# HOPKINTON-EVERETT LAKES

## HOPKINTON, HENNIKER, WEARE & DUNBARTON

## NEW HAMPSHIRE

## DESIGN MEMORANDUM NO. X
## (REVISED)

## MASTER PLAN

## FOR RECREATION RESOURCES DEVELOPMENT

Department of the Army
New England Division, Corps of Engineers
Waltham, Massachusetts

MAY 1978

## PREFACE

The State of New Hampshire possesses unique resources for year-round outdoor recreation that have made it one of the Nation's most important vacation lands. Hopkinton-Everett Lakes, with its forested lands, winding rivers and streams, scattered ponds and a variety of wildlife combined with a climate conducive to outdoor recreation is typical of New Hampshire's natural resources.

Hopkinton-Everett Lakes serve the recreational enthusiast seeking such leisurely activities as horseback riding, hunting, fishing, bird watching, picnicking and nature studies. It also has provisions for swimming, boating, hiking and snowmobiling. The project area has been increasing in popularity and is expected to serve 450,000 visitors by 1990.

It is the intent of this Master Plan to take a comprehensive look at the Corp's role in providing outdoor recreation opportunities and to preserve the unique character of the project by carefully considering the relationship between the environment and recreation facility development.

This Master Plan has been developed from a study of the recreation requirements of the region consistent with consideration for the environment, fish and wildlife enhancement and conservation of project resources. Optimum development of recreational facilities with emphasis on quality and compatibility rather than quantity have been the primary objectives in planning the recreational use potential of this important flood control project.

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

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# I. INTRODUCTION

## 1. Authorization

Hopkinton-Everett Lakes is a part of the authorized comprehensive plan for flood control and other purposes in the Merrimack River Basin. Authorization for the project is contained in the Flood Control Act of 28 June 1938, House Document No. 689, 75th Congress, 3rd Session, as amended by the Acts of 1941 and 1944, and the Merrimack River Flood Control Compact of 1957. Construction of the project was initiated in November of 1959 and completed in January 1963.

## 2. Project Purposes

Two of the principal tributaries of the Merrimack River are the Contoocook River, which joins the Merrimack 5 miles above Concord, New Hampshire and the Piscataquog River, entering the Merrimack at Manchester, New Hampshire, 15 miles below Concord. The combined reservoirs, connected by a canal, are designed to protect the cities of Concord, Manchester, and Nashua in New Hampshire, as well as Lowell, Lawrence, and Haverhill in Massachusetts together with other communities bordering the Merrimack River.

The Merrimack River Basin, with a drainage area of 5,010 square miles, has suffered severely from floods. Major floods occurred in 1927, 1936, 1938 and 1969. The flood of 1936 was the most destructive with damages amounting to $35,000,000. A recurrence of such a flood today, without flood control, would cause damages amounting to $160,000,000. It is estimated that the flood control projects previously built in the basin would reduce damages by $84,000,000 and the construction of Hopkinton-Everett Lakes would further reduce damages by $41,000,000. The project has prevented damages totaling $505,000 since initiation of construction. In April 1969 the combined reservoirs reached 44 percent of capacity and prevented damages of $400,000.

## 3. Purpose of the Master Plan

The purpose of this Master Plan is to present a comprehensive and coordinated program for the development, management and use of the Hopkinton-Everett Flood Control Reservoir for public purposes which are compatible with the authorized project purpose. This plan will serve as a guide in the operation and control of land and water use for the derivation of maximum public benefits from the resources of the project. It is intended that this plan be flexible so that adjustments may be made to it as changing conditions may warrant.

## 4. Prior Pertinent Design Memoranda

The prior pertinent design memoranda for Hopkinton-Everett Lakes are listed on the following table:

## INDEX TO DESIGN MEMORANDA

## HOPKINTON-EVERETT RESERVOIR

| Design Memo No. | Title | Submission Date | Date Approved |
|---|---|---|---|
| I | Hydrology | 29 May 1958* | 26 June 1958 |
| | | 15 Sept 1958 | 22 Oct 1958 |
| II | General Design | 18 Sept 1958 | 27 Oct 1958 |
| III | Real Estate | 16 Sept 1958 | 27 Oct 1958 |
| IV | Relocations | 29 Sept 1958 | 5 Nov 1958 |
| V | Geology and Soils | | |
| | Part A, Everett Reservoir | 31 Oct 1958 | 20 Nov 1958 |
| | Part B, Hopkinton Reservoir | 16 Feb 1959 | 16 Apr 1959 |
| VI | Embankment | | |
| | Part 1, Everett Reservoir | 2 Dec 1958 | 7 Jan 1959 |
| | Part 2, Hopkinton Reservoir | 27 Mar 1959 | 22 Apr 1959 |
| VII | Hydraulic Analysis | | |
| | Part 1, Everett Reservoir | 18 Nov 1958 | 28 Nov 1958 |
| | Part 2, Hopkinton Reservoir | 27 Mar 1959 | 21 Apr 1959 |
| VIII | Detailed Design for Spillway Weir, Outlet Works and Misc. Structures | | |
| | Part 1, Everett Reservoir | 31 Oct 1958 | 2 Dec 1958 |
| | Part 2, Hopkinton Reservoir | 2 Mar 1959 | 14 Apr 1959 |
| IX | Concrete Materials | 26 Feb 1959 | 4 Mar 1959 |
| IXA | Recreation Facilities (Construction) Part of Master Plan) | 5 Apr 1963 | 23 May 1963 |
| X | Master Plan for Reservoir Development | 26 Apr 1965 | |
| XI | Canal No. 2 | 22 May 1959 | 10 June 1959 |

*Initial submission in draft to secure approval of spillway design flood and outlet requirements approved 26 June 1958.

# HOPKINTON-EVERETT LAKES
## NEW HAMPSHIRE

# VICINITY MAP

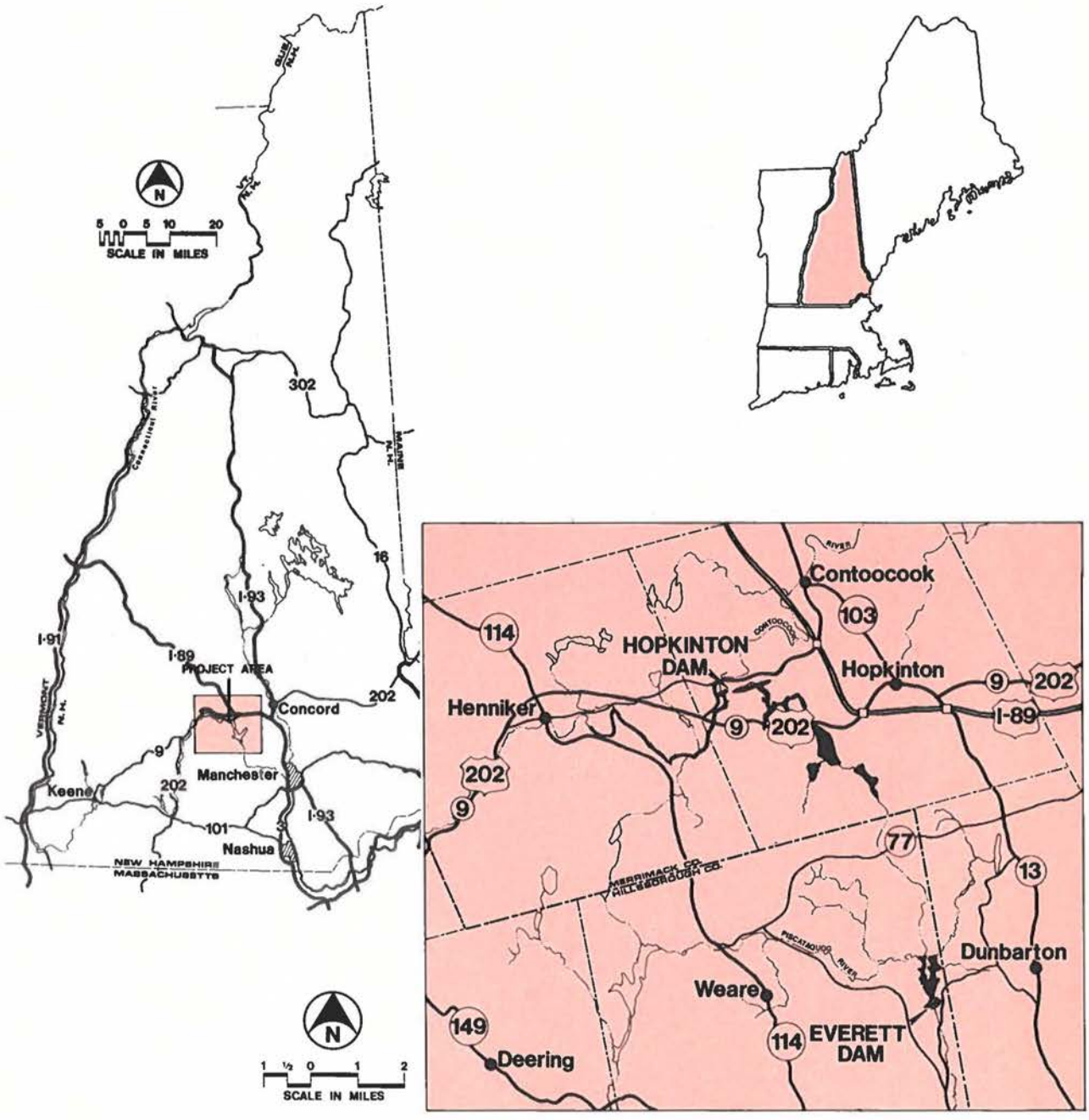



Figure 1

5. Application of Public Laws

Under Public Law 89-72, Section 4, where a project has been completed as of July 9, 1965 and non-Federal bodies agree to administer project land and water areas for recreation and fish and wildlife enhancement purposes, and to bear the cost of operation, maintenance and replacement of existing facilities serving those purposes, such facilities and appropriate project lands may be leased to non-Federal public bodies so long as agreement is made with the head of the Federal Agency having jurisdiction over the project.

Public Law 89-90 authorizes the establishment of the National Water Resources Commission which has the authority to set forth planning standards and water quality criteria and maintain a continuing study of regional or river basin plans and programs in relation to national water resource requirements. Specifically, this law regulates the coordination of Hopkinton-Everett Lakes into the Merrimack River Basin Master Plan, and further into the National Water Resources Commission objectives.

Public Law 78-534 authorized the Secretary of War to construct, maintain and operate public park and recreational facilities in reservoir areas, and to grant such leases on land or facilities to non-Federal bodies as is reasonable within the Merrimack River Basin.

Public Law 85-624 directs Federal agencies to coordinate the use of impounded bodies with the U.S. Fish and Wildlife Service, and directs State wildlife resource agencies to determine the extent of damage caused to wildlife resources. It also charges governmental bodies to promote the development and improvement of such resources by the preparation of Wildlife Resource plans and reports, to provide assistance in the development, protection, rearing and stocking of all species of wildlife, and to assist in controlling losses from disease and minimizing damages from overabundance, by providing public shooting and fishing areas, including easements over public lands thereto. It further authorizes the modification of, or addition to, projects not completed by March 10, 1934, the date of the Fish and Wildlife Coordination Act; to acquire lands to accomodate the means and measures for the conservation of wildlife resources as an integral part of the project.

6. Cooperative Planning

This Master Plan has been coordinated with several State and Federal agencies and other organizations in an effort to provide optimum recreation opportunities as well as fish and wildlife enhancement throughout the Hopkinton-Everett area.

Those with whom coordination has taken place include the N.H. Department of Resources and Economic Development, Bureau of Off-Highway Vehicles, Fish and Game Department and the U.S. Fish and Wildlife Service, as well as representatives of the four towns in which the project is located.

7. Scope of Report

The scope of the Master Plan includes an evaluation of the public recreational potential of the project in relation to other recreational opportunities available to the public within the area on which the project may be expected to exert influence.

The development and subsequent operation required to carry out the program has not been considered solely a Federal responsibility, but rather a partnership with the State of New Hampshire and other interests in providing for public enjoyment of the recreation resources of the project.

## II. PROJECT DESCRIPTION

1. Location

Hopkinton-Everett Lakes is located within the Towns of Hopkinton and Dunbarton in Merrimak County, and Henniker and Weare in Hillsboro County, New Hampshire. Project location is shown on Plates 1 and 2.

2. Project Data

a. Climate

The average annual temperature of the Contoocook and Piscataquog River Basins is about 46°F. The average monthly temperature varies from 70°F. in July to about 20°F. in January. Extremes in temperature range from slightly in excess of 100°F. to infrequent lows below -30°F. The mean annual precipitation over the Contoocook and Piscataquog River Basins varies from about 37 inches in the lowland elevations to about 43 inches in the upper elevations. It is uniformly distributed throughout the year. The annual snowfall over the basins averages about 70 inches between the months of November and April. The growing season averages about 160 days. A summer climate of warm days and cool evenings is suitable for many outdoor recreation pursuits including those that are water-oriented.

b. Reservoirs

Hopkinton Lake Lakes consists of Hopkinton Dam, Everett Dam, four dikes, two canals and two spillways. The Contoocook River Pool

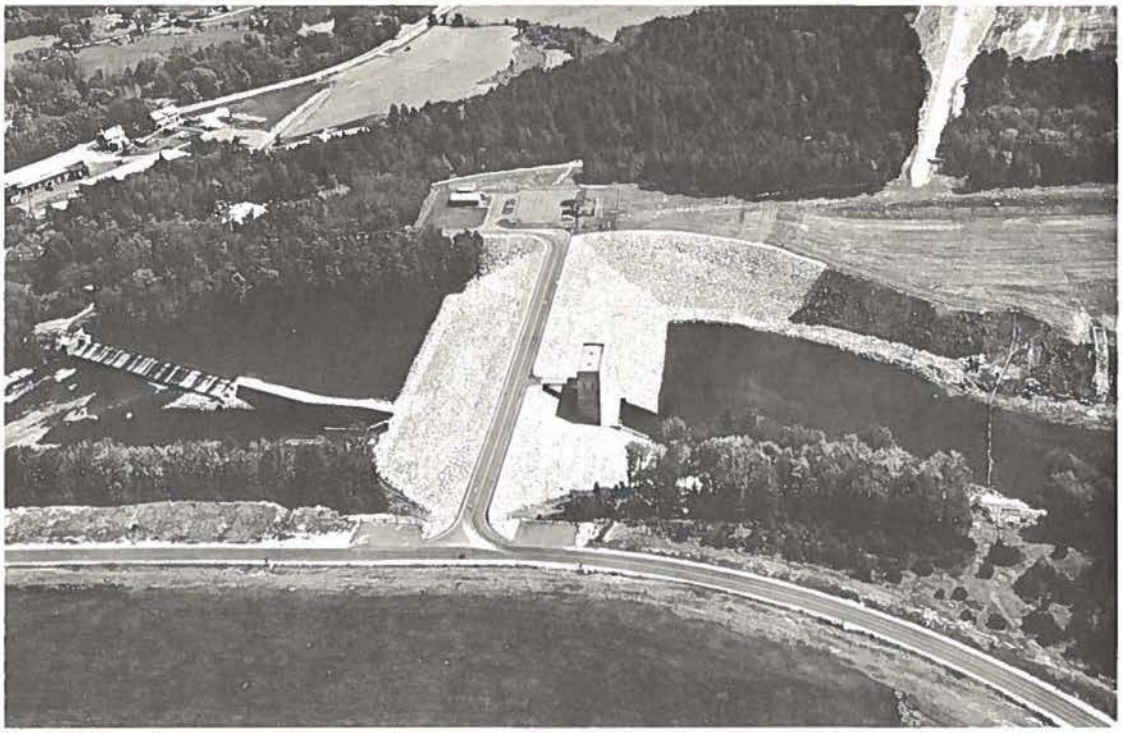


Figure 2 Hopkinton Dam as seen looking east, with Dike H-2 on right.

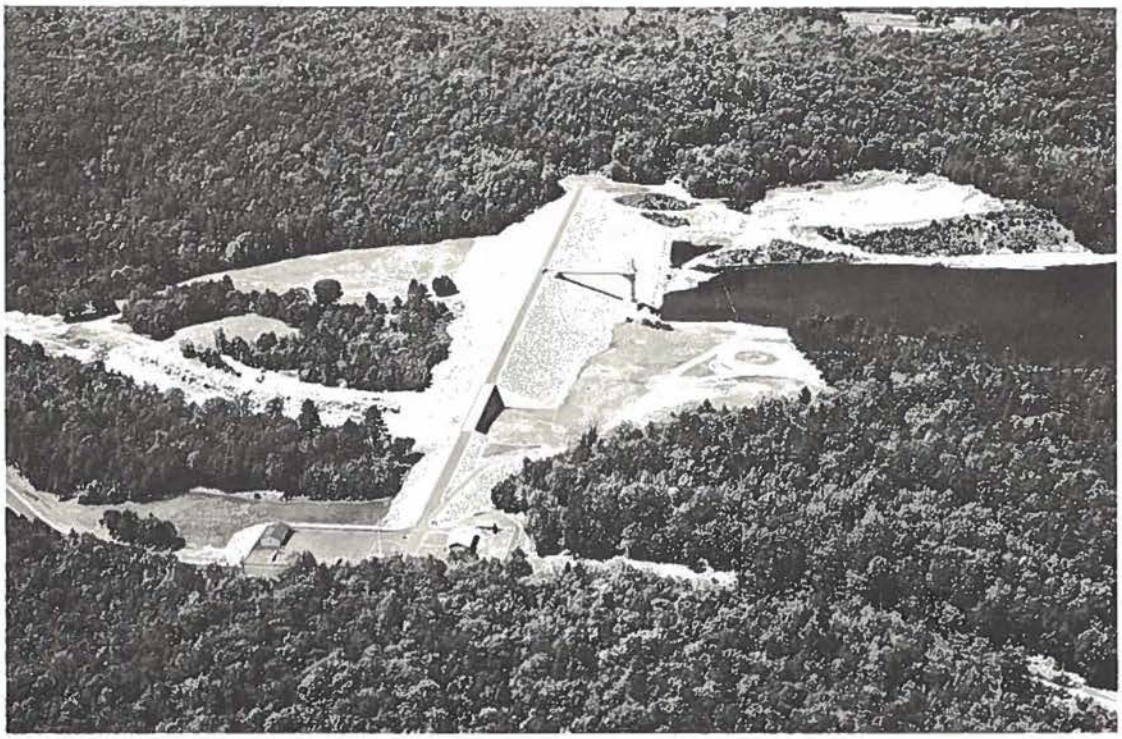


Figure 3 Everett Dam, looking west, with Everett Lake to the right.

behind Hopkinton Dam, which controls a drainage area of 426 square miles is connected to Elm Brook Pool and Marsh by Canal No. 1. The reservoir area behind Everett Dam, which controls a drainage area of 64 square miles is connected to Hopkinton Reservoir by Canal No. 2. Thus two projects act as a single reservoir with a total storage capacity of 157,300 acre-feet. The crest elevation of the Hopkinton Dam spillway is two feet lower than that of the Everett Dam spillway so that the initial spillway discharge will be to the Contoocook River which has a larger channel capacity than that of the Piscataquog River. The water surface area of the Hopkinton-Everett Reservoir at the spillway crest elevation is about 14 square miles.

c. Project Structures

Everett Dam is a rolled rock and earth fill embankment with a length of 2,000 feet, a maximum height of 115 feet above the river bed and a top elevation of 435 feet m.s.l. The outlet works for the dam consist of an 8 ft. diameter conduit. The intake gate tower is a dry well type and contains three 3'-6" x 6'-0" hydraulically operated gates. The spillway is located in the east abutment of the dam, is 180 feet long and has a crest elevation of 418 feet m.s.l.

Hopkinton Dam is a rolled rock and earth fill embankment with a length of 790 feet, a maximum height of 76 feet above the streambed, and a top elevation of 437 feet m.s.l. The outlet works for the dam consist of three 12 foot diameter conduits. The intake gate tower is a wet-well type and contains six 6-foot wide and 12-foot high motor operated vertical lift gates. One emergency gate is also provided. The spillway is located in the east abutment of Dike H-3 and is 300 feet long with a crest elevation of 416 feet m.s.l.

3. Reservoir Operation

The Hopkinton-Everett project is operated to reduce flooding of the Contoocook, Piscataquog, and Merrimack Rivers. Contoocook River floodwaters are impounded behind Hopkinton Dam above the normal level (elevation 380.0 feet m.s.l.) and upon reaching the invert of Canal No. 1 (elevation 384.0 feet m.s.l.) flow into Elm Brook Pool. Upon filling Elm Brook Pool to elevation 400.5 feet, m.s.l. the floodwaters spill over the uncontrolled North Weir at Drew Lake and then spill over the uncontrolled South Weir of Canal No. 2 (elevation 399.35 feet, m.s.l.) into Choate Brook and Everett Lake (normal elevation 340.0 feet m.s.l.). Floodwaters are evacuated by operating the outlet gates at Hopkinton and Everett Dams and releases are coordinated with those from other reservoirs in the Merrimack River system. The release rates from the reservoir are dependent upon river conditions at the downstream damage centers,

but in no case would they exceed the safe channel capacities of the Contoocook and Piscataquog Rivers. Evacuation of a full reservoir would require from two to three weeks.

4. Visitation

Hopkinton-Everett Lakes is an attractive recreation area in southern New Hampshire. A wide variety of activities make this project popular all year round. An average of 200,000 people have visited the area annually over the past ten years. With the public's increased interest for outdoor activities, an area that still maintains its natural qualities is in high demand. Hopkinton-Everett Lakes has this quality and its wide variety of activities has made it one of New Hampshire's best recreation areas. The tables and graphs in Exhibit A indicate the extent of visitation and recreation activities.

## III. OPERATING PROJECTS-STATUS

1. Project Development and Operation

Hopkinton-Everett Lakes was constructed and is operated by the Corps of Engineers, New England Division. The project is a part of the authorized comprehensive plan for flood control in the Merrimack River Basin. The legislatures of the State of New Hampshire and the Commonwealth of Massachusetts approved an interstate compact for flood control and established the Merrimack River Valley Flood Control Commission in 1957. At that time the Governor of New Hampshire notified the Corps of Engineers of his concurrence in the project.

Actual construction started in April 1959. Everett Dam was placed in full operation for flood control purposes in January 1962 and Hopkinton Dam was placed in full operation for flood control purposes in January 1963. The total cost of the project was $21,100,000.

2. Expenditures for Public Use Development

a. Federal Government

Total Federal expenditures through FY 1976 for public use and environmental resource development at the recreation areas within Hopkinton-Everett Lakes have amounted to $694,000. Of this, $53,000 has been O & M funds and $641,000 has been Code 710 funds.

b. Non-Federal Public

Total non-Federal operation and maintenance expenditures through 1975 for the public use and environmental resource developments at the facilities operated by the State of New Hampshire have amounted to $237,600.

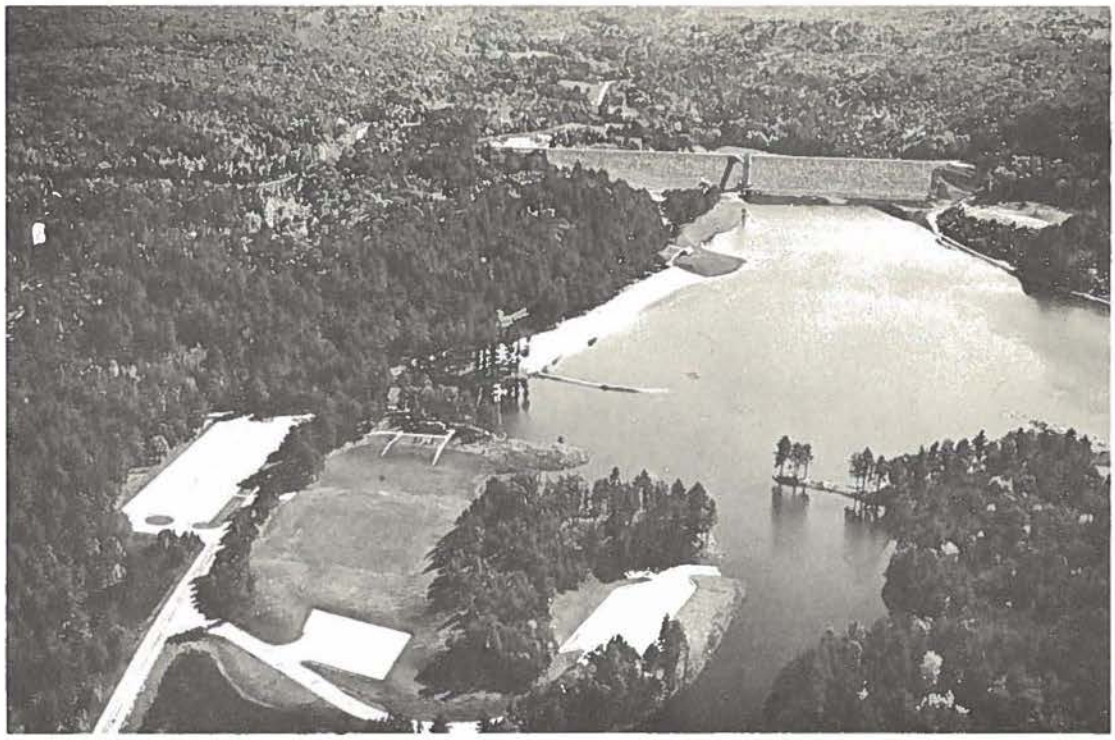


Figure 4 Clough State Park, on the east side of Everett Lake, provides public facilities for swimming, boating, and picnicking.

Figure 5 Canal Number 2 connects the reservoirs of Hopkinton and Everett Dams. View is north from Route 77 towards Canal No. 2, Drew Lake and Hopkinton Lake.

c. Private Investment

There is presently no private investment at Hopkinton-Everett Lakes and none is contemplated for the future.

## IV. RECREATIONAL AND ENVIRONMENTAL RESOURCES OF THE PROJECT AREA

### 1. Geology

The Hopkinton-Everett Lakes area is located within the low, flat, relatively wide areas of the glaciated Contoocook and Piscataquog River valleys. In general, outwash deposits and glacial till have filled the valleys to considerable depths. The entire reservoir area was occupied during the recessional phase of the last glaciation by connected pools or sluggish current lakes impounded behind ice and debris barriers which caused temporary damming and diversion of the natural drainage. In the areas occupied by the transient pools, deposits of sand, silt, and gravel occur. Till and till-covered bedrock hills which rise above the lowlands form the perimeter of the reservoir.

### 2. Archeological and Historical Resources

A cultural resource management program is currently being developed to evaluate the 31 Corps operated and maintained dams and lakes within the jurisdiction of the New England Division. This program will be conducted in compliance with the National Environmental Policy Act, the National Historic Preservation Act, Executive Order 11593: Protection and Enhancement of the Cultural Environment, as well as other related Federal Regulations and Guidelines.

Each year, beginning in FY79 (October, 1978) the Corps will conduct a cultural resource reconnaissance of three or four facilities depending on the availability of funds. This will include an intensive literature search and field reconnaissance of all lands within their jurisdiction and control. Hopkinton-Everett Lakes has been scheduled to be reconnaissanced during FY80. Should development of recreation facilities take place during the interim, the areas of direct impact will be reconnaissanced and evaluated prior to development of the facility.

The historic homestead of General Stark of Revolutionary War fame is located above the Everett spillway elevation at the intersection of Stark Lane and Mansion Road in Dunbarton, not far from Stark Pond. The old Stark family cemetery has been relocated about a half mile south of Stark Mansion on Mansion Road.

The Dinner Pine, a 150 year old bull pine tree about 14 feet 9 inches in circumference and 4 feet 8 inches in diameter, located in Henniker's southeast valley about 1/2 mile from the Old Ireland Road will be preserved and protected as an historic landmark. In the 19th century this tree provided the only shade for men working in the surrounding fields. Farmers would leave their lunch pails under the Dinner Pine and return at noon to eat their lunches. The tree is represented in the Henniker town mural painted for the Bicentennial.

3. Environmental and Scenic Qualities

Some farms and many rural residences are scattered throughout the region. Vegetation is mixed hard and soft woods with the woodland cover ranging from dense brush to secondary growth of saplings and mature stands of trees. Some areas have also been logged over.

Land use is varied, but a large amount, about 60%, is forested. The main agricultural uses in the area are for pasture and hay. Poorly drained marshlands occupy the glaciated valleys. Vegetative cover has been classified under several broad catagories including agricultural land, woodland, marshland, bottomland, brushland and fallow land.

Hopkinton-Everett Lakes lies in a scenic area of New Hampshire. Mt. Kearsarge and Pat's Peak can both be seen from several points within the project and Interstate 89 offers an excellent view of much of the Contoocook River Valley in Hopkinton. Scenic overlook areas are also located at Hopkinton and Everett Dams.

Figure 6 Snowmobiling is a popular winter activity on area trails.

4. Recreation

Hopkinton-Everett Lakes provides a valuable resource for a variety of outdoor recreation activities. The 8,000 plus acres of Federally owned land within the reservoir area, including 650 acres of permanent water, are available for use by the general public except during the infrequent periods when floodwaters are impounded. The permanent water areas, streams and rivers within the project offer opportunities for fishing, boating and swimming in the summer, while snowmobiling and ice fishing on the frozen, snow covered lakes are very popular recreation activities in the winter. The land area is available for picnicking, hiking, hunting, ski touring, snowmobiling, nature study, horseback riding and other leisure time activities.

The recreation use plan for the project is a cooperative venture of the Corps of Engineers and the State of New Hampshire. Two major day use park developments are located on the shores of the 130 acre Everett Lake (Clough State Park) and the 240 acre Elm Brook Pool (Elm Brook Park). All water areas are provided with access, parking and boat launching facilities. The entire reservoir area, exclusive of the flood control structures and the Elm Brook Park recreation area, is leased to the State of New Hampshire for management of the recreation, forestry and fish and wildlife resources.

## V. FACTORS INFLUENCING AND CONSTRAINING RESOURCE DEVELOPMENT AND MANAGEMENT

1. General

Hopkinton-Everett Lakes has a promising outlook for development into an outstanding recreation area. It has excellent accessibility and natural beauty, and the demand by the public for such areas is increasing. The project is large enough to provide many varied types of recreation opportunities without conflicts of use.

2. Demographic

Many of the small communities in the vicinity of Hopkinton-Everett Lakes have an economy which is based on small manufacturing plants. Near the cities of Manchester and Concord, service industries and agriculture are also important. The industrial character of many cities and towns of southern New Hampshire has enabled these communities to retain a fairly stable economy. In addition, more leisure time for the enjoyment of recreational pursuits has become available to the working population.

The 1970 population of the towns in which the project is located, and the major cities within 30 miles of the project are:

| | | | |
|---|---|---|---|
| Hopkinton | 3007 | Manchester | 87,754 |
| Henniker | 2348 | Nashua | 55,820 |
| Weare | 1851 | Concord | 30,022 |
| Dunbarton | 825 | | |

3. Topography and Geology

The topography of the Hopkinton-Everett project area consists of steep sided wooded hills and broad open valleys. Elevations in the close vicinity of the project area vary only moderately, ranging from about 1400 feet to 340 feet m.s.l. In the entire Contoocook and Piscataquog River basins, an area trending northeast-southwest for about 40 miles, elevations are more diverse and range from a maximum of close to 2,200 feet m.s.l. near the western edge of the Merrimack River Basin to a minimum of less than 300 feet m.s.l. at the confluence of the two rivers with the Merrimack.

4. Accessibility

Hopkinton-Everett Lakes is served by an excellent highway system. The principal routes passing by or through the project are I-89, U.S.202, NH 9, NH 127, NH 114, NH 77 and NH 13. In addition, many town roads, mostly paved, connect to these highways and offer good access to all parts of the project.

5. Area of Influence

Hopkinton-Everett Lakes is located in south-central New Hampshire, one of the fastest growing areas in the country. Nearly 180,000 people live within a 30 minute drive of the project and over 550,000 reside within a one hour's drive. The upward population trend is expected to continue and will undoubtedly have a direct effect on visitation throughout the project area.

In recent years there has been an increasing desire among recreationists for more passive types of outdoor opportunities for which formal development of facilities is not required. Activities such as hiking, snowmobiling, horseback riding, hunting, fishing, and ski touring are rapidly increasing in popularity in many areas. Hopkinton-Everett Lakes has sufficient land area to accommodate many varied activities and will continue to be heavily utilized by residents of the nearby market area.

6. Related Recreational and Historical Areas

There are fourteen State Parks in addition to Clough State Park within an hour's drive of Hopkinton-Everett Lakes. These

include Pawtuckaway State Park, Bear Brook State Park, Mount Sunapee State Park, Greenfield State Park, Kingston State Park, Silver Lake State Park, Wadleigh State Park, Wellington State Park, Winslow State Park, Miller State Park, Monadnock State Park, Cardigan State Park, Rollins State Park and Pillsbury State Park.

Historical points of interest within an hour's drive of Hopkinton-Everett Lakes include Shaker Village, Daniel Webster Birthplace, Franklin Pierce Homestead, Robert Frost Homestead, Ballard Mill, Mary Baker Eddy Birthplace, Hannah Dustin Monument and the State House. The historic homestead of General Stark of Revolutionary War fame is located near Everett Lake at the intersection of Stark Lane and Mansion Road in Dunbarton. The old family cemetery was situated within the reservoir near the south side of Stark Pond on land owned by the New Hampshire Historical Society, but has since been moved to a new location about a half mile south of Stark Mansion on Mansion Road. Every effort was made to reconstruct and restore the cemetery at the new site exactly as it was before being relocated. The site of an old saw mill below Stark Pond also has been marked with an appropriate monument.

7. Reservoir Plan of Operation

The water level at Everett Dam is controlled by a weir, while Elm Brook Pool at Hopkinton Dam is controlled by the invert of Canal No. 1. The Contoocook River water level is controlled by a downstream paper mill dam. During flooding periods the Project Manager at each dam is in contact with the Reservoir Control Center in Waltham, Massachusetts which advises him on flood control procedures. When flooding occurs, roads leading into the reservoir area are closed and all access roads are checked to assure that no one is in the area.

8. Relocations

a. Roads

Several roads in the reservoir area were relocated as depicted on the Master Plan Plates following Exhibit B.

b. Cemeteries

The Stark, Johnson, Stumpfield and East Weare Cemeteries were all relocated prior to project construction.

9. Borrow Areas

Several borrow areas are located within the project area. Some have been regraded and native vegetation now covers these areas.

Others have not been improved and are still used by the Corps and local communities for road sand and maintenance. The N.H. State Police have a permit to use one of the more isolated abandoned pits for firearms training.

10. Water Quality

During normal non-flood periods both Hopkinton and Everett Dams impound conservation pools. The Hopkinton pool has a surface area of 120 acres at an elevation of 380 feet msl, a shoreline length of 55,500 feet and a maximum depth of 15 feet. The Everett pool has a surface area of 130 acres at an elevation of 340 feet msl, a shoreline length of 29,800 feet and a maximum depth of 15 feet.

Both the Contoocook River upstream of Hopkinton Dam and the Piscataquog River upstream of Everett Dam are presently Class C waters. Class C waters are acceptable for recreational boating, fishing or for industrial water supply use. The water must contain not less than 5 mg/l of dissolved oxygen. Coliform bacteria levels are not specified but must be present in counts in excess of the 240/100 ml Class B maximum.

The primary pollution problem at Hopkinton Dam is high bacteria counts, not low dissolved oxygen values. There are also several paper industries which discharge into the Contoocook River above the dam, however, new sewage treatment facilities are presently being constructed. There are no major sources of domestic or industrial discharges into the Piscataquog River, which is classified as Class B water even though its present condition is Class C because of the high background total coliform bacterial counts. According to the New Hampshire Water Supply and Pollution Control Commission, these high counts, above 240/100 ml, are believed to be of wildlife and vegetative origin.

Periodic water quality monitoring at these two dams has indicated that degradation of their respective streams is not due to sources within the project areas.

Water quality data from the Contoocook River indicate that inflow waters are capable of ranging from the high 70's (°F) to the low 80's during the summer. The mean saturation value for dissolved oxygen from 1971 through 1974 is 89 percent. The minimum dissolved oxygen value measured during the 4-year period was 4.2 mg/l. Only one total coliform bacteria measurement has been collected; that 1973 value was 3,700 colonies per 100 ml.

The recreational pool at Elm Brook, a Class B tributary to the Contoocook River, also has a potential for summer water temperatures ranging from the high 70's to the low 80's. The mean saturation value

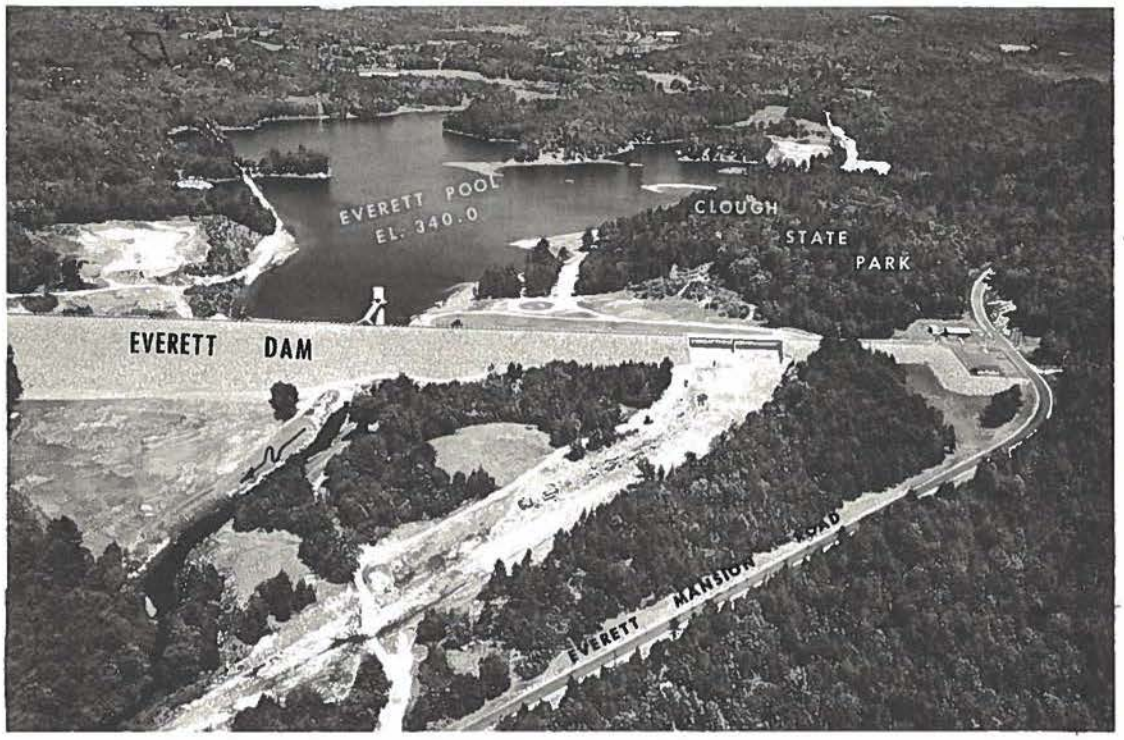



Figure 7 Everett Dam and Clough State Park, looking north.

Figure 8 Public swimming area at Clough State Park on Everett Lake.

for dissolved oxygen has been 90 percent for a 4-year period. Dissolved oxygen values never have been measured below 5 mg/l. However, approximately 70 percent of all total coliform bacteria measurements from 1971 through 1974 have exceeded Class B standards for water contact recreation. On two occasions in 1974 fecal coliform bacteria values have been between 100 and 200 colonies per 100 ml.

Waters discharged from Hopkinton Dam also approach the upper 70's and low 80's during the summer period. Although the mean saturation value for dissolved oxygen is 102 percent over a 4-year period, the mean total coliform bacteria value is 680/100 ml. The maximum recorded count was 1,500/100 ml in February of 1974.

Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD) measurements indicate that there is a significant non-biodegradable organic load. Furthermore, cyanide, mercury, chromium, colbalt, silver and vanadium have been measured in low but detectable amounts. The State of New Hampshire has determined that the Contoocook River is unsuitable for public swimming. After the June-July flood of 1973 the Elm Brook Pool was closed to swimming because it was inundated by stored water from the Contoocook River.

Water quality data from the Everett project area also indicate that inflow waters have the potential of reaching summer temperatures in the high 70's and low 80's. The Corps does not sample the waters at Clough State Park beach, a state-operated recreation area immediately upstream of the Everett Dam. Such sampling is periodically performed by the State of New Hampshire. During a 4-year period, discharge waters had a mean saturation value of 92 percent for dissolved oxygen. However, approximately 30 percent of the total coliform bacteria values are in excess of the 240/100 ml maximum for Class B water. A maximum of 400 bacteria/100 ml was reported in August 1974. Although the Piscataquog River, in the project area, does not meet bacterial standards for water contact recreation, swimming is allowed at the State-operated beach because the high background bacterial counts are from vegetative origins, not domestic origins.

The mean pH value in the discharge waters over a 4-year period is 6.5. COD and BOD measurements indicate that a significant non-biodegradable organic load exists in the Piscataquog River.

11. Anticipated Attendance

Based on previous attendance records, visitation to Hopkinton-Everett Lakes is projected to reach about 450,000 by 1990.

Public demand for swimming, picnicking, boating and snowmobiling has been increasing in recent years, while the interest in fishing and hunting has recently been fairly stable and is expected to increase in the future. With an increase in public interest for many of the activities provided at Hopkinton-Everett Lakes, a continued increase in attendance is expected.

12. Application of Public Law 89-72

The Corps of Engineers originally leased all land in the Hopkinton-Everett Reservoir, excluding project structures, to the State of New Hampshire. Recently, the State returned management of Elm Brook Park to the Corps of Engineers. All future recreational development on land leased to the State will be cost shared with the State of New Hampshire.

## VI. COORDINATION WITH OTHER AGENCIES

### 1. Federal

The U.S. Fish and Wildlife Service has been primarily responsible for determining the locations of wetlands recommended for waterfowl impoundment areas as part of the comprehensive plan for resource utilization at Hopkinton-Everett Lakes. This Master Plan has also been coordinated with the Bureau of Outdoor Recreation.

### 2. State

Extensive coordination regarding resource development and management with the New Hampshire Department of Resources and Economic Development and the New Hampshire Fish and Game Department has taken place on a continual basis since project construction. A 25 year lease was issued in July 1964 to the New Hampshire Department of Resources and Economic Development for public park and recreational, fish and wildlife, and forest management purposes in the reservoir. The New Hampshire Fish and Game Department is responsible for stocking the reservoir area with trout and pheasants, and conducting other wildlife habitat improvements. The N.H. Bureau of Off-Highway Vehicles has played an active role in developing and maintaining snowmobile trails throughout the project.

### 3. Local

Local and private interests who have been contacted regarding land use and management in relation to the recreational development of the Hopkinton-Everett Lakes project area include the towns of Hopkinton, Henniker, Weare and Dunbarton, as well as the Sierra Club, N.H. Audubon Society, and the Society for the Protection of N.H. Forests.

Several government owned gravel pits within the project are used by the respective towns for road construction and maintenance. In addition the towns have concerns for the forests and wetlands located within their boundaries.

## VII. PHYSICAL PLAN OF DEVELOPMENT

### 1. Zoning

#### a. Recreation Areas

All project lands at the reservoir are available for public recreational use. However, certain areas are classified for specific uses. The selection of areas for public use development was determined by field reconnaissance considering terrain accessibility, existing and proposed roads, proximity to water areas, and past use areas. Existing recreational activities include supervised group camping, hiking, hunting, fishing, picnicking, trailbike riding, ski touring, nature study, snowmobiling, sightseeing, boating and swimming. Of the 10,045 acres in the project, 8,019 are owned in fee and 2,026 are in flowage easement. The fee owned acreage is zoned for the following land uses:

Project Operations. The 685 acres zoned for project operations surrounds dams, dikes and other related structures utilized for operation and maintenance.

Recreation-Intensive Use. Three sections of the project lands have been zoned for intensive use. A total of 175 acres has been designated for this purpose at Clough State Park, Elm Brook Park and the proposed group camping area near Clough State Park.

Recreation-Low Density Use. The Stark Pond picnic area and several areas near Everett Dam and Elm Brook Pool comprising a total of 765 acres are available for fishing, hunting, boating and hiking.

Wildlife Management. East Weare, Stark Pond and Stark Brook Waterfowl Refuge Areas and River Road, Stumpfield-Mudgett Road and Elm Brook Waterfowl Management Areas comprise 795 acres which are zoned for wildlife management.

Natural Area. The remaining 5,600 acres has been left in its natural state and is used for fishing, hunting, snowmobiling and hiking.

#### b. Fish and Wildlife Conservation and Management

The principal game and pan fish found in Elm Brook Pool include large mouth bass, bullheads, white and yellow perch and pickerel. Drew Lake contains bullheads, yellow perch and pickerel. Everett Lake has both small and large mouth bass, bullheads, yellow perch, pickerel and brown trout. The Piscataquog River and several small tributary brooks are stocked annually with approximately 5,000 trout by the N.H. Fish and Game Department. Brook, brown and rainbow trout are the principal species stocked. Large and small mouth bass, bullheads, pickerel, white and yellow perch are the most important species found in the Contoocook River.

Whitetail deer are the only big game animals found in the reservoir area. Grouse, snowshoe hare, woodcock, cottontail rabbits, gray squirrels and pheasants are the primary upland game species sought at the project. Selected sites in the project area are stocked with pheasant by the New Hampshire Fish and Game Department every fall. Several species of ducks are also common in the wetland areas within the reservoir.

Fur bearing animals found throughout the project area include beaver, racoon, muskrat, fisher, mink, otter, fox, skunk and weasel.

c. Historical Sites

A commemorative plaque has been placed at the former site of the family cemetery of General John Stark of Revolutionary War fame. It is located on a grindstone at the site of the original grist mill. The cemetery has been relocated near the Stark Mansion to prevent inundation during flood control operations. The Dunbarton Historical Society has responsibility for the Old Stark burial site now known as Stark Memorial Park.

d. Interim Use

The Corps of Engineers has leased 822.4 acres of land to local farmers for agricultural purposes, primarily for grazing and corn and hay production. In most cases, the land is leased to the previous owners.

e. Additional Land Requirements

The present access road into Elm Brook Park has a poor intersection with Route 127, passes four houses and has a 65 degree hairpin curve at the top of Emerson Hill where it intersects Stumpfield Road. For safety and convenience, this access road should be relocated directly from Route 127. The proposed access road would be approximately 1,150 feet long, 550 feet shorter than the present road, and will not pass any homes. In order to relocate the existing road, it will be necessary to acquire a small piece of privately owned land consisting of about one acre in size.

2. Project Structures

An overlook area is located at the west end of Hopkinton Dam and provides visitors with a good view of the Contoocook River, the downstream Hoague-Sprague paper mill dam and Hopkinton Dam, including the gate tower and the outlet works. Parking is available for about ten cars.

An overlook area is also provided at the west end of Everett Dam where visitors have a good view of Clough State Park, Mount Kearsarge, and the dam itself.

The project administration areas and Project Manager's residences are located at the east end of each dam. There is public access to all of the four project dikes and the south weir of Canal No. 2, but no public use facilities are located at any of these sites.

3. Recreation Site and Area Plans

a. Areas of Initial Development

(1) Vicinity of Hopkinton Dam

The engineering and scenic features of the Hopkinton Dam are a definite attraction for visitors. The project is easily accessible via U.S. Route 202 and N.H. Route 9, which pass through the project and N.H. Route 127 which crosses over the top of the dam. An overlook area and parking for about ten cars is located at the dam along with the Project Manager's office where visitor information is available.

Figure 9 Project lands and waters provide extensive public use for hunting and fishing.

(2) Vicinity of Everett Dam

Located near Clough State Park, Everett Dam also exerts a strong attraction for visitors. An access road across the top of the dam leads to a turn-around and scenic overlook which provides a good view of the lake. Visitor information is available at the Project Manager's office.

(3) Clough State Park

Clough State Park, which is just upstream from Everett Dam, provides an area for general outdoor recreation. Initial development was completed in July 1964. Existing facilities in the park consist of a 1100 foot-long beach, restrooms, a dual lane concrete plank boat ramp with parking for 40 cars and trailers, water supply system, 130 picnic sites, 2 picnic shelters and parking for a total of 270 cars.

(4) Elm Brook Park

A beach 300 feet in length with parking for 32 cars is located at Elm Brook Park. A picnic shelter, play field, 80 picnic sites, a dual lane concrete plank boat ramp with parking for 10 cars and trailers, a water supply system, and restrooms are also provided.

(5) Drew Lake and Canal No. 2

Public access and limited use is accommodated at this area. Fishing is popular but there is no formal development of any recreation facilities.

(6) Stark Pond

At the southwest end of Stark Pond, a scenic waterfowl management area, 4 picnic sites and parking has been provided.

(7) River Road Boat Launching Area

This site is designated for boat launching and provides public access to the Contoocook River Pool. A 2-lane concrete plank boat ramp and parking for about 10 cars and trailers are located here.

(8) General Reservoir Area

Public access is available throughout the reservoir area although no formal recreation facility development is provided except at the above designated recreation areas. The principle use of the undeveloped portions of the project is by hunters, fishermen and snowmobilers. An

excellent snowmobile trail system with over 20 miles of designated trails centering around Elm Brook Pool and Marsh, Drew Lane and Canal No. 2, and Everett Lake, is now recognized as one of the New Hampshire's premier snowmobiling areas. Nearly 1,000 acres of open fields and frozen lakes and ponds complement the excellent trail system.

(9) Control of Access Roads

Barriers are installed and signs posted on all roads leading into the reservoir area so that they may be closed as a safety precaution prior to any impoundment of floodwaters. All access roads are open to the public, however, when there is no danger of flooding.

(10) Waterfowl Impoundment Areas

Two waterfowl impoundment areas were created by the Corps of Engineers by construction of project structures. The 160-acre Elm Brook Marsh is part of the 240-acre Elm Brook Pool which is maintained by Dike H-2 and Canal No. 1. The 95-acre Stumpfield Marsh was created by raising the invert of a culvert during relocation of Stumpfield Road. The 19-acre Stark Pond Waterfowl Management Area existed before construction of the project is also managed by the New Hampshire Fish and Game Department.

b. Areas of Future Development

The extent of future recreational development is based on the provision of adequate facilities for the projected annual attendance of 450,000 visitors. Recorded use of the recreational facilities provided in the initial construction will determine the schedule of future development.

Existing plans for future development include improvements to Elm Brook Park and Clough State Park. Since Clough State Park is leased to the State of New Hampshire, any improvements made there must be cost-shared between the State and the Corps of Engineers. Because Elm Brook Park is managed by the Corps, recent improvements have been limited to the provision of new sanitary facilities. Future plans call for the relocation of the present access road provided the necessary land can be acquired. The beach should be improved along with the parking area to better serve the visiting public.

A two lane gravel boat ramp and parking for six cars and trailers are needed at the upstream end of Everett Lake. An informal State operated group camping area is also planned near Clough State Park along with improvement of the old State Route 77 as a scenic recreation road with overlooks provided at significant vista points.

Development of future impoundment areas for waterfowl management is desired by the U.S. Fish and Wildlife Service and the New Hampshire Fish and Game Department at such time that funds become available.

4. Schedule of Development

The development of facilities by the Corps of Engineers is confined to improvements described in this Design Memorandum for Reservoir Development. Immediate plans for development near Clough State Park include installation of the two lane boat ramp and development of the group camping area. Immediate improvements needed at Elm Brook Park consist of construction of a new access road.

5. Cost Estimates

The estimated costs of land and facilities needed to complete the planned development for Hopkinton-Everett Lakes as previously described includes: $60,000 for access road construction and land acquisition and $60,000 for beach and parking area improvements at Hopkinton Lake, and $430,000 for additional road improvement and recreation development at Everett Lake. Section XV includes a detailed breakdown of all costs for both existing and planned facilities including contingencies, engineering, design, supervision and administration.

## VIII. FACILITY LOAD AND DESIGN CRITERIA

1. Siting

All recreation developments have been planned, designed and located with consideration given to environmental and aesthetic qualities, type of use, amount of visitation and the ability of the area to assimilate activities and to avoid overuse, incompatability and congestion. All structures harmonize with typical local architecture.

2. Water System

All sources of potable water supply for both Elm Brook Park at Hopkinton Lake and Clough State Park at Everettt Lake are individual wells. These wells supply water for the restrooms and drinking fountains. The project administration areas are served by separate wells.

3. Waste Collection and Treatment Systems

Adequate waste collection and treatment systems are provided at each recreation area and consist of septic tanks and leaching fields.

The waste collection and treatment systems are designed and constructed with strict adherence to State and Federal standards and have been coordinated with the Environmental Protection Agency and the State of New Hampshire Water Supply and Pollution Control Commission.

4. Roads

All access roads throughout the project area average between 20 and 24 feet wide and about half of the total mileage is paved. These roads were existing State and town roads prior to project construction. Maximum speeds are limited to about 30 miles per hour. All roads within State leased land are maintained by the State while the remaining roads are maintained by the Corps of Engineers.

5. Parking Areas

All parking areas have been designed to accommodate the maximum number of visitors expected at each recreation area at any one time. Most of the parking areas are bituminous surfaced with only a few small gravel surface parking areas.

6. Launching Ramps

There are four formal boat launching ramps with adequate parking for cars and trailers located within the project area. The launching areas at Clough State Park, Elm Brook Pool and the Contoocook River Pool have concrete plank boat ramps at about a 12% grade, while at Stumpfield Marsh there is a single lane gravel ramp. Fishermen also use the many access roads leading to the water to launch boats. A new boat ramp is planned for the upper end of Everett Lake where access will not be restricted by opening and closing times at Clough State Park.

7. Picnic Units

Picnic facilities have been provided to complement the other recreational facilities at Hopkinton-Everett Lakes. Picnic tables, fireplaces and trash receptacles are available at Clough State Park (190 sites), Elm Brook Park (38 sites) and at Stark Pond (3 sites).

8. Camping Units

A group camping area with sanitary facilities and drinking water is planned north of Clough State Park near Choate Brook. This area without any developed facilities is presently used on an informal basis by children associated with the New Hampshire State Hospital.

The Choate Brook area is heavily stocked with pheasants in the fall, but no conflict with hunters is expected since camping would only take place in the summer.

9. Swimming Beach

There are two swimming beaches at Hopkinton-Everett Lakes. The beach located at Clough State Park is 1200 feet long and the other at Elm Brook Park is 300 feet in length. These beaches are man-made, about 50 to 100 feet wide and are surrounded by grassed areas. There is parking for 150 cars at Clough State Park and 80 cars at Elm Brook Park.

10. Restrooms

Waterborne restrooms of an A-frame design with exposed aggregate concrete are provided at Clough State Park and Elm Brook Park. Bath houses and picnic shelters are also located at these two day use areas.

11. Overlook Structures

One overlook area is located at the turn-around on top of Everett Dam while a second overlook area is provided at the west end of Hopkinton Dam. Both structures give visitors an excellent view of the surrounding area with parking available for about ten cars at each area.

12. Trails

Hopkinton-Everett Lakes has become one of the outstanding snowmobiling areas in New Hampshire over the past ten years. Elm Brook Pool and Marsh, Drew Lake and Canal No. 2, and Everett Lake have always been popular attractions to snowmobiliers, as well as ice fishermen, due to the many miles of smooth riding available. In addition to these frozen water bodies, there is also an excellent 25 mile long designated trail system connecting the various areas of the project. Most of the trails are unplowed reservoir roads which are groomed by the State of New Hampshire and complement the hundreds of acres of open fields and frozen lakes. Many of the designated snowmobile trails are also used by horseback riders, trail bikes and ski tourers at appropriate times of the year. A short nature or interpretive trail has been constructed at Elm Brook Park to complement the other day use facilities and is particularly popular with children's groups.

13. Site Improvement

In order to preserve the aesthetic beauty of the project area the natural cover is maintained as much as possible and thus a minimum degree of clearing and grading is done. During the construction of public use or other facilities care is taken to blend the improvements in with the surroundings to minimize the disruption to the existing environment.

14. Signs

The majority of the signs in the reservoir area are routed and stained wood with white lettering. The informational signs are rectangular, while the directional signs are arrow shaped. Those signs serving either a protective or safety purpose are made of metal.

15. Waste Disposal

Trash cans are provided throughout the public recreation areas and all sanitary facilities at Hopkinton-Everett Lakes have individual septic tank and leaching field wastewater treatment systems.

16. Visitor Convenience Features

Convenience and safety features utilized at both Hopkinton and Everett Dams include protective fencing around the intake and outlet structures and marker floats and ring buoys at the swimming areas at Clough State Park and Elm Brook Park. The restroom facilities at these two day-use areas include provisions for the handicapped. Potentially dangerous areas are barricaded and appropriate signs posted.

## IX. SPECIAL PROBLEMS

1. Natural Resource Preservation

Recreational development at Hopkinton-Everett Lakes has been planned to preserve the natural characteristics of the area as much as possible. Specific recreation areas have been designated for facility development while other areas have been set aside for fish and wildlife management.

A significant problem which has become worse in recent years is the encroachment of aquatic plants in Elm Brook Pool. All of the shallow water areas are now covered with pickerel weed and every year several more acres are overrun. Removal and control of these aquatic plants would greatly improve the appearance of the area. Swimming and boating in particular would benefit from an effective aquatic plant control program.

2. Fish and Wildlife Resources

Bag limits and seasons for the various species of fish and game found throughout the project area are set by the N.H. Fish and Game Department, except for migratory birds which are determined by the U.S. Fish and Wildlife service in cooperation with the Fish and Game Department.

The principal game birds sought at Hopkinton-Everett Lakes are pheasants (stocked by the State), ruffed grouse, woodcock and ducks. The most important game animals hunted in the reservoir area are whitetail deer, gray squirrels, raccoon, snowshoe hare and cottontail rabbits. Otter, mink, muskrat and beaver are also trapped. Varmints which are occasionally hunted include fox, crows, woodchucks and porcupines.

Varying seasons and limits for the several kinds of fish found in the lakes and streams in the project area are also revised occasionally. Brook and brown trout are stocked in several streams while good native populations of large and small mouth bass, pickerel, horned pout, yellow and white perch and sunfish are found in many areas along with several species of non-game fish.

Wildlife management programs at Hopkinton-Everett Lakes consist of mowing abandoned fields, cutting brush, and providing duck boxes in some of the marshes. The fish and wildlife resources at this project are considered by sportsmen as among the most significant in southern New Hampshire.

### 3. Historical Resources

The Stark Mansion and the site of the old Stark Mill and cemetery in Weare and the Dinner Pine in Henniker are the only historic sites on or near the Hopkinton-Everett Lakes project. A site marker and plaque at Stark Pond identifies the location of the original mill, and a site marker is planned to identify the Dinner Pine.

### 4. Fee Systems and Collection

The State of New Hampshire charges a fee of $0.75 per adult to use the beach, boat ramp and picnic facilities in Clough State Park. The fees are collected by the seasonal park staff at the entrance to the area. No other fees are charged for use of any of the recreational facilities at Hopkinton-Everett Lakes.

## X. PROJECT RESOURCE MANAGEMENT

Hopkinton-Everett Lakes is staffed by a Corps of Engineers' Project Manager and assistant at each dam, with the Project Manager residing on site. These permanent personnel perform all routine operation and maintenance activities. Seasonal help, including a park technician, is hired during the summer recreation season at Hopkinton Lake. At Everett Lake, the State's Division of Parks and Recreation operates Clough State Park during the summer season.

The reservoir area is periodically patrolled by local and State law enforcement agencies as well as a Corps of Engineers Ranger assigned to the Merrimack River Basin. A Project Resource Management Appendix to this Master Plan is scheduled to be prepared.

## XI. FOREST MANAGEMENT

The forestry resources at Hopkinton-Everett Lakes have been evaluated in cooperation with the U.S. Forest Service, Department of Agriculture and with the New Hampshire Department of Resources and Economic Development. These resources appear to be of major value as wildlife cover although a program of silvacultural management is warranted. Principal growth is of second generation mixed hard and soft woods. A Forest Management Appendix to this Master Plan is scheduled to be prepared.

## XII. FIRE PROTECTION

Over 60 percent of the project is in grassland and shrubs. Consequently there is a danger of forest fires during summer dry periods. Public use of the recreational resources tends to aggravate this hazard. Available for use on the lands of the reservoir is the fire protection and suppression services of the New Hampshire Division of Forests and Lands and the surrounding communities.

Sufficient equipment for the containment and suppression of a fire, including a portable fire pump and other equipment as outlined in the operation and maintenance manual for the Hopkinton-Everett projects, is maintained in a state of readiness. During times when there is a danger of forest fires, the Project Managers are on the alert for fires in the reservoir. They are familiar with all sources of water in the project area and during dry periods have up-to-date information as to the availability of water.

Public activities and use of forest lands conform to conditions as established by the New Hampshire Division of Forestry. No open fires are permitted except at fireplaces in the developed recreational areas. Roads throughout the reservoir are maintained in a manner adequate to permit the passage of fire fighting equipment. A Fire Protection Appendix to this Master Plan has been completed.

## XIII. FISH AND WILDLIFE MANAGEMENT

The New Hampshire Fish and Game Department manages the fish and wildlife resources of the project land and water areas. This

includes management of waterfowl impoundment areas, habitat improvement, protection of deer wintering areas, stocking of fish and pheasants and enforcement of all hunting and fishing laws.

The reservoir waters provide a good fishery resource. The Contoocook River, Elm Brook Pool and Marsh, Everett Lake, Drew Lake and Stumpfield Marsh all have good populations of several species of game fish. However, pan fish such as yellow perch in Drew Lake and white perch and sunfish in Elm Brook Pool have become a problem which may require consideration for partial reclaimation in the future. The demand for fishing on the Piscataquog River is very high and the New Hampshire Fish and Game Department stocks as many as 6,000 yearling trout annually. Stocked and native trout are also present in many of the smaller brooks and in Everett Lake.

The project lands provide good habitat for a variety of wildlife. The interspersion of vegetative cover reflects both the topography and land use changes during the last century. The area supports a high white tail deer population. Grouse, snowshoe hare, woodcock, cotton tail rabbits and gray squirrels are the principal upland game species found in the reservoir area. Fur bearing species such as beaver, racoon, muskrat, mink, otter, fox, skunk and weasel are also common in the area. The entire project is open to public hunting, subject to the laws and regulations of the State of New Hampshire. A Fish and Wildlife Management Appendix to this Master Plan is scheduled to be prepared.

## XIV. PROJECT SAFETY

The safety of the general public is considered a permanent responsibility of personnel engaged in reservoir management. Rules and regulations relating to safety have been established for both project personnel and the visiting public. All employees of the Corps in a reservoir management capacity are trained in the principles of first aid, especially resusctiation, and fire fighting. A Project Safety Appendix to this Master Plan is scheduled to be prepared.

## XV. COST ESTIMATES

The following tables list the total expenditures to date for recreation development at Hopkinton-Everett Lakes, as well as estimated future costs for development as outlined in this Master Plan.

## XVI. CONCLUSIONS

Hopkinton-Everett Lakes, in addition to its primary function of flood control, provides a significant part of the recreational needs within the area of influence. The natural resources of over

Figure 10 The project area provides valuable public open space for hunting.

Figure 11 Trout fishing on the Piscataguag River, upstream of Everett Lake.

Figure 12 Ice fishing on Elm Brook Pool near Hopkinton Dam.

HOPKINTON LAKE - ELM BROOK PARK

| Item | Unit | Unit Cost | Existing Qty. | Existing Cost | Future Qty. | Future Cost | Total Qty. | Total Cost |
|---|---|---|---|---|---|---|---|---|
| Site Preparation | L.S. | $13,665 | 1 | $ 13,665 | | | 1 | $ 13,665 |
| Parking Area Improvements | L.S. | 11,550 | 1 | 11,550 | 1 | $20,000 | 2 | 31,550 |
| Access Road | L.S. | 4,800 | 1 | 4,800 | 1 | 40,000 | 1 | 44,800 |
| Beach Improvements | L.S. | 11,900 | 1 | 11,900 | 1 | 20,000 | 2 | 31,900 |
| Water Supply System | L.S. | 27,754 | 1 | 27,754 | | | 1 | 27,754 |
| Boat Launching Ramp | Each | 1,450 | 2 | 2,900 | | | 2 | 2,900 |
| Fencing | L.F. | 2.40 | 1960 | 4,707 | | | 1960 | 4,707 |
| Gates & Barricades | Each | 180 | 60 | 10,835 | | | 60 | 10,835 |
| Picnic Tables | Each | 236 | 38 | 8,960 | | | 38 | 8,960 |
| Fireplaces | Each | 113 | 19 | 2,145 | | | 19 | 2,145 |
| Trash Barrels | Each | 19 | 39 | 741 | | | 39 | 741 |
| Rest Rooms | Each | 47,988 | 1 | 47,988 | | | 1 | 47,988 |
| Picnic Shelters | Each | 2,925 | 2 | 5,850 | | | 2 | 5,850 |
| Landscaping | L.S. | 7,352 | 1 | 7,352 | | | 1 | 7,352 |
| Sewage Disposal System | L.S. | 6,911 | 1 | 6,911 | | | 1 | 6,911 |
| Visitor Center | L.S. | 9,960 | 1 | 9,960 | | | 1 | 9,960 |
| Miscellaneous | L.S. | 10,740 | 1 | 10,740 | | | 1 | 10,740 |
| SUB-TOTAL | | | | $188,758 | | $80,000 | | $268,758 |
| Contingencies | | | | - | | 16,000 | | 16,000 |
| E. & D and S. & A. | | | | 56,242 | | 24,000 | | 80,242 |
| TOTAL COST | | | | $245,000 | | $120,000 | | $365,000 |
| Federal Cost | | | | $245,000 | | $120,000 | | $365,000 |
| Non-Federal Cost | | | | 0 | | 0 | | 0 |

8,000 acres of land and water, together with developed initial and future facilities discussed in this Master Plan, will provide significant recreational opportunities throughout the life of the project. At ultimate development it is expected that this project will accommodate over 450,000 visitors annually.

With the continued growth of the already heavy population centers in southern New Hampshire and eastern Massachusetts, it can be assumed that there will be an increasing demand on all available publicly owned recreational facilities. All factors of growing population, increased mobility and income point to this increasing demand and the need for additional facilities as recommended.

## XVII. RECOMMENDATIONS

The following improvements are recommended by this Master Plan to enhance the recreation resources at Hopkinton-Everett Lakes.

### Clough State Park - Everett Lake

Immediate Plans:

1. Construct two-lane gravel boat ramp.
2. Provide parking for six cars with trailers.

Future Needs:

1. Develop group camping area, including the construction of sanitary facilities.
2. Improve old State Route 77 as scenic recreation road with overlook areas.

### Elm Brook Park - Hopkinton Lake

Future Needs:

1. Improve bathing beach and bring aquatic plants under control.
2. Expand and improve the present parking area at the beach and picnic area.
3. Relocate access road directly from Route 127.

EXHIBIT A

## VISITATION BY AREA

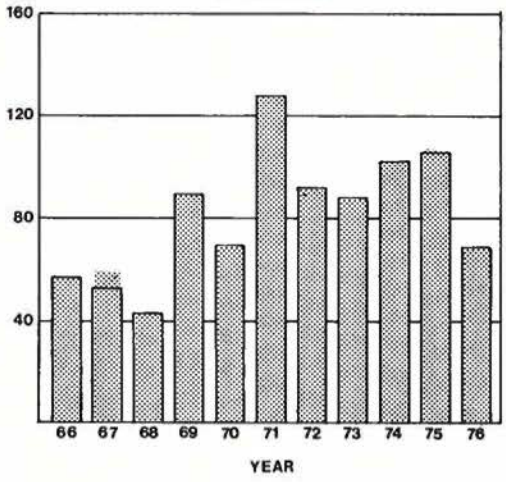
| | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 |
|---|---|---|---|---|---|---|---|
| Hopkinton Dam | 39,558 | 33,395 | 39,646 | 64,233 | 45,939 | 51,512 | 69,939 |
| Everett Dam | 34,622 | 156,728 | 86,509 | 104,720 | 115,537 | 126,878 | 174,289 |
| TOTAL | 74,180 | 190,123 | 126,155 | 168,953 | 161,476 | 178,390 | 244,228 |

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 |
|---|---|---|---|---|---|---|---|
| Hopkinton Dam | 63,856 | 123,133 | 100,241 | 74,355 | 85,930 | 109,300 | 80,442 |
| Everett Dam | 154,442 | 205,132 | 211,204 | 199,132 | 203,114 | 267,412 | 143,802 |
| TOTAL | 218,298 | 328,265 | 311,445 | 273,487 | 289,044 | 376,712 | 224,244 |

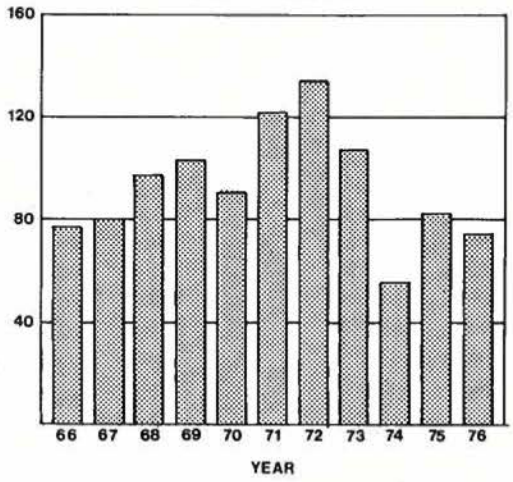
# VISITATION DATA

ANNUAL ATTENDANCE IN THOUSANDS

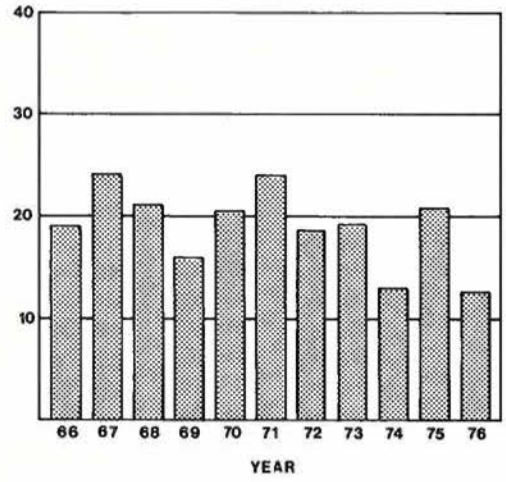
## PICNICKING



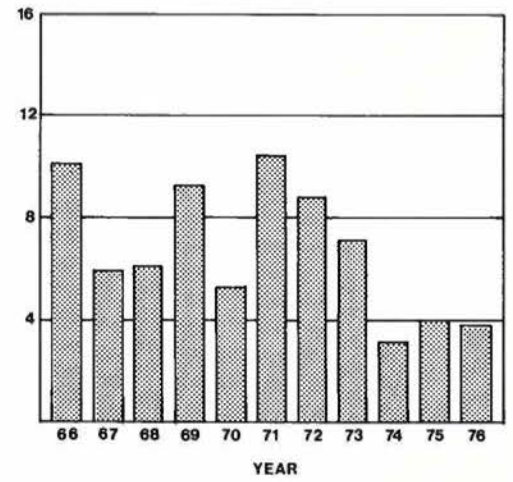

## SIGHTSEEING



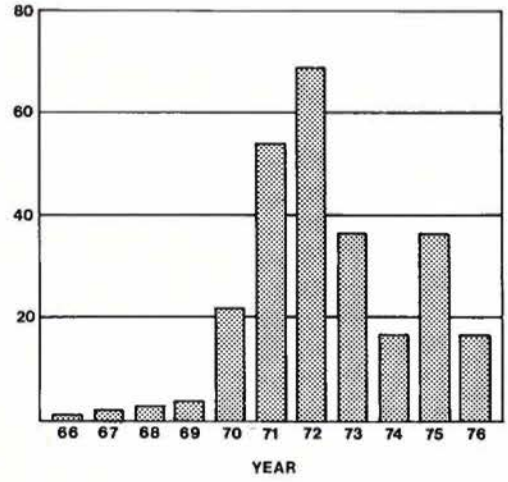

## FISHING



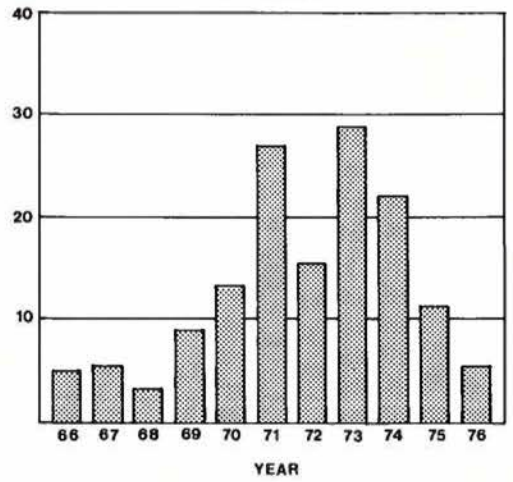

## HUNTING




## SNOWMOBILING



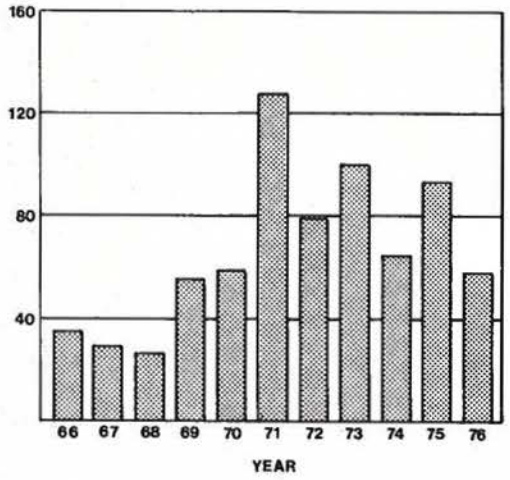

## CAMPING



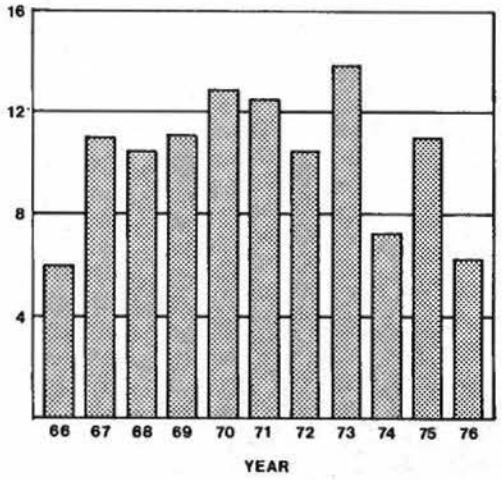
# VISITATION DATA

ANNUAL ATTENDANCE IN THOUSANDS

## SWIMMING




## BOATING




## TOTAL VISITATION

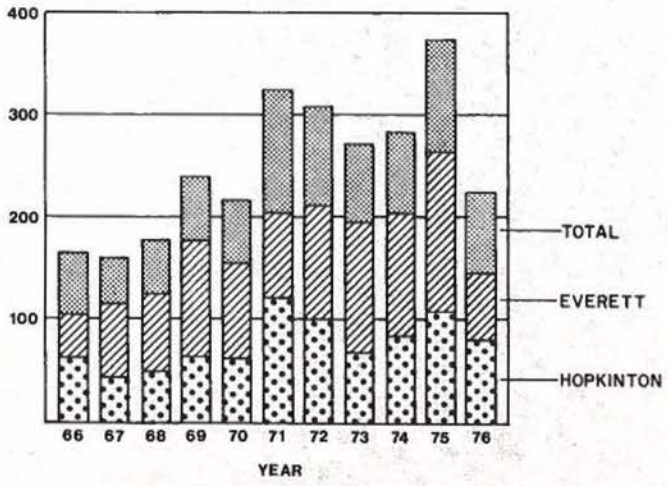


EXHIBIT B

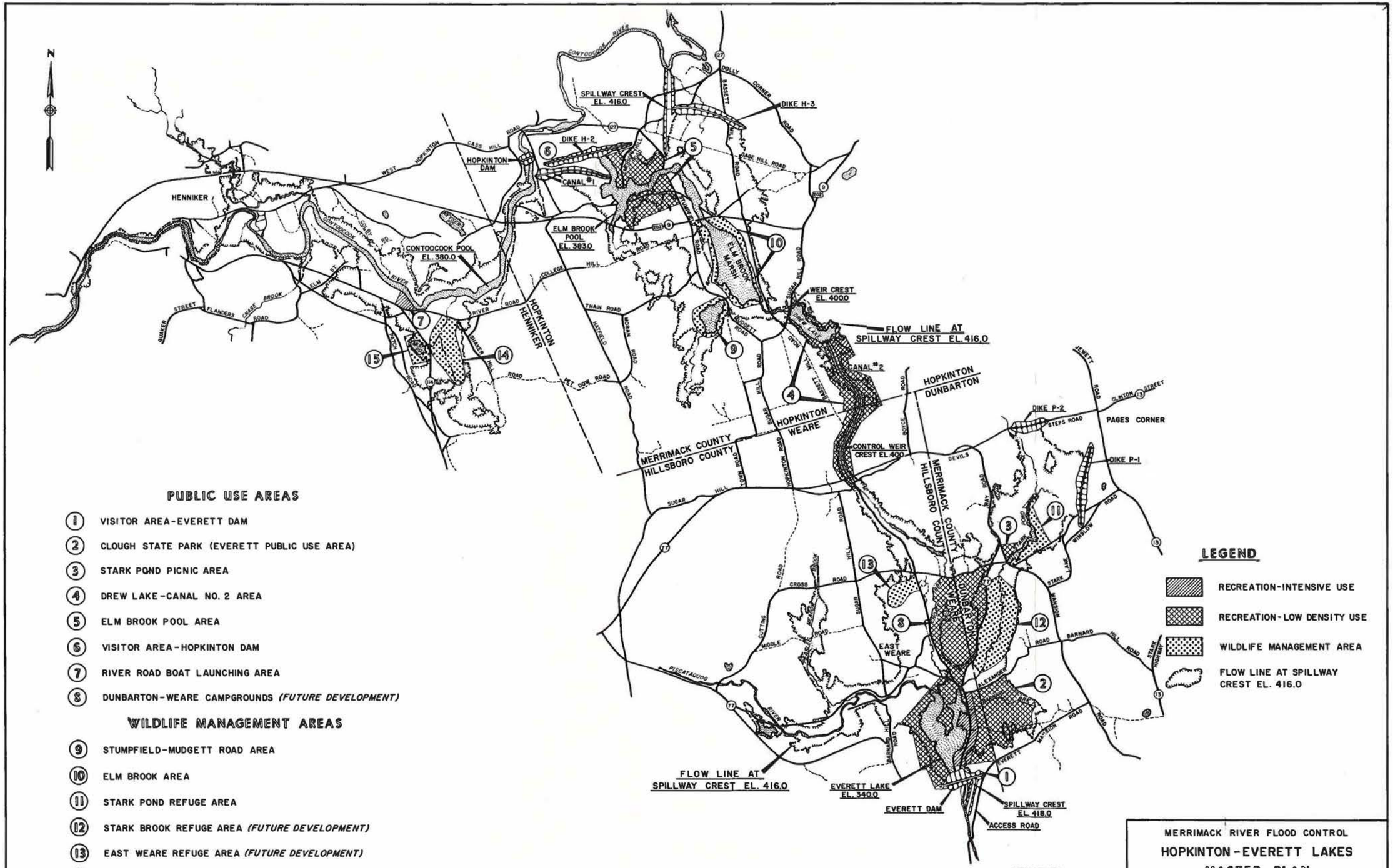
# PERTINENT DATA - HOPKINTON LAKE

| | |
|---|---|
| RIVER BASIN: | Merrimack |
| RIVER: | Contoocook |
| LOCATION: | Henniker & Hopkinton, New Hampshire |
| DRAINAGE AREA - Square Miles | 426 |
| **PERMANENT POOL** | |
| Elevation - Feet msl | 380 |
| Capacity - Acre Feet | 700 |
| - Inches of Runoff | 0.03 |
| Area - Acres | 220 |
| **FLOOD CONTROL STORAGE** | |
| Capacity - Acre Feet | 70,100 |
| - Inches of Runoff | Combined Total for Hop-Ev 6.6 |
| Area at Crest - Acres | 3,700 |
| **DAM** | |
| Type | Rolled Earth and Rock |
| Length - Feet | 790 |
| Top Elevation - Feet msl | 437 |
| Height Above River Bed - Feet | 76 |
| **DIKES** - (H-2 and H-3 Combined) | |
| Length - Feet | 9,620 |
| **SPILLWAY** | |
| Type | Concrete Ogee Weir |
| Length - Feet | 300 |
| Elevation - Feet msl | 416 |
| **CONTROL WORKS** | |
| Type | 3 Square Conduits |
| Size - Feet (Conduit) | 11 ft. x 11 ft. |
| Length - Feet | 124 |
| Elevation - Feet msl | 366 |
| Capacity - Full Pool - cfs | 4,840 (per conduit) |
| Gates - Type | Vertical Lift |
| - Number | 6 |
| - Size | 6 ft. x 12 ft. |
| OPERATIONAL DATE | January 1963 |
| **PROJECT AREA** (Combined Total for Hop-Ev) | |
| - Fee - Acres | 7,915 |
| - Easement - Acres | 2,024 |

## TABULATION OF SIGNIFICANT FLOOD STORAGES AT HOPKINTON - EVERETT RESERVOIR

| Date | Maximum Impoundments | | | | Flood Storage Utilized | | |
|---|---|---|---|---|---|---|---|
| | Hopkinton | | Everett | | | | |
| | Elevation (ft, msl) | Storage (ac/ft) | Elevation (ft, msl) | Storage (ac/ft) | Acre-Feet | Inches | Percent |
| 1962 Oct | 391.3 | 8,900 | 348.7 | 1,400 | 10,300 | .43 | 7 |
| 1964 Apr | 395.8 | 15,400 | 348.2 | 1,300 | 16,700 | .70 | 11 |
| 1967 Apr | 394.2 | 12,800 | 346 | 900 | 13,700 | .58 | 9 |
| 1968 Mar | 402.0 | 26,200 | 366.4 | 7,400 | 33,500 | 1.40 | 22 |
| Dec | 390 | 7,200 | 355 | 3,000 | 10,200 | .43 | 7 |
| 1969 Apr | 405.0 | 33,800 | 397.1 | 41,500 | 70,000 | 2.94 | 44 |
| 1970 Feb | 391.0 | 8,500 | 360.3 | 4,800 | 13,300 | .56 | 9 |
| Apr | 391 | 8,500 | 358 | 4,000 | 12,500 | .52 | 8 |
| 1973 Mar | 391.2 | 8,700 | 359 | 4,400 | 13,100 | .55 | 8 |
| Apr | 396.4 | 16,500 | 358.4 | 4,200 | 20,700 | .87 | 13 |
| July | 392.0 | 9,700 | 354.3 | 2,800 | 12,500 | .52 | 7 |
| Dec | 393.9 | 11,600 | 351.0 | 1,950 | 13,550 | 0.57 | 8 |
| 1977 Mar | 402.2 | 28,100 | 365.4 | 8,200 | 36,300 | 1.53 | 22 |
| Apr | 390.4 | 7,500 | 355.9 | 4,700 | 12,200 | .51 | 8 |

Hopkinton net are = 382 square miles, flood storage = 70,100 acre-feet
Everett net area = 64 square miles, flood storage = 85,500 acre-feet
Total net area = 446 square miles, total flood storage = 155,600 ac. ft. = 6.6" R.O.




## PUBLIC USE AREAS

1. VISITOR AREA-EVERETT DAM
2. CLOUGH STATE PARK (EVERETT PUBLIC USE AREA)
3. STARK POND PICNIC AREA
4. DREW LAKE-CANAL NO. 2 AREA
5. ELM BROOK POOL AREA
6. VISITOR AREA-HOPKINTON DAM
7. RIVER ROAD BOAT LAUNCHING AREA
8. DUNBARTON-WEARE CAMPGROUNDS *(FUTURE DEVELOPMENT)*

## WILDLIFE MANAGEMENT AREAS

9. STUMPFIELD-MUDGETT ROAD AREA
10. ELM BROOK AREA
11. STARK POND REFUGE AREA
12. STARK BROOK REFUGE AREA *(FUTURE DEVELOPMENT)*
13. EAST WEARE REFUGE AREA *(FUTURE DEVELOPMENT)*
14. RIVER ROAD AREA *(FUTURE DEVELOPMENT)*
15. MUD POND REFUGE AREA *(FUTURE DEVELOPMENT)*

## LEGEND

- RECREATION-INTENSIVE USE
- RECREATION-LOW DENSITY USE
- WILDLIFE MANAGEMENT AREA
- FLOW LINE AT SPILLWAY CREST EL. 416.0

MERRIMACK RIVER FLOOD CONTROL

# HOPKINTON-EVERETT LAKES

## MASTER PLAN

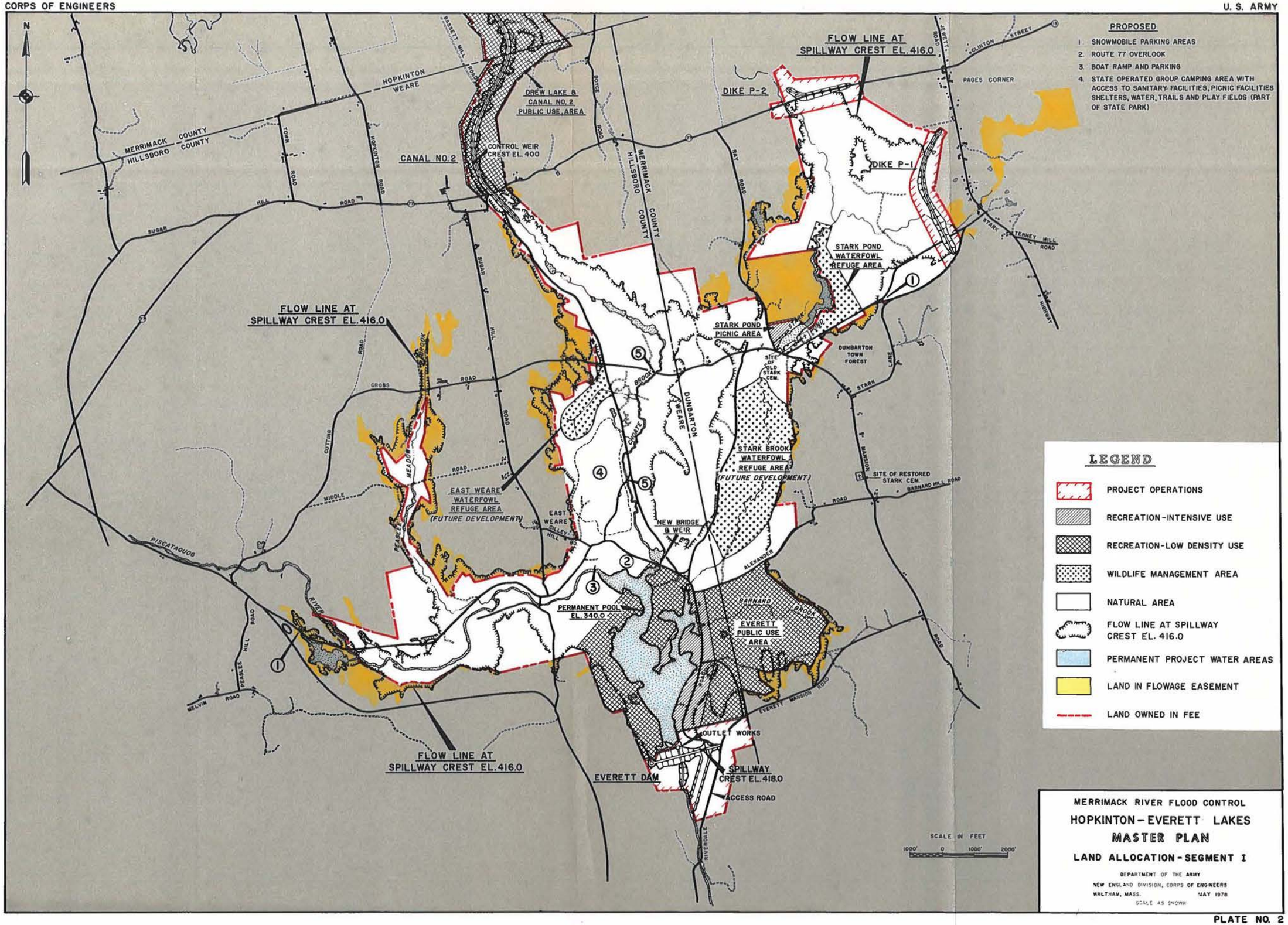
### GENERAL DEVELOPMENT PLAN

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. MAY 1978
SCALE AS SHOWN

PLATE NO. 1

CORPS OF ENGINEERS

U. S. ARMY




**PROPOSED**

1. SNOWMOBILE PARKING AREAS
2. ROUTE 77 OVERLOOK
3. BOAT RAMP AND PARKING
4. STATE OPERATED GROUP CAMPING AREA WITH ACCESS TO SANITARY FACILITIES, PICNIC FACILITIES SHELTERS, WATER, TRAILS AND PLAY FIELDS (PART OF STATE PARK)

**LEGEND**

- PROJECT OPERATIONS
- RECREATION-INTENSIVE USE
- RECREATION-LOW DENSITY USE
- WILDLIFE MANAGEMENT AREA
- NATURAL AREA
- FLOW LINE AT SPILLWAY CREST EL. 416.0
- PERMANENT PROJECT WATER AREAS
- LAND IN FLOWAGE EASEMENT
- LAND OWNED IN FEE

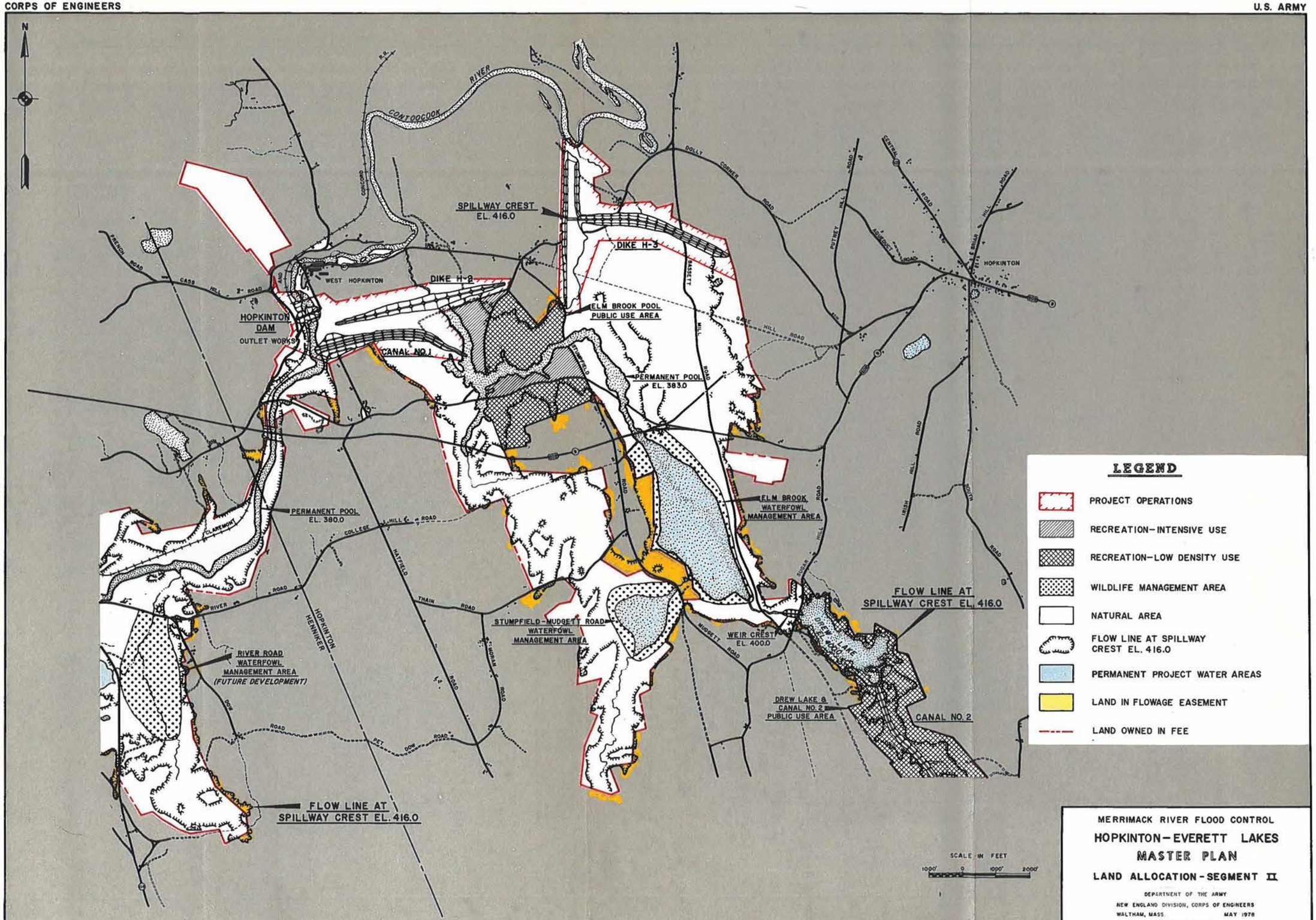
# MERRIMACK RIVER FLOOD CONTROL
# HOPKINTON – EVERETT LAKES
# MASTER PLAN
## LAND ALLOCATION - SEGMENT I

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. MAY 1978
SCALE AS SHOWN

PLATE NO. 2

CORPS OF ENGINEERS

U.S. ARMY




## LEGEND

- PROJECT OPERATIONS
- RECREATION–INTENSIVE USE
- RECREATION–LOW DENSITY USE
- WILDLIFE MANAGEMENT AREA
- NATURAL AREA
- FLOW LINE AT SPILLWAY CREST EL. 416.0
- PERMANENT PROJECT WATER AREAS
- LAND IN FLOWAGE EASEMENT
- LAND OWNED IN FEE

MERRIMACK RIVER FLOOD CONTROL

# HOPKINTON–EVERETT LAKES MASTER PLAN

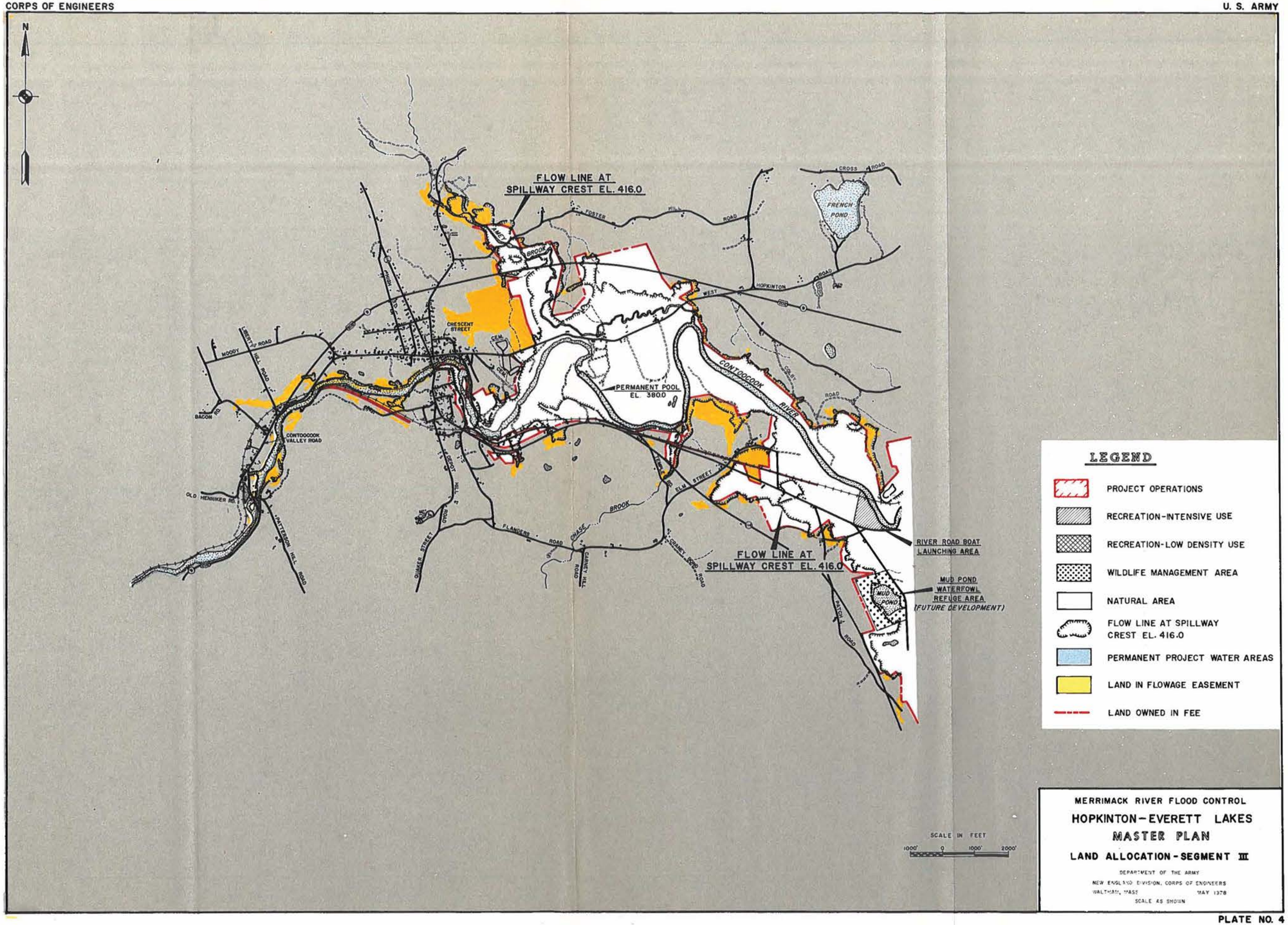
## LAND ALLOCATION - SEGMENT II

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. MAY 1978
SCALE AS SHOWN

PLATE NO. 3

CORPS OF ENGINEERS

U. S. ARMY




## LEGEND

- PROJECT OPERATIONS
- RECREATION-INTENSIVE USE
- RECREATION-LOW DENSITY USE
- WILDLIFE MANAGEMENT AREA
- NATURAL AREA
- FLOW LINE AT SPILLWAY CREST EL. 416.0
- PERMANENT PROJECT WATER AREAS
- LAND IN FLOWAGE EASEMENT
- LAND OWNED IN FEE

MERRIMACK RIVER FLOOD CONTROL

# HOPKINTON – EVERETT LAKES

## MASTER PLAN

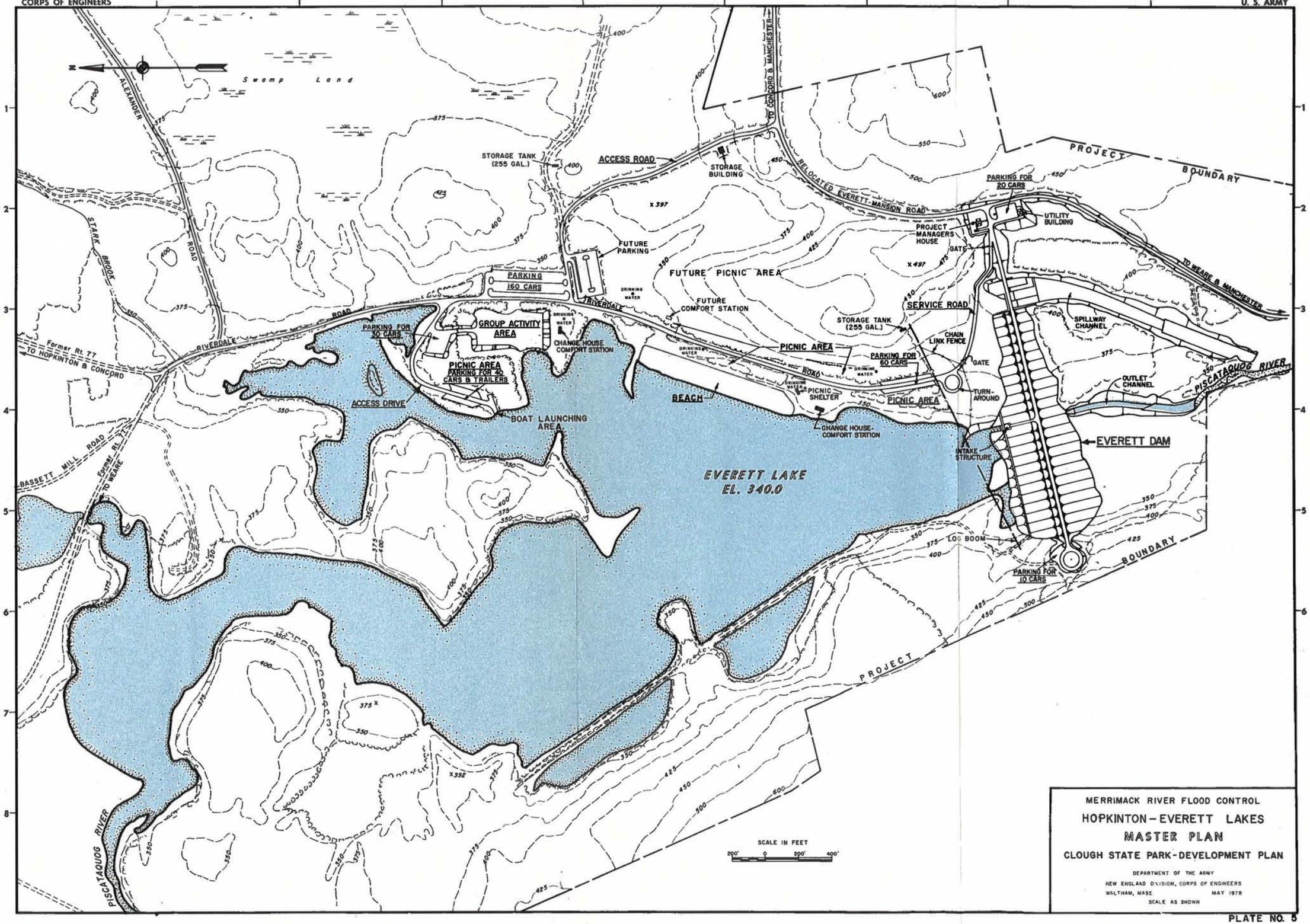
## LAND ALLOCATION - SEGMENT III

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. MAY 1978
SCALE AS SHOWN

PLATE NO. 4

CORPS OF ENGINEERS

U. S. ARMY




MERRIMACK RIVER FLOOD CONTROL

# HOPKINTON – EVERETT LAKES MASTER PLAN

## CLOUGH STATE PARK - DEVELOPMENT PLAN

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. MAY 1978
SCALE AS SHOWN

PLATE NO. 5

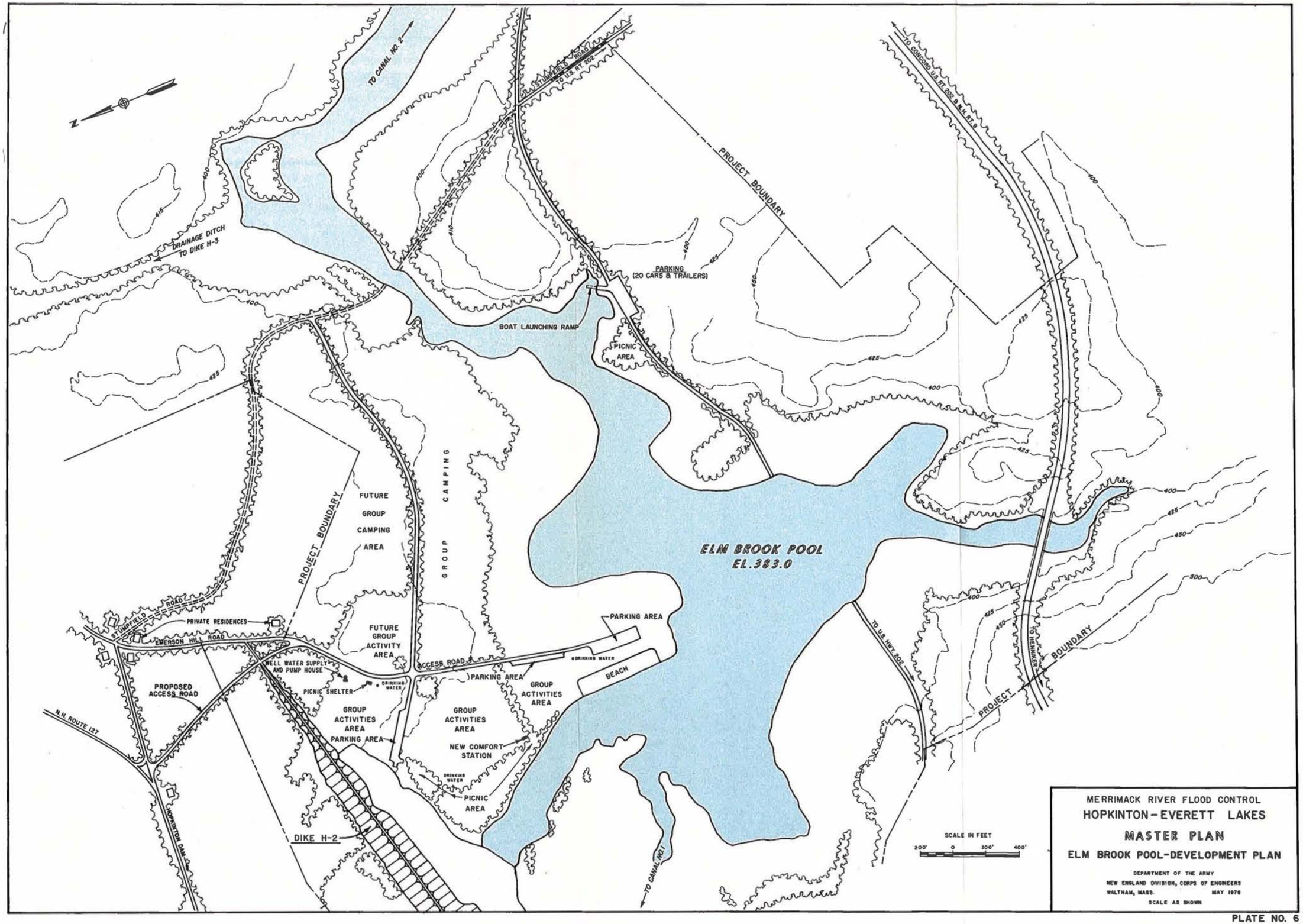

N
TO CANAL NO. 2
DRAINAGE DITCH TO DIKE H-3
STUMPFIELD ROAD TO U.S. RT. 202
TO CONCORD U.S. RT. 202 & N.H. RT. 9
PROJECT BOUNDARY
PARKING (20 CARS & TRAILERS)
BOAT LAUNCHING RAMP
PICNIC AREA
FUTURE GROUP CAMPING AREA
GROUP CAMPING AREA
PROJECT BOUNDARY
ELM BROOK POOL EL. 383.0
PRIVATE RESIDENCES
STUMPFIELD ROAD
EMERSON HILL ROAD
FUTURE GROUP ACTIVITY AREA
WELL WATER SUPPLY AND PUMP HOUSE
PICNIC SHELTER
DRINKING WATER
ACCESS ROAD
PARKING AREA
PARKING AREA
BEACH
GROUP ACTIVITIES AREA
PROPOSED ACCESS ROAD
N.H. ROUTE 127
GROUP ACTIVITIES AREA
GROUP ACTIVITIES AREA
PARKING AREA
NEW COMFORT STATION
DRINKING WATER
PICNIC AREA
HOPKINTON DAM
DIKE H-2
TO CANAL NO. 1
TO U.S. HWY. 202
TO HENNIKER
PROJECT BOUNDARY
SCALE IN FEET
200' 0 200' 400'
MERRIMACK RIVER FLOOD CONTROL
HOPKINTON - EVERETT LAKES
MASTER PLAN
ELM BROOK POOL-DEVELOPMENT PLAN
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. MAY 1978
SCALE AS SHOWN

PLATE NO. 6