still be able to enjoy the remoteness and solitude of the Maine woods, but with the assurance that the amenities of civilization are close at hand. Canoeing, hunting and stream fishing would be replaced by power boating and lake fishing, and hunting grounds would be relocated. Located at the confluence of the St. John and the Little Black arms of the lake the dam and public access would become a natural focal point for virtually all recreation activities except perhaps for hunting and stream fishing. Motor boats would make any point on the lake accessible within the span of a single day. And, the highly irregular character of the lake shoreline would offer a wide range of new opportunities to both recreational boaters and boat fishermen.

6.12.1 Recreation Concept

The recreation concept as illustrated in Figure 9, Recreation Concept, is a function of the inherent characteristics of the proposed impoundment together with its surrounding land mass, and of the recreational use projections as contained in Chapter V. The concept plan reflects the following conclusions relative to recreational uses:

- a. The dam site and the peninsula adjoining and northwest of the dam would become the focal points for most all recreational uses other than for hunting and stream fishing.
- b. With the construction of Dickey Lake, primary recreational uses would consist of day activities including sightseeing, picnicking and motor boating.
- c. Although picnicking, swimming, hiking, nature viewing, casual fishing from both the shore and boats, and sightseeing may account for a significant percentage of total recreational use within the project area, they are likely to occur as incidental to or in support of those activities listed in "b" above.

Based upon the above conclusions, the Recreational Concept Plan includes four major components:

a. Intensive Use Area

The intensive use area is proposed to be located at and adjacent to the Dickey Dam and contain these facilities:

Visitor Center
Scenic Overlooks
Picnic Facilities
Boat Launch

Figure 9
Recreation Concept

a. Intensive Use Area (Cont.)

Swimming Beach
Destination Campground
Trails
Demonstration Forest

b. Group Camping Facilities

These would be apart from the destination campground yet readily accessible by boat or haul roads. Group facilities would include tent pads or lean-tos, picnic shelter, well point and/or hand pump, a large common fireplace, privies, and boat landing.

c. Primitive Campsites

Primitive campsites would be remote from the intensive use area, accessible by boat or trail and designed to provide a remote wilderness environment to those seeking that experience. Facilities would include a tent-site or lean-to, picnic table, fireplace, privy and boat landing.

d. Canoe Take-Out Facilities

Canoe take-out facilities would be necessary to get canoeists off both the Allagash and the St. John Rivers before entering the impounded area. Facilities would include those similar to primitive campsites, plus road access and parking area.

6.12.2 Alternative Plans

The range of alternatives with respect to the types of activities and facilities at the project are limited due to land ownership patterns, access to the impoundment, and non-commercial public outdoor recreation activities which are consistent with the 1977 Maine Statewide Comprehensive Outdoor Recreation Plan. Alternatives do exist, however, with respect to the location of facilities within the intensive use area.

Three alternative plans for the intensive use area were considered. They are shown in Figure 10, Intensive Use Alternatives. Only one plan, Plan A was recommended. A comparison of the advantages and disadvantages of each alternate plan is contained in Table VI-11.

6.12.3 Recommended Recreation Development Plan

6.12.3.1 Intensive Use Area Plan

The recommended plan for recreation facilities within the intensive use area is shown in Figure 11, Intensive Use Area Plan. This plan

was selected as being the optimal balance among the relative advantages and disadvantages of the alternate plans and their various combinations. The locations indicated for the various facilities are those most generally propitious to the facilities provided.

The visitor center presents the most difficult siting problem. There is no site which could be considered clearly the best location as to access, proximity to dam operations, view potential, and which also has ample space and slopes suitable for the structure itself, parking, and related facilities. The area between the South Dike and the South Dam was selected as the best of available alternative, subject to the following conditions:

- A. Construction of an observation platform, presumably integral to the visitor center itself, from which views of the entire damsite area are possible. This site offers the best vantage point for views of both sides of the dam, the lake and of the valley below the dam.
- B. A mini-bus to transport sightseers across the dam to and from the area of the intake, spillway and powerhouse. In addition to offering a truly dramatic visual experience as the bus crosses the dam, this arrangement would provide an effective means of visitor control away from the powerhouse.

6.12.3.2 Development Plan

The Recommended Development Plan, Figure 12, places the intensive use area plan in context with the concept plan contained in Figure 14 and integrates all activities for which facilities would be constructed.

The Development Plan responds to the projected recreational use discussed in Section 6.3.2. It also provides:

- a. Efficiency of operation and management.
- b. Appeal to the wide range of recreational users indicated by market and use projections.
- c. Dispersion of facilities to avoid the appearance of congestion.
- d. Harmonious siting of facilities in keeping with a semi-wilderness setting.
- e. A retention of the essential values to be derived from the quiet solitude of woods and water far removed from the intrusion of the transient moods and pressures of modern society.

Figure 10

Intensive Use Alternatives

COMPARISON OF ALTERNATE PLANSAdvantagesDisadvantagesAlternative A

Visitor Center Affords Full View of Dam
 Visitor Center Located on Major Access Road
 Good Exposure for Beach and Camping
 Dispersed but Integrated Facilities
 Sun Exposure for Beach and Campground
 Group Campsite in Sheltered Cove

Distance of Visitor Center from Dam
 Visitor Center Poorly located for Dam Tours
 Visitor Center Conflicts with Proposed
 Relocation of Town
 Land Acquisition
 Poor Visitor Control
 Boat Launch and Beach Exposure to Wind

Alternative B

Views from Visitor Center
 Visitor Center Well Located for Tours
 Sun Exposure for Beach
 Protected Cove for Boat Launch and Beach
 Route 161 Scenic Turnout Full View of Dam

Potential Siting Constraints for Visitor Center
 Distance of Visitor Center from Operational
 Center of Dam
 Land Acquisition
 Conflicts with Logging Haul Road
 Dispersion and Lack of Visitor Control
 Cost of Road Improvement and Maintenance

Alternative C

Good Visitor Control
 Clustered Facilities
 Visitor Center Centrally Located for Tours
 Cost of Visitor Center Shared with Operational
 Facilities
 Route 161 Scenic Turnout Full View of Dam
 Sun Exposure for Beach and Campground
 *Land Acquisition
 Minimum Road and Utility Construction

Siting Constraints for Visitor Center and
 Related Parking Facilities
 Poor View of Dam from Visitor Center
 Potential Conflicts between Dam Operations
 and Visitors
 Potential Conflicts from Over-Concentration
 of Facilities
 Site Modification to Accommodate Concentrated
 Facilities
 Limited Potential for Future Expansion
 Boat Launch and Beach Exposure to WIND

* Land acquisition is an advantage because less land must be
 acquired in fee than for the other alternatives.

Figure 11

Intensive Use Area

Figure 12

Development Plan

To meet projected recreational use over time, two phases are proposed for development of recreational facilities. The Initial Phase provides facilities for the use projected between 1988 and 1995; and the Future Phase, for the period to 2030. Estimated cost of recreation development has been calculated for those phases and is contained in Chapter XI. Primary facilities to be included in each phase are shown in Table VI-12.

TABLE VI-12
Development Phasing

| <u>Facility</u> | <u>Initial</u> | <u>Future</u> | <u>Total</u> |
|-------------------------|----------------|---------------|--------------|
| Rte. 161 Scenic Turnout | | | |
| Parking Spaces | 20 | - | 20 |
| Visitor Center | 1 | - | 1 |
| Parking Spaces | 33 | - | 33 |
| St. John Canoe Takeout | | | |
| Campsites | 4 | - | 4 |
| Parking Spaces | 7 | - | 7 |
| Allagash Canoe Takeout | | | |
| Campsites | 10 | - | 10 |
| Parking Spaces | 14 | - | 14 |
| Picnic Facilities | 1 | - | 1 |
| Tables | 16 | - | 16 |
| Parking Spaces | 16 | - | 16 |
| Campsites | | | |
| Destination | 30 | 31 | 61 |
| Group | 8 | 4 | 12 |
| Primitive | 12 | 20 | 32 |
| Boat Launch | | | |
| Ramps | 1 | 1 | 2 |
| Parking Spaces | 50 | 13 | 63 |
| Beach | | | |
| Length (Feet) | 85 | - | 85 |
| Parking Spaces | 43 | - | 43 |
| Picnic Units | 5 | 5 | 10 |
| Trails - miles | 17 | - | 17 |

Chapter XI, Costs, contains a more detailed breakdown of the supporting elements and utilities proposed for each of the above facilities.

In the final analysis, various agreements between and among private landowners, the Federal Government and the State of Maine would determine the nature and extent of facilities to be provided, and the management policies and responsibilities by which they would be administered. This recommended development plan would serve to provide a framework for those decisions and for the more intensive recreational site planning which may follow.

6. Land Acquisition for Recreation

The following recommendations are made relative to acquisition of land and/or cooperative arrangements between land owners, the State and the Federal government. Figure 13, Acquisition Map, illustrates these recommendations.

6.13.1 Intensive Use Area

Purchase in fee simple of the peninsula adjacent to and northwest of the Dickey Dam. The recommended purchase encompasses approximately 2,080 acres.

6.13.2 Primitive and Group Campsites

These facilities can all be accommodated within the normal acquisition line of the project. No additional purchases are recommended.

6.13.3 St. John and Allagash Canoe Take Out Areas

It is recommended that these two takeout areas be located at Nine-Mile Bridge and near the upper end of the Lincoln School impoundment on the Allagash River. Some sort of cooperative agreements must be made with the landowners for the development, maintenance, and use of these takeout areas. The costs of these two takeouts are included as "Project Costs" (minimal facilities) in the cost estimates provided in Chapter XI.

6.13.4 Trails and Overlooks on Private Land

It is recommended that the Federal government enter into cooperative agreements with landowners, North Maine Woods, the State, and possibly with organizations such as the Appalachian Mountain Club, relative to the construction and maintenance of trails and overlooks which are located other than on land acquired by the federal government. The cost of initial construction has been included in the cost estimates contained in Chapter XI.

6.14 Fish and Wildlife Enhancement

6.14.1 General

All recreational development in the project area should be designed to promote a maximum level of enjoyment of the fish and wildlife resources. The U.S. Fish and Wildlife Service (USFWS) is planning to prepare a detailed fish and wildlife management plan for the project.

Currently, little active fish and wildlife habitat management is carried out in the project area because of the large area and low density of recreation use. Perhaps the most influential factor on fish and wildlife in the project area is timber harvesting. The intensity of recreational use associated with Dickey Lake might justify implementation of a more active management plan which works within the limits of the available

Figure 13

Acquisition Map

fish and wildlife habitat. The primary objective of the plan and of all management practices should be to promote as high a level of habitat diversity as is practicable with the existing condition of the land and water resources.

Management of fish and wildlife resources includes more than just preserving wildlife habitat in its natural state. Other management considerations must include artificial propagation and stocking of landlocked salmon or lake trout, cuttings, prescribed burning, and plantings. Habitat protection and preservation is generally employed to favor climax successional stage wildlife species such as moose, woodpeckers, spruce grouse, bear, fisher, marten, bobcat, and lynx. Cutting, burning, and planting are usually done to favor the early successional stage wildlife such as ruffed grouse, songbirds, deer, and snowshoe hare.

6.14.2 Fish Hatchery and Stocking

One of the most urgent management decisions that must be made is which fisheries management alternative to pursue at the project area. As already mentioned, a landlocked salmon fishery would require the construction of a fish hatchery and annual stocking of smolts in order to maintain the fishery. Either landlocked salmon or lake trout must be introduced if the lake fishery is to be enhanced and the project's full recreational potential realized.

6.14.3 Inventory and Regulation of Important Habitats

Efforts should be made to continuously inventory and map all critical fish and wildlife habitats such as: trout spawning and nursery areas, waterfowl and marsh bird nesting and brood rearing areas, heron rookeries, nesting sites of predatory birds, particularly the bald eagle and osprey, deer wintering areas, and both active and inactive beaver flowages. All recreation facility planning, siting, construction and regulation will avoid such areas and discourage detrimental man-wildlife encounters. Regulations may include, but are not limited to adequate trash removal, pet leashing laws, and seasonal restriction of individual road or trail use during stressful seasons. This could include fall trout spawning seasons, winter deer yarding periods, and spring bird nesting seasons. Prior to any vegetation removal activities such as clearing or thinning, efforts must be made to identify and mark all den or nest trees so that they would not be removed or damaged during the cutting.

6.14.4 Cuttings and Plantings

Measures to favor production of mast and browse producing species such as oak, beech, cherry, ash, dogwood, birch, maple, the conifers, raspberry, blackberry, blueberry, and viburnums should be taken on lands adjacent to development areas. This would be to attract wildlife, particularly songbirds and small game species near the more intensively used facilities such as the visitor center, picnic area, parking lots, roads and trails in order to increase the chances that visitors see native wildlife in a natural setting. Larger game species such as

deer, moose and bear should not be encouraged near these areas, however, so that potentially detrimental man-wildlife encounters are avoided. Browse and mast production enhancement could also be employed immediately adjacent to yet not encroaching on known deer wintering areas to improve winter food supplies in these areas. Measures should include release cuttings, to favor mature mast producing trees, plus clearing and/or prescribed burning of blocks or strips of land to favor sprout growth of browse species, and establishment of mast producing species.

Plantings are to be used only in areas disturbed during development activities as part of landscaping and reforestation programs. Hedge-rows and buffer strips are to be left or planted whenever possible in and around these areas to provide escape, refuge and travel lanes for songbirds and game birds and mammals. Dense, shrubby thickets should be established along gulleys and drainage swales whenever possible as part of the overall landscaping plan.

6.14.5 Waterfowl Enhancement Opportunities

Because of the possible variation in water level conditions in early spring in the Dickey impoundment, enhancement methods must be utilized to increase waterfowl use of the lake for nesting and feeding. The numerous beaver impoundments and marsh areas located on tributary streams also offer opportunities for enhancement. Nesting boxes could be placed in these areas and possibly even plantings of submergent aquatics made to provide food and cover for waterfowl. Diking of shallow embayments would reduce the variations in water levels within the periodically inundated zone.

6.14.6 Recreational Facilities and Use

Educational displays and programs covering native wildlife species might be provided at the visitor center. In addition, both hunting and fishing will be permitted under State and Federal regulations on those lands not designated for intensive recreational use. This will allow maximum realization of the project's recreational potential and provide a population regulation tool. Boat access sites will provide fishermen and possibly a few hunters access to Dickey Lake. Roads and trails will allow hunters and stream fishermen access to project area lands and streams.

6.15 Forest Management Opportunities

Any forest management plan developed for the project area lands acquired in fee simple should be directed toward perpetuating aesthetic, ecological, and recreational land values rather than profit oriented sustained yield timber management. The narrow, approximately 300 foot wide band of land acquired along the shoreline of the Dickey and Lincoln School Reservoirs would not lend itself to commercial sustained yield timber management. The value of these lands in retaining soil stability, preventing siltation, providing wildlife habitat and ecological diversity,

and preserving visual quality outweigh their value as commercial timber lands.

Vegetation removal, living or dead, on project lands should be done only when the intent is for: urgent disease or insect pest control, fire hazard reduction, construction of project facilities, enhancing wildlife habitat, improving the health and vigor of mature timber stands, insuring public health and safety, or when specific essential uses justify it. Areas designed for low density recreational use would be managed so as to maintain plant species diversity and age structure variability and to preserve or enhance wildlife habitat diversity so that the probability of complete losses from natural causes would be minimized. In areas designated for intensive recreational use, efforts would be made to protect large and interesting trees from damage, and prolong their life. Artificial reforestation of disturbed land areas would be undertaken if natural regeneration is deemed inadequate. Generally, natural regeneration on cutover lands in the project area proves to be more than adequate, however

The Maine Land Use Regulation Commission would be responsible for regulating forest harvesting practices on lands which are adjacent to the project. Control of cutting practices on land adjacent to project area access roads, and near water courses and water bodies would be especially important to the maintenance of visual, aesthetic, and ecological qualities of the land and water resources in and around the project area.

CHAPTER VII

INDIVIDUAL AND AGENCY COORDINATION

7.0 Introduction

During the preparation of this appendix on the recreational potential of the proposed Dickey-Lincoln School Lakes Project, efforts were made to maintain communications with various Federal, State and local agencies, private organizations and individuals familiar with the project area.

7.1 Citizen Participation

A group of local citizens organized as the Recreation Advisory Committee to the Northern Maine Regional Planning Commission and representing a diverse cross-section of interests in Northern Maine was consulted during the study. This group of approximately 30 people met two times between August of 1976 and January of 1977. At these meetings, the group was provided an opportunity to review the work of the research team. Comments were received regarding the projections of visitation to the project area and the recommended recreational development plan. Those Committee members in attendance endorsed, in principle, the development plan and proposed a phased development process contingent on actual use of the reservoir and its facilities.

Contacts were also made with the forestland owners or their representatives, and the North Maine Woods Association. These parties reviewed the method of assessing the recreational impacts of the project and they offered valuable insights regarding the research work. It should also be mentioned that these individuals provided invaluable statistical data for the projections in this appendix.

7.2 State of Maine

As this study considered all forms of outdoor recreation activities in Northern Maine, it was necessary that the research team develop communications with the various State agencies having expertise in this field. Discussions were held with the Maine Department of Inland Fisheries and Wildlife, both regional and State level personnel, in an attempt to transpose their knowledge of the project area into quantitative figures that would most accurately depict the fish and wildlife resources that would be available in the future.

In the same manner, staff personnel from the Maine Bureau of Parks and Recreation were contacted in order to obtain information regarding participation in outdoor recreation activities in Maine. The 1977 Maine Statewide Comprehensive Outdoor Recreation Plan which has been produced by this agency serves as an important reference in the estimates of recreation demand contained in this report. Communications were also maintained with the Maine Land Use Regulation Commission

and the Bureau of Forestry on specific topics as dictated by the research effort.

7.3 Federal Government

Discussions were held with staff members of the Bureau of Outdoor Recreation and the U.S. Fish and Wildlife Service, who provided input to this recreation resource appendix.

CHAPTER VIII
SPECIAL PROBLEMS, RECOMMENDATIONS
and
ADDITIONAL CONSIDERATIONS

8.0 Introduction

Preceding chapters dealt in detail with numerous factors that could influence the potential usage of the Upper St. John River for recreational purposes. Until now no effort has been made to present special problems or other considerations as they relate to the recreational development of Dickey-Lincoln School Lakes, nor have recommendations been put forth concerning these potential developments.

Due to the erratic and drastic changes that have occurred within the recreation field in the last two decades, exemplified with the major shift from hotel and motel vacationers to family camping, it is difficult to project what may occur in the next twenty to fifty years. Many of the items to be discussed in this chapter are design considerations that should be dealt with in detail in the final recreation design plans. Other considerations which are outlined in this chapter deal with activities under consideration by the various sections of our economy which would affect the projections stated elsewhere in this appendix.

It should be clear that intent of this chapter is solely to point out special problems and considerations.

8.1 Impact on the Allagash Wilderness Waterway

Throughout the debate on the proposed Dickey-Lincoln School Lakes project, there has been a concern that flooding the St. John River to create Dickey-Lincoln School Lakes may adversely affect the Allagash Wilderness Waterway. As mentioned earlier in Chapter IV, use of the Allagash Wilderness Waterway is presently at or near its institutionally fixed capacity of 50,000 visitor-days per year

Because the Allagash is so near its capacity, the transfer of any proportion of canoeists to it from the St. John River would force the Allagash to reach its optimum use sooner than it would if the dams were not built. Even though Table IV-3 indicates the Allagash Wilderness Waterway nearly reached capacity in 1972 and 1973, significant drops occurred in 1974 and 1975, which allowed the State of Maine to maintain the status-quo with regards to camping facilities.

Therefore a plan would have to be made by the Allagash Wilderness Waterway Authority for accommodation of more users or limitation of use. In any case, excess visitor-days of canoeing would have to be provided for at alternate resources or they would be lost.

8.2 Canadian Access from Quebec Province

With the impoundment of waters on the Little Black River, flooding would occur back into the province of Quebec, Canada, for a distance of approximately six miles at the occurrence of high water. This situation could have an effect on recreational use by making water access to primary fishing, hunting, and semi-wilderness camping facilities easier. This situation could potentially limit facilities available to recreationists entering the project at Allagash in that assigned sites may be taken by others who have failed to register. Due to the erratic cycle of this occurrence, it appears probable that a method for managing this possible access would far outweigh its benefits, but it should be considered in a management plan. This problem would most appropriately be addressed by working together with the North Maine Woods Association, which would control land access to the western side of the impoundment by means of control gates at Daaquam, Lac Frontiere, St. Pamphile and Estcourt, Quebec.

8.3 Lincoln School Lake Fluctuations

Because of the large water level fluctuations associated with the Lincoln School Lake, there exists no feasible recreational use of that impoundment, and therefore, no recreational development or use is proposed.

Because recreational usage of this portion of the St. John is so informal at the present time, no records are available as to its current usage. It would be necessary to obtain data on current use in order to determine proper mitigation.

8.4 Probable Alternative Recreational Developments

When examining the viability of a project like the proposed Dickey-Lincoln School Lakes, it is also necessary to look at alternative developments that are presently under consideration to determine whether or not these alternate resource developments might also fill the recreation void which could be filled by Dickey-Lincoln School Lakes.

At the present time, the State of Maine through the Department of Conservation, has acquired partial ownership of 7500-8800 acres of land on Squa Pan Lake which is located approximately fifteen miles west of the City of Presque Isle, Maine. Although no definite plans have been made for the development of this resource, consideration is being given to developing it as a major day-use facility, with the possibility of some camping. Any development of this site could substantially affect the potential visitation to the proposed Dickey-

Lincoln School Lakes from the day-use and weekend-use zone.

Additionally, the State of Maine has recognized the need for a major state park facility for Aroostook County and is considering various concepts for the type, location and intensity of any such development. The eventual outcome of this issue is unknown at this time. It is important to note that if such a facility is proposed at a location other than the Dickey-Lincoln Reservoir, it would detract from the projections stated in Chapter IV.

Also, consideration should be given to any expansion plans anticipated for existing state parks located further south in the State of Maine. Because of the project area's unusual distance from major markets, any significant enlargement of intervening facilities would tend to detract from recreational attendance to this more remote area.

8.5 Conflict with other Plans

At the present time the North Maine Woods Association is independently preparing plans for the recreational use of the entire North Maine Woods Area. These plans and others such as the Land Use Regulation Commission's adopted plan for the unorganized areas of Maine are being conducted exclusive of the proposed Dickey-Lincoln School Lakes. The imposition of the Dickey-Lincoln project on their plans could lead to management conflicts.

8.6 Other Issues for Consideration in Final Recreation Design Plans

8.6.1 Traffic Movement

The movement of visitors to the Dickey-Lincoln School Lakes project would be complicated by the fact that there would be essentially only one formal access point, that being by means of Route 161. It is possible that there would be some traffic congestion at inter-sections near the Dickey Dam.

Consideration should be given to the separation of day-users from those recreationists intending to utilize the Dickey-Lincoln facilities for destination activities. Proper road design and control booth location would enable the management personnel to collect fees easily and permit even traffic circulation throughout the area.

For several reasons, such as fire control, public security, etc., consideration should be given to restrictions on access to the impoundment via discontinued timber hauling roads which now exist. In a similar manner restrictions should be placed on off-road vehicular use consistent with the management policies of the North Maine Woods Association.

Special consideration should be given to the provision of a potential ferry facility at a suitable location to provide access by recreationists and forestland owners to the western side of the impoundment. This

would open further land for recreational development, consistent with the current emphasis on remote, primitive camping facilities.

8.6.2 Security Measures

Due to the immense size of the surface water acreage, miles of shoreline, plus the potential construction of a major "state park" type facility, security and enforcement could be a potential problem. Again, proper design of facilities and access to the impoundment would ease potential man/wildlife conflicts, vandalism, forest fires, floating debris, etc. Special waterway patrol personnel would be essential. Responsibilities and liability would have to be addressed in management discussions between the State of Maine and other appropriate Federal agencies.

8.6.3 Protection of Resources

Because of observations and experience at the Allagash Wilderness Waterway, located adjacent to the Upper St. John River, it is recommended that the use of recreational sites and facilities such as trails and campsites be on a rotational basis to minimize damage to vegetation resulting from recreational use.

8.6.4 Provisions for the Handicapped and Elderly

During the final design studies, recreational facilities should be designed to accommodate the handicapped and elderly. with special attention being given to the dam areas and the intensive recreation area.

CHAPTER IX
MANAGEMENT AND COST SHARING

Management, maintenance and operation of Dickey-Lincoln School Lakes for its authorized purposes will be the responsibility of the Corps of Engineers. Project facilities recommended in the development plan which are considered to be the minimal development necessary for the public health and safety, and which would be provided at Federal cost, include the scenic turnout along the relocated Route 161, the project visitor center and the two canoe takeout areas on the St. John and Allagash Rivers. These facilities would also be operated by the Corps of Engineers.

The proposed recreation facilities which P.L. 89-72 requires to be cost shared with a non-Federal interest include the picnic area, beach area, destination campground, group campsites, primitive campsites, boat launching area, trails and land acquisition. In 1969, the Governor of the State of Maine indicated a willingness to consider cost sharing recreation facilities. However, the present Governor of Maine's position on the project is awaiting the completion and review of current engineering, economic and environmental impact studies. A positive indication of the State's willingness to participate in the recreational plan is dependent upon the Governor's future position, consideration of the then prevailing State priorities, and availability of funds.

Operation and maintenance of the proposed recreation facilities to be cost shared would also be the responsibility of the State, however, some of the State's recreational development costs may be partially recovered through user fees. A detailed breakdown of costs is contained in Chapter XI.

CHAPTER X
ENVIRONMENTAL QUALITY

10.0 Introduction

The project as a whole affects environmental quality at two levels:

- a. Construction of the dam and the impoundment and the resulting effects upon existing and traditional recreational values and uses.
- b. Construction and use of recreational facilities intended to replace those destroyed by the project, plus other facilities and uses intended to enhance the recreational values to be derived from the changed environment.

This chapter addresses the environmental impacts resulting from the construction and use of recreational facilities developed pursuant to the project. When taken in context, it is clear that any environmental impacts resulting from the recommended recreation facilities are insignificant indeed when compared with the impact of the project as a whole. The following section discusses measures by which these impacts may be mitigated. As a matter of policy, maintenance of environmental quality would be emphasized in all aspects of planning, development, and operation of project lands and facilities. All buildings, structures, roads, and walkways or trails would be sited and landscaped to follow natural contours and blend with existing terrain. Disturbance of vegetation and soil would be minimized as far as possible. Development and operation must also be planned so as to maximize public utilization of the project land and facilities.

10.1 Siting Considerations

Natural conditions of the land are to be preferred over artificially developed conditions whenever the option is available. Disturbance of natural vegetation and soil always increases the risk of causing excessive runoff and resulting soil erosion. This is particularly true in the project area near Dickey Dam where steep slopes and shallow soils are common. Therefore, all roads, walkways and trails would be constructed as near to natural grade as is possible in order to avoid excessive earth cuts and fills, removal or damage to native vegetation, and excavation for drainage ditches. Drainage diversions must be provided along roads and trails to avoid excessive carrying capacities of ditches or other channelization of runoff

10.2 Treatment of Disturbed Areas

All disturbed areas must be graded and landscaped to represent natural landforms, and re-seeded, mulched or re-forested as rapidly as possible to stabilize slopes and reduce the possibility of stream sedimentation. Vegetated ditches, swales, and subsurface drainage structures would be used before, during and after construction to provide adequate drainage. Natural drainageways would be used whenever possible, and grading would be undertaken to restore proper drainage where it has been altered. Utilities would be placed below ground in intensive use areas such as the campground, visitor center, and swimming areas, and alignments selected to remain compatible with the aesthetics of non-intensive use areas such as along roads and in open space areas.

10.3 Vegetation

Native vegetation contributes to visual quality, reduces surface runoff rates, thus protecting the soil and also provides wildlife habitat. Therefore forestry resources would be retained whenever possible for the benefit of recreationists, and wildlife. Every effort possible would be made to protect trees from unnecessary damage during construction and operation of the project. This may include thinning and pruning of trees in intensive use areas such as campgrounds, picnic areas, and along trails and paths. Adequate buffer strips of natural vegetation would be retained along roads and between intensive use areas, and around parking areas to preserve scenic quality and reduce noise pollution. All landscaping would use native species where possible. Open space areas would be designated and protected from encroachment.

10.4 User Traffic

The thin, glacial till soils found throughout most of the proposed recreational development areas generally cannot withstand heavy vehicular or foot traffic by recreationists. Heavy traffic on such soils often leads to soil compaction and deterioration of vegetation, and possibly would result in serious erosion problems. Therefore placement of gravel or artificial surfaces should be made in areas anticipated to be subjected to heavy user traffic such as: campsites, trails and walkways near the visitor center, paths from parking lots to the picnic area and swimming beach and within picnic areas, paths leading to toilet or bathhouse facilities, around drinking fountains and water faucets, and on any nature interpretive trails. Appropriate measures such as constructing vegetative or artificial fencing and railings in strategic locations would be taken to control visitor circulation and insure that these artificial surfaces are used.

10.5 Architecture

In order that buildings and structures blend with the natural terrain, architectural themes should be primarily rustic, and utilize native materials whenever possible. Signs would also be rustic in character, and limited to the minimum necessary for information, education, and direction of users.

CHAPTER XI
COST ESTIMATE

The following tables are preliminary construction cost estimates for development of the proposed recreation facilities. The tables are summarized according to facility proposed, construction item, unit cost, quantity, initial cost, future cost, and total cost. In the following tables the abbreviations appear as L.F (linear foot), L.S. (lump sum) and S.Y. (square yard). A 15-percent increase for construction contingencies and a 20-percent increase for engineering and design (E & D) and supervision and administration (S & A) have been added to the total cost.

Recreation facility costs are grouped according to whether they are "project costs", or "recreation costs." Those classified as project costs are the minimal facilities necessary to protect human health and safety, and will be paid for by the Federal government in full. Recreation costs are those facilities felt to be an enhancement of existing recreational facilities and are therefore subject to cost-sharing between Federal and most likely State governments.

It should be noted that the assumption was made that facilities would be provided for in 1988 to fulfill needs to the year 1995. If increases in visitation were noted, another phase of facility construction would take place between 1995 and 2000 which would develop the maximum facilities necessary for the year 2030.

Unit cost estimates have been prepared from prevailing 1976-1977 construction costs in northern Maine. Due to the conceptual level of design, cost estimates are "order of magnitude" and do not incorporate cost effective techniques. Economies might be achieved by substituting alternate materials or designs without substantial loss in the overall design intent. Where possible, estimates incorporate the use of native materials and local labor.

Recreation facilities development would require acquisition of 2,080 acres of land on the peninsula northwest of the South Dam. An item for land acquisition cost is included in the following tables.

TABLE XI - 1

SCENIC TURNOUT

| Item | Unit | Unit Cost | Initial Qty. | Initial Cost | Future Qty. | Future Cost | Total Qty. | Total Cost |
|------------------------|------|-----------|--------------|--------------|-------------|-------------|------------|------------|
| Parking | S.Y | 6 | 1 167 | \$7,000 | | | 1,167 | \$7,000 |
| Interpretive Sign | L.S. | | 1 | 1,500 | | | 1 | 1,500 |
| Trash Receptacle | Each | 50 | 3 | 150 | | | 3 | 150 |
| Landscaping | L.S. | 4,000 | 1 | 4,000 | | | 1 | 4,000 |
| Wood Timber Guard Rail | L.F | 5 | 300 | 1,500 | | | 1 | 1,500 |
| SUB-TOTAL | | | | \$14,150 | | | | \$14,150 |
| Contingencies | | | | 2,100 | | | | 2,100 |
| 1977 Construction Cost | | | | 16,250 | | | | 16,250 |
| E. & D. and S. & A. | | | | 3,250 | | | | 3,250 |
| TOTAL COST | | | | \$19,550 | | | | \$19,550 |

TABLE XI - 2

VISITOR CENTER

| Item | Unit | Initial | | Future | | Total | | |
|---|------|-----------|-------|-----------|------|----------|-------|-----------|
| | | Unit Cost | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Road Improvements | L.S. | | 1 | \$10,000 | | | 1 | \$10,000 |
| Road Construction | L.F. | 20 | 1,600 | 32,000 | | | 1,600 | 32,000 |
| Parking | S.F. | 6 | 1,600 | 9,600 | | | 1,600 | 9,600 |
| Wood Timber Guard Rail | L.F. | 5 | 500 | 2,500 | 375 | 1,900 | 875 | 4,400 |
| Signs | Each | 250 | 3 | 750 | | | 3 | 750 |
| Landscaping | L.S. | | 1 | 10,000 | 1 | 5,000 | 2 | 15,000 |
| Overlook | L.S. | | 1 | 4,000 | | | 1 | 4,000 |
| Visitor Center Building | S.F. | 70 | 2,150 | 150,500 | | | 2,150 | 150,500 |
| Water Supply (drilled well and pressure tank) | L.S. | | 1 | 2,000 | | | 1 | 2,000 |
| Sewage Disposal | L.S. | | 1 | 30,000 | 1 | 20,000 | 2 | 50,000 |
| Trash Receptacles | Each | 50 | 5 | 250 | 3 | 150 | 8 | 400 |
| Interpretive Signs | Each | 1,500 | 1 | 1,500 | | | 1 | 1,500 |
| Bituminous Walk | L.F. | 3 | 300 | 900 | | | 300 | 900 |
| Gravel Walk | L.F. | 2 | 500 | 1,000 | | | 500 | 1,000 |
| SUB-TOTAL | | | | \$255,000 | | \$27,050 | | \$282,050 |
| Contingencies | | | | 38,250 | | 4,050 | | 42,300 |
| 1977 Construction Cost | | | | 293,250 | | 31,100 | | 324,350 |
| E. & D. and S. & A. | | | | 58,650 | | 6,200 | | 64,850 |
| TOTAL COST | | | | \$351,900 | | \$37,300 | | \$389,200 |

TABLE XI - 3

ST JOHN CANOE TAKEOUT

| Item | Unit | Initial | | Future | | Total | | |
|--|------|-----------|------|----------|------|-------|------|----------|
| | | Unit Cost | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Tent Pads | Each | \$ 150 | 4 | \$ 600 | | | 4 | \$ 600 |
| Picnic Tables | Each | 200 | 8 | 1,600 | | | 8 | 1,600 |
| Parking | S.Y. | 3 | 700 | 2,100 | | | 700 | 2,100 |
| Trash Receptacles | Each | 50 | 4 | 200 | | | 4 | 200 |
| Water Supply (Dug well and hand pump) | L.S. | | 1 | 600 | | | 1 | 600 |
| Pit Privy | Each | 400 | 2 | 800 | | | 2 | 800 |
| Fireplaces | Each | 100 | 8 | 800 | | | 8 | 800 |
| XI - 4 Shoreline Clearing | L.F. | 4 | 200 | 800 | | | 200 | 800 |
| Signs | Each | 250 | 3 | 750 | | | 3 | 750 |
| Road Improvements | L.S. | | 1 | 20,000 | | | 1 | 20,000 |
| Landing Area Prep. | S.Y | 2 | 100 | 200 | | | 100 | 200 |
| SUB-TOTAL | | | | \$28,450 | | | | \$28,450 |
| Contingencies | | | | 4,250 | | | | 4,250 |
| 1977 Construction Costs | | | | 32,700 | | | | 32,700 |
| E. & D. and S. & A. | | | | 6,550 | | | | 6,550 |
| TOTAL COST | | | | \$39,250 | | | | \$39,250 |

TABLE XI - 4

ALLGASH CANOE TAKEOUT

| Item | Unit | Unit Cost | Initial | | Future | | Total | |
|--|------|--------------|---------|----------|--------|------|-------|----------|
| | | | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Tent Pads | Each | \$ 150 | 10 | \$ 1,500 | | | 10 | \$ 1,500 |
| Picnic Tables | Each | 200 | 15 | 3,000 | | | 15 | 3,000 |
| Trash Receptacles | Each | 50 | 7 | 350 | | | 7 | 350 |
| Fireplaces | Each | 100 | 15 | 1,500 | | | 15 | 1,500 |
| Water Supply (Dug well and hand pump) | L.S. | | 1 | 600 | | | 1 | 600 |
| Pit Privies | Each | 600 | 4 | 2,400 | | | 4 | 2,400 |
| Shoreline Clearing | L.F. | 4 | 400 | 1,600 | | | 400 | 1,600 |
| Landing Area Prep. | S.Y. | 2 | 200 | 400 | | | 200 | 400 |
| Signs | Each | 250 | 3 | 750 | | | 3 | 750 |
| Parking | S.Y. | 3 | 1,400 | 4,200 | | | 1,400 | 4,200 |
| Road Construction | L.F. | 8 | 600 | 4,800 | | | 600 | 4,800 |
| Road Improvements | L.S. | | 1 | 5,000 | | | 1 | 5,000 |
| SUB-TOTAL | | | | \$26,100 | | | | \$26,100 |
| Contingencies | | | | 3,900 | | | | 3,900 |
| 1977 Construction Costs | | | | 30,000 | | | | 30,000 |
| E. & D. and S. & A. | | | | 6,000 | | | | 6,000 |
| TOTAL COST | | | | \$36,000 | | | | \$36,000 |

5 - IX

TABLE XI - 5

PICNIC AREA

| Item | Unit | Unit Cost | Initial | | Future | | Total | |
|--|------|-----------|---------|----------|--------|------|-------|----------|
| | | | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Road Construction | L.F. | \$ 15 | 500 | \$ 7,500 | | | 500 | \$ 7,500 |
| Parking | S.Y. | 6 | 800 | 4,800 | | | 800 | 4,800 |
| Selective Shoreline Clearing | L.F. | 4 | 500 | 2,000 | | | 500 | 2,000 |
| Picnic Table Site Prep. | Each | 50 | 16 | 800 | | | 16 | 800 |
| Picnic Tables | Each | 200 | 16 | 3,200 | | | 16 | 3,200 |
| Trash Receptacles | Each | 50 | 16 | 800 | | | 16 | 800 |
| Raised Charcoal Grills | Each | 100 | 16 | 1,600 | | | 16 | 1,600 |
| Signs | Each | 250 | 2 | 500 | | | 2 | 500 |
| Gravel Walkways | L.F. | 2 | 800 | 1,600 | | | 800 | 1,600 |
| Water Supply (dug well and hand pump) | L.S. | | 1 | 600 | | | 1 | 600 |
| 9 - IX SUB-TOTAL | | | | \$23,400 | | | | \$23,400 |
| Contingencies | | | | 3,500 | | | | 3,500 |
| 1977 Construction Costs | | | | 26,900 | | | | 26,900 |
| E. & D. and S. & A. | | | | 5,400 | | | | 5,400 |
| TOTAL COST | | | | \$32,300 | | | | \$32,300 |

TABLE XI - 6

DESTINATION CAMPGROUND

| Item | Unit | Unit Cost | Initial | | Future | | Total | |
|---|----------|--------------|---------|-----------|--------|-----------|-------|-----------|
| | | | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Paved Access Road | L.F. | \$ 20 | 8,800 | \$176,000 | | | 8,800 | \$176,000 |
| Gravel Access Road | L.F. | 8 | 5,000 | 40,000 | | | 5,000 | 40,000 |
| Campground Road | L.F. | 4 | 1,800 | 7,200 | 1,860 | 7,450 | 3,660 | 14,650 |
| Campsite w/o Elec. | Each | 500 | 20 | 10,000 | 20 | 10,000 | 40 | 20,000 |
| Campsite w/ Elec. | Each | 900 | 10 | 9,000 | 11 | 9,900 | 21 | 18,900 |
| Picnic Tables | Each | 200 | 30 | 6,000 | 31 | 6,200 | 61 | 12,200 |
| Selective Shoreline Clearing | L.F. | 4 | 1,000 | 4,000 | | | 1,000 | 4,000 |
| Contact Station | L.S. | | 1 | 1,500 | | | 1 | 1,500 |
| Water Supply (drilled well and pressure tank) | L.S. | | 1 | 6,000 | | | 1 | 6,000 |
| Water Lines and Fountains | Per Site | 200 | 30 | 6,000 | 31 | 6,200 | 61 | 12,200 |
| Trailer Sanitary Disposal Station | L.S. | | 1 | 9,000 | 1 | 6,400 | 2 | 15,400 |
| Rest Rooms | Each | 30,000 | 2 | 60,000 | 2 | 60,000 | 4 | 120,000 |
| Playfield | S.Y. | 4 | 4,200 | 16,800 | | | 4,200 | 16,800 |
| Trash Receptacles | Each | 50 | 18 | 900 | 17 | 850 | 35 | 1,750 |
| Signs | Each | 250 | 4 | 1,000 | 2 | 500 | 6 | 1,500 |
| SUB-TOTAL | | | | \$353,400 | | \$107,500 | | \$460,900 |
| Contingencies | | | | 53,000 | | 16,100 | | 69,100 |
| 1977 Construction Costs | | | | 406,400 | | 123,600 | | 530,000 |
| E. & D. and S. & A. | | | | 81,300 | | 24,700 | | 106,000 |
| TOTAL COST | | | | \$487,700 | | \$148,300 | | \$636,000 |

TABLE XI - 7

GROUP CAMPSITES

| Item | Unit | Unit Cost | Initial | | Future | | Total | |
|--|----------|--------------|---------|----------|--------|----------|-------|----------|
| | | | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Tent Pads | Each | \$ 150 | 8 | \$ 1,200 | 4 | \$ 600 | 12 | \$ 1,800 |
| Large Masonry Fireplaces | Each | 600 | 2 | 1,200 | 1 | 600 | 3 | 1,800 |
| Shelter | Each | 1,000 | 2 | 2,000 | 1 | 1,000 | 3 | 3,000 |
| Pit Privy | Each | 500 | 2 | 1,000 | 1 | 500 | 3 | 1,500 |
| Water Supply (dug well and hand pump) | Each | 700 | 1 | 700 | 1 | 700 | 2 | 1,400 |
| Signs | Each | 300 | 2 | 600 | 1 | 300 | 3 | 900 |
| Picnic Tables | Each | 200 | 6 | 1,200 | 3 | 600 | 9 | 1,800 |
| Selective Shoreline Clearing | Per Area | 100 | 2 | 200 | 1 | 100 | 3 | 300 |
| Boat Landing | Per Area | 2,000 | 2 | 4,000 | 1 | 2,000 | 3 | 6,000 |
| Road Construction | L.F. | 8 | 4,400 | 35,200 | | | 4.400 | 35,200 |
| Leantos | Each | 800 | 8 | 6,400 | 4 | 3,200 | 12 | 9,600 |
| SUB-TOTAL | | | | \$53,700 | | \$9,600 | | \$63,300 |
| Contingencies | | | | 8,050 | | 1,450 | | 9,500 |
| 1977 Construction Costs | | | | 61,750 | | 11,050 | | 72,800 |
| E. & D. and S. & A. | | | | 12,350 | | 2,200 | | 14,550 |
| TOTAL COST | | | | \$74,100 | | \$13,250 | | \$87,350 |

8 - IX

TABLE XI - 8

PRIMITIVE CAMPSITES (In groups of two)

| Item | Unit | Unit Cost | Initial | | Future | | Total | |
|--|----------|--------------|---------|----------|--------|----------|-------|-----------|
| | | | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Tent Site Preparation | Each | \$ 150 | 12 | \$ 1,800 | 20 | \$ 3,000 | 32 | \$ 4,800 |
| Picnic Tables | Each | 200 | 12 | 2,400 | 20 | 4,000 | 32 | 6,400 |
| Fireplace and Grill | Each | 100 | 12 | 1,200 | 20 | 2,000 | 32 | 3,200 |
| Sign | Each | 300 | 6 | 1,800 | 10 | 3,000 | 16 | 4,800 |
| Pit Privy | Each | 500 | 6 | 3,000 | 10 | 5,000 | 16 | 8,000 |
| Water Supply (dug well and hand pump) | Each | 700 | 6 | 4,200 | 10 | 7,000 | 16 | 11,200 |
| Boat Landing | Per Site | 600 | 12 | 7,200 | 20 | 12,000 | 32 | 19,200 |
| Selective Shoreline Clearing | Per Site | 100 | 12 | 1,200 | 20 | 2,000 | 32 | 3,200 |
| Leantos | Each | 800 | 6 | 4,800 | 10 | 8,000 | 16 | 12,800 |
| SUB-TOTAL | | | | \$27,600 | | \$46,000 | | \$73,600 |
| Contingencies | | | | 4,150 | | 6,900 | | 11,050 |
| 1977 Construction Costs | | | | 31,750 | | 52,900 | | 84,650 |
| E. & D. and S. & A. | | | | 6,350 | | 10,600 | | 16,950 |
| TOTAL COST | | | | \$38,100 | | \$63,500 | | \$101,600 |

6 - IX

TABLE XI - 9

BOAT LAUNCH RAMP & FACILITIES

| Item | Unit | Unit Cost | Initial | | Future | | Total | |
|---|------|--------------|---------|------------------|--------|-----------------|-------|------------------|
| | | | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Access Road | L.F. | \$ 20 | 2,000 | \$40,000 | | | 2,000 | \$ 40,000 |
| Parking | S.Y. | 6 | 3,730 | 22,400 | 3,360 | \$20,150 | 7,090 | 42,540 |
| Boat Launch Ramps | Each | 8,000 | 1 | 8,000 | 1 | 8,000 | 2 | 16,000 |
| Floating Dock | S.F. | 12 | 750 | 9,000 | 675 | 8,100 | 1.425 | 17 100 |
| Signs | Each | 250 | 3 | 750 | | | 3 | 750 |
| Water Supply (drilled well and pressure tank) | L.S. | | 1 | 2,000 | | | 1 | 2,000 |
| Rest Rooms | L.S. | | 1 | 14,000 | 1 | 12,750 | 2 | 26,750 |
| Trash Receptacles | Each | 50 | 3 | 150 | 2 | 100 | 5 | 250 |
| SUB-TOTAL | | | | \$96,300 | | \$49,100 | | \$145,400 |
| Contingencies | | | | 14,450 | | 7,350 | | 21,800 |
| 1977 Construction Costs | | | | 110,750 | | 56,450 | | 167,200 |
| E. & D. and S. & A. | | | | 22,150 | | 11,300 | | 33,450 |
| TOTAL COST | | | | \$132,900 | | \$67,750 | | \$200,650 |

XI - 10

TABLE XI - 10

BEACH AREA

| Item | Unit | Unit Cost | Initial | | Future | | Total | |
|---|----------|--------------|---------|----------|--------|---------|-------|----------|
| | | | Qty. | Cost | Qty. | Cost | Qty. | Cost |
| Access Road | L.F. | \$ 8 | 1,800 | \$14,400 | | | 1,800 | \$14,400 |
| Parking | S.Y. | 3 | 2,500 | 7,500 | | | 2,500 | 7,500 |
| Timber Guard Rail | L.F. | 5 | 200 | 1,000 | 200 | \$1,000 | 400 | 2,000 |
| Selective Shoreline Clearing | L.F. | 4 | 100 | 400 | | | 100 | 400 |
| Beach Construction | S.Y. | 3 | 2,500 | 7,500 | | | 2,500 | 7,500 |
| Picnic Table Area Prep. | Per Site | 50 | 5 | 250 | 5 | 250 | 10 | 500 |
| Gravel Walkways | L.F. | 2 | 150 | 300 | | | 150 | 300 |
| Picnic Tables | Each | 200 | 5 | 1,000 | 5 | 1,000 | 10 | 2,000 |
| Raised Charcoal Grills | Each | 100 | 5 | 500 | 5 | 500 | 10 | 1,000 |
| Trash Receptacles | Each | 50 | 8 | 400 | 8 | 400 | 16 | 800 |
| Water Supply (drilled well and pressure tank) | L.S. | 2,000 | 1 | 2,000 | | | 1 | 2,000 |
| Signs | Each | 250 | 2 | 500 | | | 2 | 500 |
| Rest Rooms | Each | | 1 | 30,000 | | | 1 | 30,000 |
| SUB-TOTAL | | | | \$65,750 | | \$3,150 | | \$68,900 |
| Contingencies | | | | 9,850 | | 450 | | 10,300 |
| 1977 Construction Costs | | | | 75,600 | | 3,600 | | 79,200 |
| E. & D. and S. & A. | | | | 15,100 | | 700 | | 15,800 |
| TOTAL COST | | | | \$90,700 | | \$4,300 | | \$95,000 |

TABLE XI - 11

HIKING TRAIL CONSTRUCTION

| Item | Unit | Unit Cost | Initial Qty. | Initial Cost | Future Qty. | Future Cost | Total Qty. | Total Cost |
|--|------|-----------|--------------|--------------|-------------|-------------|------------|------------|
| Visitor Center to Lake Overlook | Mile | \$ 1,000 | 2.7 | \$ 2,700 | | | 2.7 | \$ 2,700 |
| Signs | Each | 150 | 4 | 600 | | | 4 | 600 |
| Overlook | Each | 500 | 1 | 500 | | | 1 | 500 |
| Destination Campground to Visitor Center | Mile | 1,000 | 3.5 | 3,500 | | | 3.5 | 3,500 |
| Signs | Each | 150 | 5 | 750 | | | 5 | 750 |
| Visitor Center to Group Campsite | Mile | 1,000 | 11 | 11,000 | | | 11 | 11,000 |
| Signs | Each | 150 | 5 | 750 | | | 5 | 750 |
| Overlook | Each | 500 | 3 | 1,500 | | | 3 | 1,500 |
| SUB-TOTAL | | | | \$21,300 | | | | \$21,300 |
| Contingencies | | | | 3,200 | | | | 3,200 |
| 1977 Construction Costs | | | | 24,500 | | | | 24,500 |
| E. & D. and S. & A. | | | | 4,900 | | | | 4,900 |
| TOTAL COST | | | | \$29,400 | | | | \$29,400 |

XI - 12

TABLE XI - 12

LAND COST

| Item | Unit | Unit Cost | Initial Qty. | Initial Cost | Future Qty. | Future Cost | Total Qty. | Total Cost |
|------------|------|-----------|--------------|--------------|-------------|-------------|------------|------------|
| Land Cost | Acre | \$ 100 | 2,080 | \$208,000 | | | 2,080 | \$208,000 |
| TOTAL COST | | | | \$208,000 | | | | \$208,000 |

TABLE XI - 13
 COST SUMMARY OF RECREATION PLAN
 FOR
 DICKEY-LINCOLN SCHOOL LAKES

| Item | Phase I | Phase II | Total Cost Phase I & II |
|---|-------------|-----------|-------------------------|
| <u>PROJECT COSTS (Minimal Facilities)</u> | | | |
| Scenic Turnout | \$19,550 | | \$ 19,550 |
| Visitor Center | 351,900 | \$37,300 | 389,200 |
| St. John Canoe Takeout | 39,250 | | 39,250 |
| Allagash Canoe Takeout | 36,000 | | 36,000 |
| Total Project Costs | \$446,700 | | \$ 484,000 |
| <u>RECREATION COSTS (Cost Shared)</u> | | | |
| Picnic Area | \$ 32,300 | | \$ 32,300 |
| Destination Campground | 487,700 | \$148,300 | 636,000 |
| Group Campsites | 74,100 | 13,250 | 87,350 |
| Primitive Campsites | 38,100 | 63,500 | 101,600 |
| Boat Launch Ramp & Fac. | 132,900 | 67,750 | 200,650 |
| Beach Area | 90,700 | 4,300 | 9,500 |
| Hiking Trail Const. | 29,400 | | 29,400 |
| Land Cost | 208,000 | | 208,000 |
| Total Recreation Costs | \$1,093,200 | \$297,100 | \$1,390,300 |
| TOTALS | \$1,539,900 | \$334,400 | \$1,874,300 |

XI - 14

CHAPTER XII

BENEFITS

12.0 Estimating Benefits

Recreation benefits have been derived by applying a monetary value to each of the expected activities in the project area. A single unit value is assigned per visitor-day of recreation use for each activity. Table XII-1 shows the range of values which have been assigned. These values are consistent with the U.S. Water Resources Council's "Principles and Standards"

TABLE XII-1

Value of Recreation Activities

| <u>Recreation Activity</u> | <u>Unit Value Per Visitor Day Prior to 1988</u> | <u>Unit Value Per Visitor Day After 1988</u> |
|----------------------------|---|--|
| Camping (Primitive, Group) | \$7.00 | \$9.00 |
| Camping (Destination) | -- | 2.00 |
| Fishing | 6.00 | 6.00 |
| Hunting | 9.00 | 9.00 |
| Canoeing | 9.00 | -- |
| Day Activities | 1.00 | 2.00 |

An average annual recreation benefit is calculated for each activity for selected periods by applying the monetary values to an estimate of the average annual attendance in the selected period. Table XII-2 and Table XII-3 show the average annual attendance/benefit figures without and with the project, respectively. Recreation benefits without the project are calculated using only the monetary unit values effective prior to 1988. Recreation benefits with the project are calculated using the monetary unit values effective prior to 1988 and also those values effective after 1988.

Table XII-4 and Table XII-5 show the total recreation benefits for each activity for selected periods without and with the project, respectively. These figures were calculated by summing the average annual benefits over the period. Future recreation benefits have been discounted to their present value in 1977 using the interest rate authorized for this project (3.25%) and the prevailing rate for federal water resource projects (6.375%). By summing the discounted benefits to the year 2030, a value of total recreation benefits is derived. A comparative summary of recreation benefits without and with the project is presented in Table XII-6.

TABLE XII-2

Average Annual Recreation Use and Benefits
Without
Dickey-Lincoln School Lakes

| | 1975-1979 | 1980-1984 | 1985-1987 | 1988-1989 | 1990-1994 | 1995-1999 |
|----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Camping (Primitive, Group) | 1,900/\$13,300 | 2,300/\$16,100 | 2,800/\$19,600 | 3,100/\$21,700 | 3,600/\$25,200 | 4,500/\$31,500 |
| Fishing | 4,700/\$28,200 | 5,400/\$32,400 | 6,000/\$36,000 | 6,500/\$39,000 | 7,200/\$43,200 | 8,300/\$49,800 |
| Hunting | 8,600/\$77,400 | 9,500/\$85,500 | 10,200/\$91,800 | 10,700/\$96,300 | 11,400/\$102,600 | 12,600/\$113,400 |
| Canoeing | 2,500/\$22,500 | 3,000/\$27,000 | 3,400/\$30,600 | 3,800/\$34,200 | 4,300/\$38,700 | 5,100/\$45,900 |
| Day Activities | 1,200/\$1,200 | 1,500/\$1,500 | 1,700/\$1,700 | 1,900/\$1,900 | 2,300/\$2,300 | 2,800/\$2,800 |
| | 2000-2004 | 2005-2009 | 2010-2014 | 2015-2019 | 2020-2024 | 2025-2030 |
| Camping (Primitive, Group) | 5,600/\$39,200 | 7,000/\$49,000 | 8,700/\$60,900 | 10,800/\$75,600 | 13,500/\$94,500 | 17,200/\$120,400 |
| Fishing | 9,500/\$57,000 | 11,000/\$66,000 | 12,700/\$76,200 | 14,600/\$87,600 | 16,900/\$101,400 | 19,800/\$118,800 |
| Hunting | 13,800/\$124,200 | 15,200/\$136,800 | 16,700/\$150,300 | 18,300/\$164,700 | 20,100/\$180,900 | 22,300/\$200,700 |
| Canoeing | 6,100/\$54,900 | 7,400/\$66,600 | 8,800/\$79,200 | 10,600/\$95,400 | 12,700/\$114,300 | 15,500/\$139,500 |
| Day Activities | 3,400/\$3,400 | 4,200/\$4,200 | 5,200/\$5,200 | 6,500/\$6,500 | 8,000/\$8,000 | 10,100/\$10,100 |

TABLE XII-3

Average Annual Recreation and Benefits
With
Dickey-Lincoln School Lakes

| | 1975-1979 | 1980-1984 | 1985-1987 | 1988-1989 | 1990-1994 | 1995-1999 |
|--|----------------|----------------|-----------------|-----------------|------------------|------------------|
| Camping: Primitive, Group Destination | 1,900/\$13,300 | 2,300/\$16,100 | 1,000/\$7,000 | 2,800/\$25,000 | 5,000/\$45,000 | 7,000/\$63,000 |
| | ---- | ---- | ---- | 4,200/\$8,400 | 7,500/\$15,000 | 10,500/\$21,000 |
| Fishing | 4,700/\$28,200 | 5,400/\$32,400 | 2,000/\$12,000 | 2,400/\$14,400 | 3,800/\$22,800 | 6,700/\$40,200 |
| Hunting | 8,600/\$77,400 | 9,500/\$85,500 | 10,200/\$91,800 | 10,700/\$96,300 | 11,400/\$102,600 | 12,600/\$113,400 |
| Canoeing | 2,500/\$22,500 | 3,000/\$27,000 | ---- | ---- | ---- | ---- |
| Day Activities | 1,200/\$1,200 | 1,500/\$1,500 | 1,700/\$1,700 | 30,000/\$60,000 | 31,000/\$62,000 | 33,000/\$66,000 |

| | 2000-2004 | 2005-2009 | 2010-2014 | 2015-2019 | 2020-2024 | 2025-2030 |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
| Camping: Primitive, Group Destination | 9,000/\$81,000 | 11,000/\$99,000 | 12,500/\$112,500 | 13,500/\$121,500 | 14,500/\$130,500 | 15,500/\$139,500 |
| | 13,500/\$49,200 | 16,500/\$33,000 | 18,700/\$37,400 | 20,200/\$40,400 | 21,700/\$43,400 | 23,200/\$46,400 |
| Fishing | 8,200/\$49,200 | 9,300/\$55,800 | 10,000/\$60,000 | 10,000/\$60,000 | 10,000/\$60,000 | 10,000/\$60,000 |
| Hunting | 13,800/\$124,200 | 14,600/\$131,400 | 14,600/\$131,400 | 14,600/\$131,400 | 14,600/\$131,400 | 14,600/\$131,400 |
| Canoeing | ---- | ---- | ---- | ---- | ---- | ---- |
| Day Activities | 34,500/\$69,000 | 36,000/\$72,000 | 38,000/\$76,000 | 40,000/\$80,000 | 42,000/\$84,000 | 44,500/\$89,000 |

TABLE XII-4

Recreation Benefits
Without
Dickey-Lincoln School Lakes

| | 1975-1979 | 1980-1984 | 1985-1987 | 1988-1989 | 1990-1994 | 1995-1999 |
|----------------------|--------------|--------------|--------------|--------------|---------------|---------------|
| Camping | \$ 66,500 | \$ 80,500 | \$ 58,800 | \$ 43,400 | \$ 126,000 | \$ 157,500 |
| Fishing | 141,000 | 162,000 | 108,000 | 78,000 | 216,000 | 249,000 |
| Hunting | 387,000 | 427,500 | 275,400 | 192,600 | 513,000 | 567,000 |
| Canoeing | 112,500 | 135,000 | 91,800 | 68,400 | 193,500 | 229,500 |
| Day Activities | <u>6,000</u> | <u>7,500</u> | <u>5,100</u> | <u>3,800</u> | <u>11,500</u> | <u>14,000</u> |
| TOTAL | \$713,000 | \$812,500 | \$539,100 | \$386,200 | \$1,060,000 | \$1,217,000 |
| Discounted at 3.25% | 713,000 | 692,400 | 404,300 | 263,100 | 656,100 | 641,900 |
| Discounted at 6.375% | 713,000 | 596,500 | 309,100 | 184,000 | 419,500 | 353,600 |

| | 2000-2004 | 2005-2009 | 2010-2014 | 2015-2019 | 2020-2024 | 2025-2030 |
|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Camping | \$ 196,000 | \$ 245,000 | \$ 304,500 | \$ 378,000 | \$ 472,500 | \$ 722,400 |
| Fishing | 285,000 | 330,000 | 381,000 | 438,000 | 507,000 | 712,800 |
| Hunting | 621,000 | 684,000 | 751,500 | 823,500 | 904,500 | 1,204,200 |
| Canoeing | <u>274,500</u> | <u>333,000</u> | <u>396,000</u> | <u>477,000</u> | <u>571,500</u> | <u>837,000</u> |
| TOTAL | \$1,393,500 | \$1,613,000 | \$1,859,000 | \$2,149,000 | \$2,495,000 | \$3,537,000 |
| Discounted at 3.25% | 626,400 | 617,900 | 606,900 | 597,900 | 591,700 | 692,200 |
| Discounted at 6.375% | 297,300 | 252,600 | 213,700 | 181,400 | 154,700 | 151,300 |

TABLE XII-5
Recreation Benefits
With
Dickey-Lincoln School Lakes

| | 1975-1979 | 1980-1984 | 1985-1987 | 1988-1989 | 190-1994 | 1995-1999 |
|----------------------|--------------|--------------|--------------|----------------|----------------|----------------|
| Camping | \$ 66,500 | \$ 80,500 | \$ 35,000 | \$ 67,200 | \$ 300,000 | \$ 420,000 |
| Fishing | 141,000 | 162,000 | 36,000 | 28,400 | 114,000 | 201,000 |
| Hunting | 387,000 | 427,500 | 275,400 | 192,600 | 513,000 | 567,000 |
| Canoeing | 112,500 | 135,000 | --- | --- | --- | --- |
| Day Activities | <u>6,000</u> | <u>7,500</u> | <u>5,100</u> | <u>120,000</u> | <u>310,000</u> | <u>330,000</u> |
| TOTAL | \$713,000 | \$812,500 | \$251,500 | \$408,200 | \$1,237,000 | \$1,518,000 |
| Discounted at 3.25% | 713,000 | 692,400 | 263,600 | 278,100 | 765,600 | 800,700 |
| Discounted at 6.375% | 713,000 | 596,500 | 201,500 | 194,400 | 489,500 | 441,000 |

| | 2000-2004 | 2005-2009 | 2010-2014 | 2015-2019 | 2020-2024 | 2025-2030 |
|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Camping | \$ 540,000 | \$ 660,000 | \$ 749,500 | \$ 809,500 | \$ 869,500 | \$1,115,400 |
| Fishing | 246,000 | 279,000 | 300,000 | 300,000 | 300,000 | 360,000 |
| Hunting | 621,000 | 657,000 | 657,000 | 657,000 | 657,000 | 788,400 |
| Canoeing | --- | --- | --- | --- | --- | --- |
| Day Activities | <u>345,000</u> | <u>360,000</u> | <u>380,000</u> | <u>400,000</u> | <u>420,000</u> | <u>534,000</u> |
| TOTAL | \$1,752,000 | \$1,956,000 | \$2,086,500 | \$2,166,500 | \$2,246,500 | \$2,797,800 |
| Discounted at 3.25% | 787,600 | 749,300 | 681,200 | 602,800 | 532,700 | 547,600 |
| Discounted at 6.375% | 373,700 | 306,300 | 239,900 | 182,900 | 139,200 | 119,700 |

TABLE XII-6

Comparison of Recreation Benefits

| | <u>Total Benefits Prior to Discounting</u> | |
|--|--|--|
| Without Dickey-Lincoln School Lakes | \$17,774,300 | |
| With Dickey-Lincoln School Lakes | \$17,945,500 | |
| | <u>Total Benefits Discounted at 3.25%</u> | <u>Total Benefits Discounted at 6.375%</u> |
| Without Dickey-Lincoln School Lakes | \$7,103,800 | \$3,826,700 |
| With Dickey-Lincoln School Lakes | <u>\$7,414,600</u> | <u>\$3,997,600</u> |
| Net Benefit of Dickey-Lincoln School Lakes | \$ 310,800 | \$ 170,900 |

EXHIBIT I

NORTHERN MAINE REGIONAL PLANNING COMMISSION
LAKES STUDY - PHASE I REPORT

EXHIBIT I

Excerpted from
NORTHERN MAINE REGIONAL PLANNING COMMISSION
LAKES STUDY
PHASE I REPORT

INTRODUCTION

The Colonial Ordinance of 1641 taken from the 1814 Edition of Ancient Chapters and Laws of the Colony and Province of Massachusetts Bay guarantees free public access to all great ponds of ten or more acres in size. A widespread demand by modern society for water-based recreation has been generated by increased affluence, greater mobility, more leisure time, and a burgeoning population. The right of free public access to great ponds coupled with the need for more water based recreation facilities prompted the Northern Maine Regional Planning Commission to engage the Edward C. Jordan Co., Inc., Engineers and Planners, to undertake a physical inventory of the great ponds falling within the bounds of Commission members, including all of Aroostook County and the communities of Mt. Chase, Patten, and Staceyville in Penobscot County.

The purpose of this study is to provide the basic data necessary for water oriented outdoor recreation planning at county, regional and state levels. The scope of this study includes identification of existing ponds within the region, physical characteristics of the ponds and adjacent land areas; existing use of ponds and adjacent land areas, with emphasis on shoreline land use and development.

The information gained by this study can provide a fundamental ingredient for the planning of the Region's recreational and economic development consistent with the capabilities of its natural resources. Sensible use of the Region's resources is based upon understanding of the natural characteristics and carrying capacities of land and water resources. Development of given sites consistent with these capabilities will enable public access and economic progress without destruction of the natural environment.

The benefit of this initial study will be the compilation of basic data to guide in selection of those lakes offering the greatest potential for public access and recreational development. Future study would identify specific access sites to be developed and recommend the type and extent of development best suited to these sites. In this way, public access and recreational use of great ponds can be integrated with regional economic and development plans.

LAKES SURVEY

The lakes survey consisted of two parts: an inventory of all Great Ponds and an aerial survey

As there was no available comprehensive listing of lakes by size and depth, it was necessary to prepare an inventory of the lakes to be included in the survey. It was decided to include all lakes in the study area of ten acres or more in size and ten feet or more in depth. Lakes and ponds of smaller size and depth are considered to have limited capacities unsuited to development for intensive recreational use.

The following data were used to determine the lakes meeting size and depth criteria; topographic maps, lake surveys conducted by the Maine Department of Inland Fisheries and Game, and the Maine General Highway Atlas published by the State Highway Commission.

The aerial survey was conducted during the week of October 21, 1968 after deciduous leaves had fallen and prior to the first snowfall. A total of 172 lakes were included in the aerial survey. Data was subsequently compiled relative to the observable characteristics for the 106 lakes which met size and depth criteria. Recorded data included the natural character of each lake and its surrounding land area, the type and extent of physical development, and existing public access.

To facilitate the aerial survey and data handling, the study area was divided into three regions: Northwest, Northeast, and Southeast.

CLASSIFICATION OF LAKES

Upon completion of the aerial survey, the recorded data were compiled and analyzed to classify the lakes according to their potential for public access and recreational development. The following classifications were established: Lakes with Outstanding Recreation Potential, and Lakes Not Meeting Size Criteria.

A list of the lakes within each classification is as follows:

LAKES WITH OUTSTANDING RECREATION POTENTIAL

Deboullie Mountain Area
Eagle Lake

Grand Lake
Pleasant Lake

LAKES WITH ABOVE AVERAGE RECREATION POTENTIAL

| | |
|------------------|-------------------|
| Beau Lake | Long Lake |
| Beaver Tail Pond | Madawaska Lake |
| Blake Lake | Mattawamkeag Lake |
| Carr Pond | Meduxnekeag Lake |
| Chandler Lake | Molunkus Lake |
| Chase Ponds | Musquacook Lakes |
| Clayton Lake | Nickerson Lake |
| Collins Pond | Rowe Lake |
| Cross Lake | Skitacook Lake |
| Glazier Lake | Square Lake |
| Horseshoe Pond | Wallagrass Lakes |

LAKES WITH AVERAGE POTENTIAL

Northwest Region

Allagash Lakes*
Harvey Pond
Long Lake
Round Pond
Umsaskis Lake
Bic Machias Lake
Cunliff Lake
First Negro Brook Lake
Fish River Lake
Hunnewell Lake
Lower McNally Pond
McKeen Lake
McLean Lake
Pratt Lake
Round Mountain Pond
Squirrel Pond
Third Negro Brook Pond
Upper Hudson Pond
Upper McNally Pond

Northeast Region

Bennett Lake
Black Lake
Cross Lake
Daigle Pond
Ferguson Pond
Hanson Pond
Impoundment at Easton
Island Pond
Little Machias Lake
Moccasin Pond
Mud Lake
Portage Lake
Round Pond
Silver Lake
Sly Brook Lakes
Soldier Pond
Squapan Lake
St. Froid Lake
Wheelock Lake

Southeast Region

Bradbury Lake
Carry Lake
Cochrane Lake
Conroy Lake
County Road Lake
Crystal Lake
Faulkner Lake
Flinn Pond
Green Pond
Hale Pond
Haywire Pond
Long Lake
Longfellow Lake
Lower Macwahoc Lake
Lower Shin Pond
Mattaseunk Lake
Mud Pond
Mud Lake
Number Nine Lake

(Continued on next
page)

* Included in Allagash Wilderness Area, therefore, not considered for development within the context of this report.

Southeast Region (continued)

Plunkett Pond
Portland Lake
Reed Lake
Rockabema Lake
Ross Lake
Spaulding Lake
Timoney Lake
Upper Shin Pond
Umcolcus Lake
Wytopotlock Lake

LAKES NOT MEETING SIZE CRITERIA

Northwest Region

Bean Pond
Big Brook Lake
Burntland Pond
Clayton Lake
Cunliffe Pond
Depot Lake
Ed Jones Pond
Glazier Pond
Grey Pond
Jones Pond
Linscott Pond
Little Presley Lake
Mink Pond
Mud Pond
(Beaver Pond Quad)
Mud Pond
(Beau Lake Quad)
Mud Pond
(Connors Brook Quad)
Pete's Pond
Presley Pond
Robbins Brook Pond
Sag Pond
Sweeney Pond
Ugh Lake
Weeks Pond
Yankeetuladi Pond

Northeast Region

Ben Lake
Bishop Pond
Black Pond
California Pond
Carr Pond
Echo Lake
Hewes Brook Pond
Marcial Lake
Mars Hill Lake
Mud Pond
(Winterville Quad)
Violette Pond
Winslow Lake
Youngs Lake

Southeast Region

Alerton Lake
Beaver Brook Lake
Brackett Lake
Brandy Lake
Caribou Lake
Cold Brook Lake
Davidson Pond
Deep Lake
Duck Pond
(Island Falls Quad)
Duck Pond
(Smyrna Mills Quad)
Gilman Pond
Green Pond
Hidden Pond
Hocter Pond
Longley Lake
Lost Pond
Monson Lake
Mud Pond
(Sherman Quad)
Otter Pond
Rideout Lake
Rush Pond
Scott Pond
St. Croix Lake
Ten Mile Lake
Whitehead Lake

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