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

IN REPLY REFER TO:
NEDED-R

10 February 1967

SUBJECT: Blackwater Reservoir, Merrimack River Basin, New Hampshire
Master Plan for Reservoir Development

TO: Chief of Engineers
ATTN: ENGCW-O

1. Submitted for review and approval is Design Memorandum, Master Plan for Reservoir Development, in accordance with ER 1110-2-1150. The previous Master Plan for Reservoir Management, Blackwater Reservoir, New Hampshire, dated February 1954, is rescinded.

2. The plan has been developed to provide for maximum use of the reservoir by the public consistent with the resources of the area and the authorized flood control functions of the project.

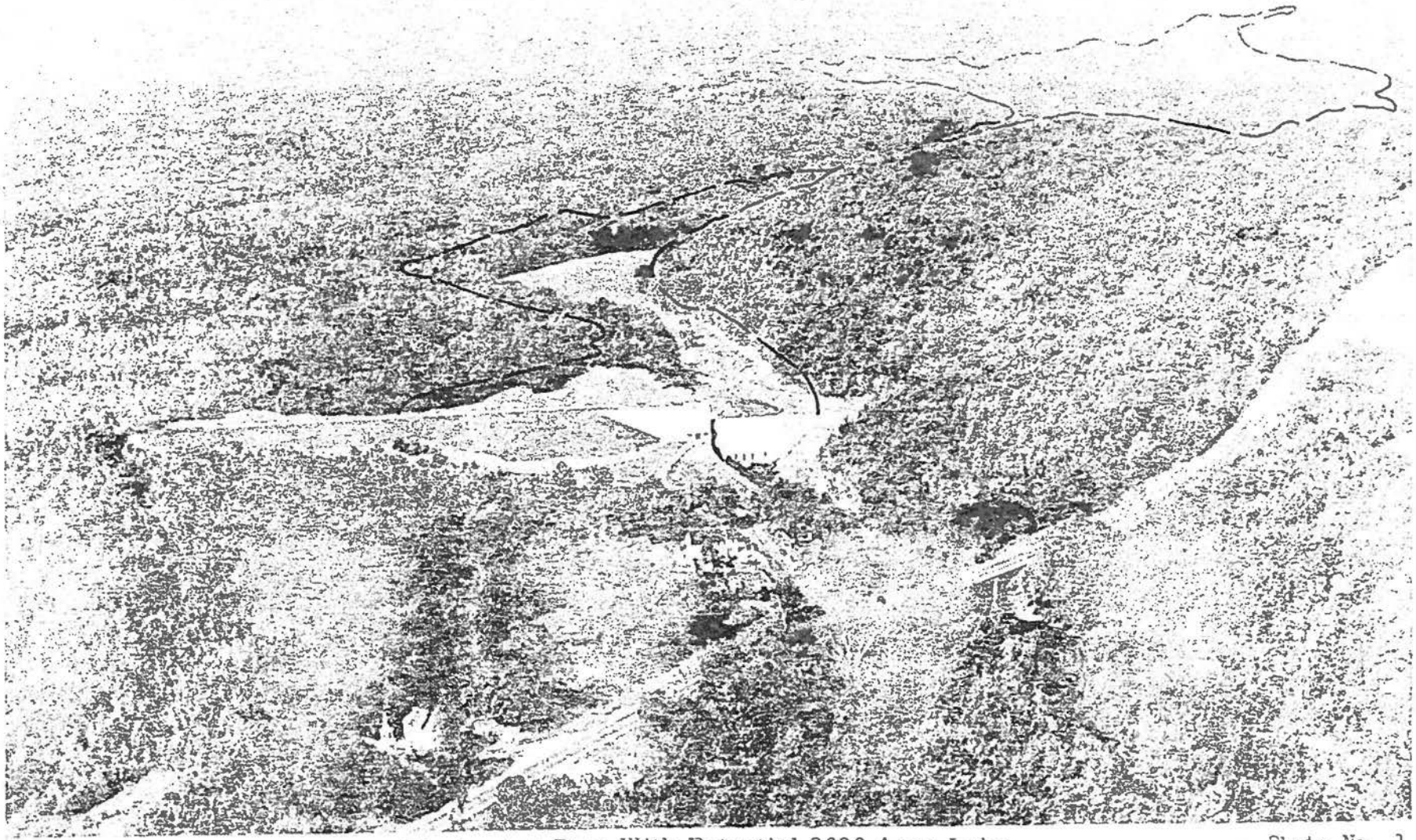
3. The plan has been coordinated with and concurred in by the Operations Division and Real Estate Division.

FOR THE DIVISION ENGINEER:

John Wm Leslie

JOHN Wm. LESLIE
Chief, Engineering Division

Incl (trip)
as



Blackwater Dam With Potential 2020 Acre Lake
Mount Kearsarge in Background

Photo No. 1

FOREWORD

This "Master Plan" is presented in two parts. The basic report presents the resource potential of the existing "dry-bed" flood control reservoir. Appendix A of the Master Plan presents the potential of the project to support a major recreational water resource by means of modifying the existing flood control structures to create a 2020 acre lake.

The reservoir area, in its present state, is a natural environment area and the basic report presents a plan of development of minor facilities consistent with this classification. As a natural environment area, the project has limited potential due to its small size. It is foreseeable that potential encroachment by private development along the fringe of Federal lands and overuse of the limited resource will eventually result in its despoilment as a natural environment area.

The Blackwater Reservoir, developed as a natural environment area, can meet the needs of a very small segment of outdoor recreation users. Development of the project as presented in Appendix A is considered to be the most valuable use of the project to help meet the overall future recreation needs of the New England area. It is not considered that modification of the project to create a 2020 acre lake will be necessary until sometime in the period 1975 to 1980. Development of the reservoir as presented in the basic report is feasible for the interim period.

Recreation areas are in heavy demand in the New England area where existing areas having size and resources to be of regional significance are limited. New England has long relied on many scattered small scale State Park facilities and a small number of Federal recreation areas to cope with the Public outdoor recreation needs of a heavy population. The establishment of the Cape Cod National Seashore was a major step in providing an area for future New Englanders and visitors from other parts of the United States and Canada.

More areas of regional importance will be needed to meet projected future demands and the development of the Blackwater Reservoir, as presented in Appendix A, offers an excellent potential to meet part of the future outdoor recreation needs of New Hampshire. This proposal should be considered in the State's long-range outdoor recreation plan.

At present, the Blackwater Reservoir is a single purpose flood control reservoir. However, with minor modification to project structures the reservoir could support a water body of substantial significance and still maintain the necessary flood control storage. Master

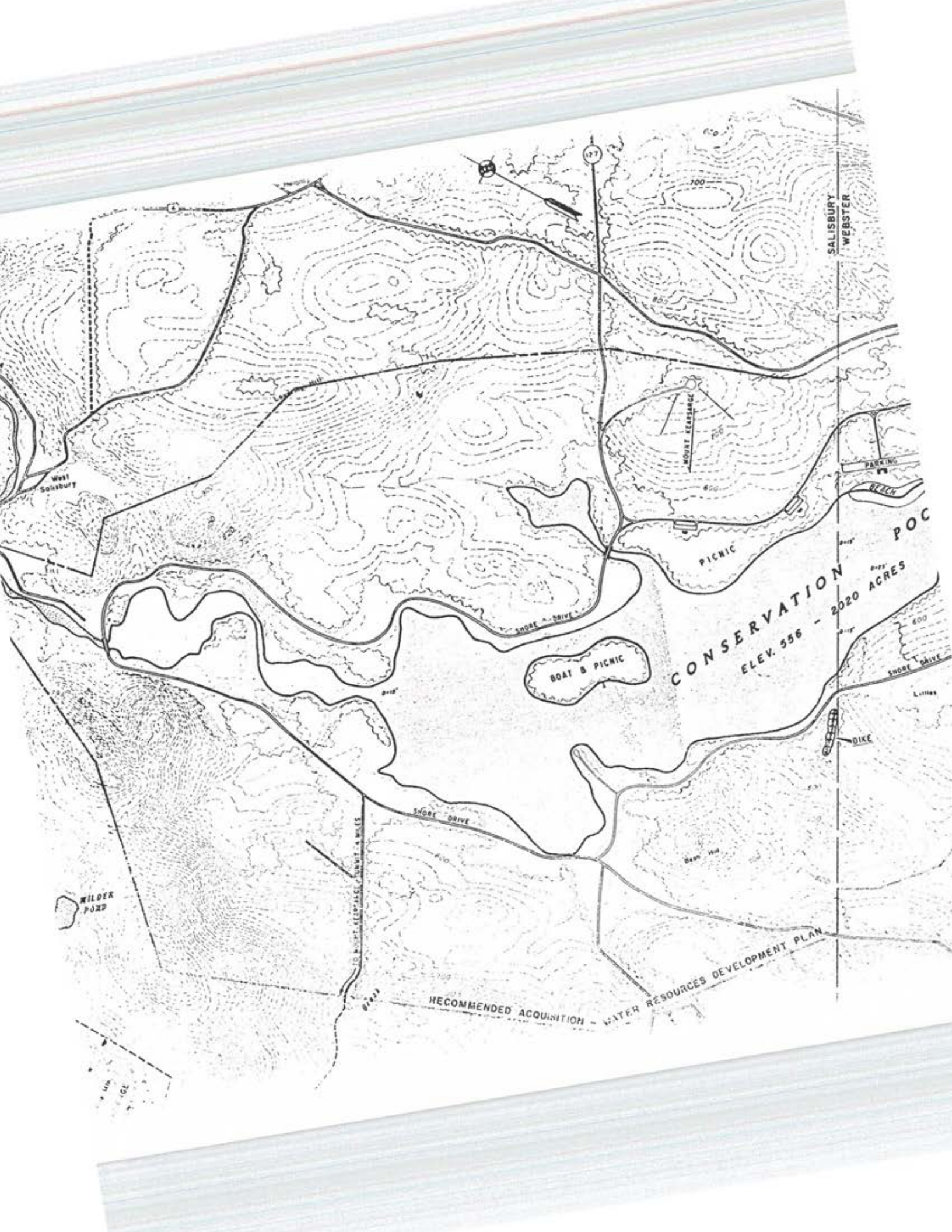
Plan studies have revealed that the most desirable permanent water surface would be at elevation 556 and have an area of approximately 2,000 acres. This could be accomplished by adding 6 feet to the height of the flood control dam and the two dikes. This would be a relatively simple modification as the project was originally constructed to permit future raising to a maximum of 16 feet to accommodate Conservation Storage. Details of the modification aspects of the project are contained further in Appendix A and in "Analysis of Design" - Blackwater Reservoir, dated 1940.

The 2020 acre lake, as shown in the tailored photograph in the front of this Master Plan, has a unique setting. The immediate shoreline is gently sloped and has excellent cover to support intensively developed day use and overnight camping areas and yet have ample natural areas devoted to preserving the scenic view of the shoreline. From the water, a boater would have a panoramic view of the Mount Kearsarge Mountain Range and the adjacent foothills unblemished by man-made structures.

Combined with the State-owned land holdings at Mount Kearsarge, the creation of the lake would provide a publicly-owned mountain-lake setting unparalled in New England. If properly developed and managed, the area could become one of New England's favorite outdoor recreation attractions with a potential of over one million users annually.

It is interesting to note that the project would meet criteria, set forth by the "Recreation Advisory Council", to be classified as a "National Recreation Area". The existing State holdings at Mount Kearsarge and Federal holdings at the reservoir along with additional acquisition to make the two areas contiguous would create a significant mountain-lake resource. Its location affords easy access to the heavily populated areas of southern New England and the project would have significant resources and development to attract visitors from a large area of influence.

The development of the Blackwater Reservoir as proposed in Appendix A is a potential that should be considered in the State of New Hampshire's long-range outdoor recreation plan as one with potential to help meet the future needs of the State's residents and out of State visitors.


SALISBURY
WEBSTER
West Salisbury
MOUNT KEARSARGE
PARKING
BEACH
PICNIC
SHORE DRIVE
BOAT & PICNIC
CONSERVATION
ELEV. 556 - 2020 ACRES
DIKE
WILDER POND
TO MOUNT KEARSARGE SUMMIT - 4 MILES
RECOMMENDED ACQUISITION - WATER RESOURCES DEVELOPMENT PLAN

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A	Modification of Blackwater Project to Create A 2020 Acre Lake
B	Management Report, Blackwater Reservoir

I. INTRODUCTION

1. Authorization. The Blackwater Dam and Reservoir project was authorized by the Flood Control Act approved 22 June 1936, (Public Law 738 - 74th Congress) as modified by the Flood Control Act approved 28 June 1938, (Public Law 761 - 75th Congress) as part of a system of flood control works in the Merrimack River Basin. Construction of the dam was started in May 1940 and completed in November 1941.

2. Purpose and Scope. The purpose of this Master Plan is to present a comprehensive and coordinated program for the development, management, and public use of the Blackwater Reservoir area for purposes 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 optimum public benefits from the resources of the project. It is intended that this plan will be flexible so that adjustments may be made as changing conditions may warrant. This report will rescind the "Master Plan for Reservoir Management", dated February 1954 and approved March 1954.

The scope of this plan includes an evaluation of the public recreational potential of the reservoir area in relation to other recreational opportunities available to the public within the area on which the project may be expected to exert influence. It contains an analysis of project resources, factors influencing their development and a plan for their development and management.

The plan is presented in two parts. The basic report presents a plan for reservoir development of the present flood control only project. Appendix A presents a plan for ultimate development which includes a proposal for modification of project structures to create a 2020 acre lake.

3. Local Cooperation. The New Hampshire Division of Resources Development holds a 25-year license for management of the recreation, fish and wildlife, and forestry resources of approximately 3510 acres of reservoir land and water areas. Since issuance of the license, on 4 November 1954, that agency has made surveys of the woodlands, mapped and typed the area, instituted improved silvicultural practices and carried on an experimental planting and selective harvesting program. Wood roads have been cleared and graded and new roads constructed.

The major activities by the licensee have been to improve the forestry resource. With the ever increasing use of New Hampshire outdoor recreation resources and the evolvement of policy relative to prudent recreational use of Federal reservoirs in the

past 10 years, it was deemed necessary to develop a plan for more comprehensive public use of the Blackwater Reservoir. To develop this plan, close coordination was made with resource agencies of the State working through the Chairman of the New Hampshire Council of Resources and Development.

II. DESCRIPTION OF AUTHORIZED PROJECT

4. General. The project consists of an earth dam 1150 feet long and 75 feet high. In addition to the main dam, two dikes, totalling 1375 feet long, close off low saddles on the west rim of the reservoir. At spillway crest elevation 566 feet m.s.l., the reservoir extends up the Blackwater River about seven miles and inundates 3140 acres. The dam controls a drainage area of 127.5 square miles and has a flood control storage capacity of 46,000 acre-feet equal to 6.8 inches of runoff. The dam was constructed with provision for future modification for power storage when and if needed. Specific data on the project is contained in "Blackwater Dam Analysis of Design" and related appendices dated 1940.

5. Location. The Blackwater dam is located on the Blackwater River about 8.6 miles above its confluence with the Contoocook River. It is just above the Village of Swetts Mills, in the Town of Webster, Merrimack County, New Hampshire, and about 12.5 miles northwest of the City of Concord, New Hampshire. Project location is shown on Plates 1 and 2.

6. Description of Reservoir Area. Reservoir lands are fee-owned and amount to 3582 acres, of which 67% are woodland, 29% are open land and the remaining 4% in water. For a distance of one mile above the dam, the reservoir is less than one-half mile wide, thence widens out to about two miles in the central portion and narrows again to a width of less than one-half mile in the upper two miles. The Blackwater River meanders through the reservoir with a uniform slope of about six feet per mile. The valley bottom and gentler slopes in the central portion are cleared and used for pasturage and crop under lease. The side hill slopes are gentle and mostly covered with stands of softwoods. Predominant species are white pine, hemlock, red pine and a few red spruce. Mixed hardwoods of maple, white birch, and oak are scattered throughout the area.

7. Climate. The climate for the area is variable with a mean annual temperature of 45°F. The average monthly temperature varies from 70°F in July to about 20°F in January. The mean annual precipitation is about 37 inches and is uniformly distributed throughout the year. The average annual snowfall is about 68 inches between

the months of November to April. The growing season averages about 160 days. A summer climate of warm days and cool evenings is suitable for many outdoor recreational pursuits.

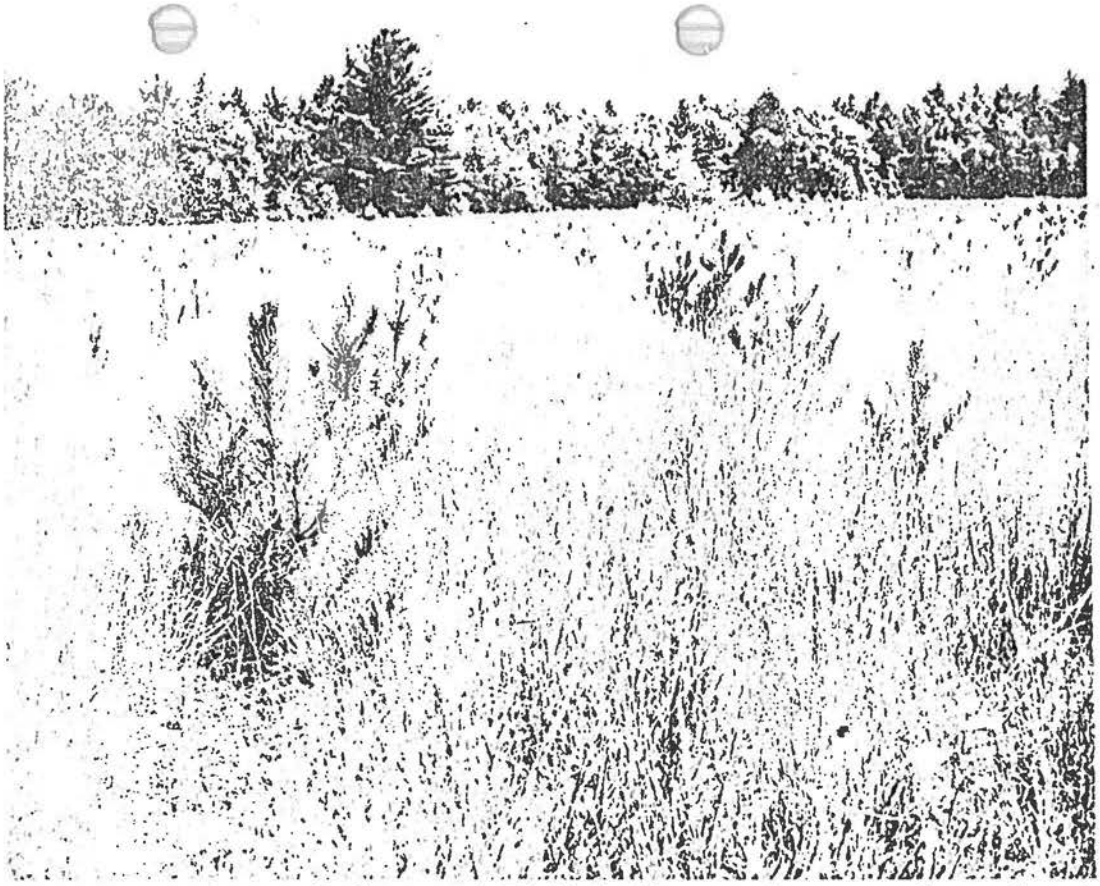
III. PROJECT RESOURCES

8. Suitability of Reservoir for Recreational Use. Experience in the operation of the Blackwater Reservoir indicates that the natural resources of the reservoir are generally available for uninterrupted use during most of the summer, fall and winter seasons. Reservoir regulation for flood control purposes generally has not been detrimental to the important benefits accruing from recreational, fish and game, agricultural and forestry resources of the reservoir.

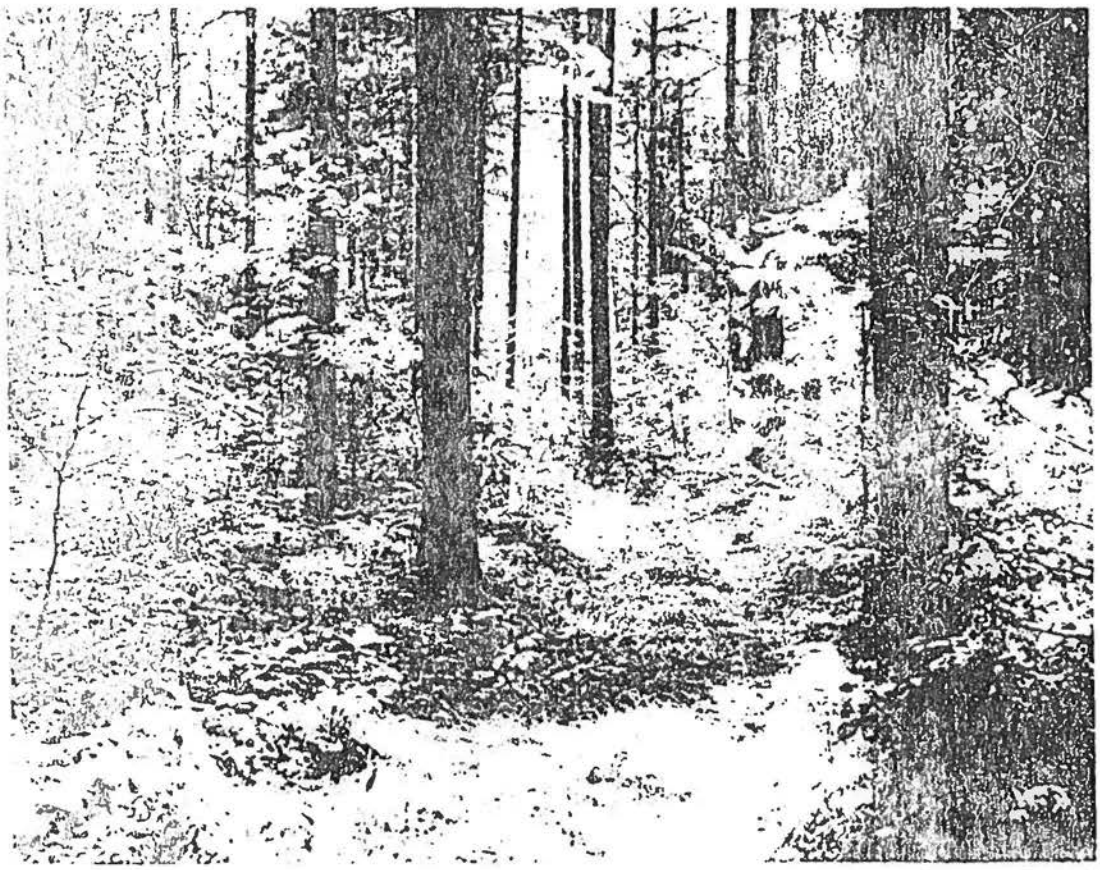
Under the classification system recommended by the Outdoor Recreation Resources Review Commission and adopted by the Bureau of Outdoor Recreation, the Blackwater Reservoir area is classified as Class III - "Natural Environment Area". In general, the terrain and cover of the reservoir area, lend themselves to development of roads, trails and simple campsite and picnic facilities without detracting from the natural environment of the area. The forestry management program by the State has retained the area in a relatively natural setting. The existing gravel road network within the reservoir limit is adequate to provide access to all reaches of project land and water areas. Access to the project is provided by Route 127 which connects with the principal east-west roads (Routes 9 & 202) and north-south roads (Routes 3 & 4).

9. Fish and Wildlife Resources. Fish and game activities have been extensive throughout the project lands and surrounding areas. The Blackwater River is stocked annually by the New Hampshire Fish and Game Department with brook, brown and rainbow trout and is classified as the best trout stream in southern New Hampshire. The reservoir area is considered very good game habitat for such species as whitetailed deer, ruffed grouse, snowshoe hare, woodcock, waterfowl, grey squirrel and pheasant. Hunting pressure on the area is moderate to heavy.

10. Forestry Resources. Forestry management has been quite extensive at the reservoir and has been the major activity of the licensee. The forestry resources are of major importance for both the local economic values that they induce, and the high aesthetic and recreational qualities that they provide. Appendix B contains a summary of the forestry program by the licensee and their management program. Photographs 2 and 3 are typical views of the work in progress.

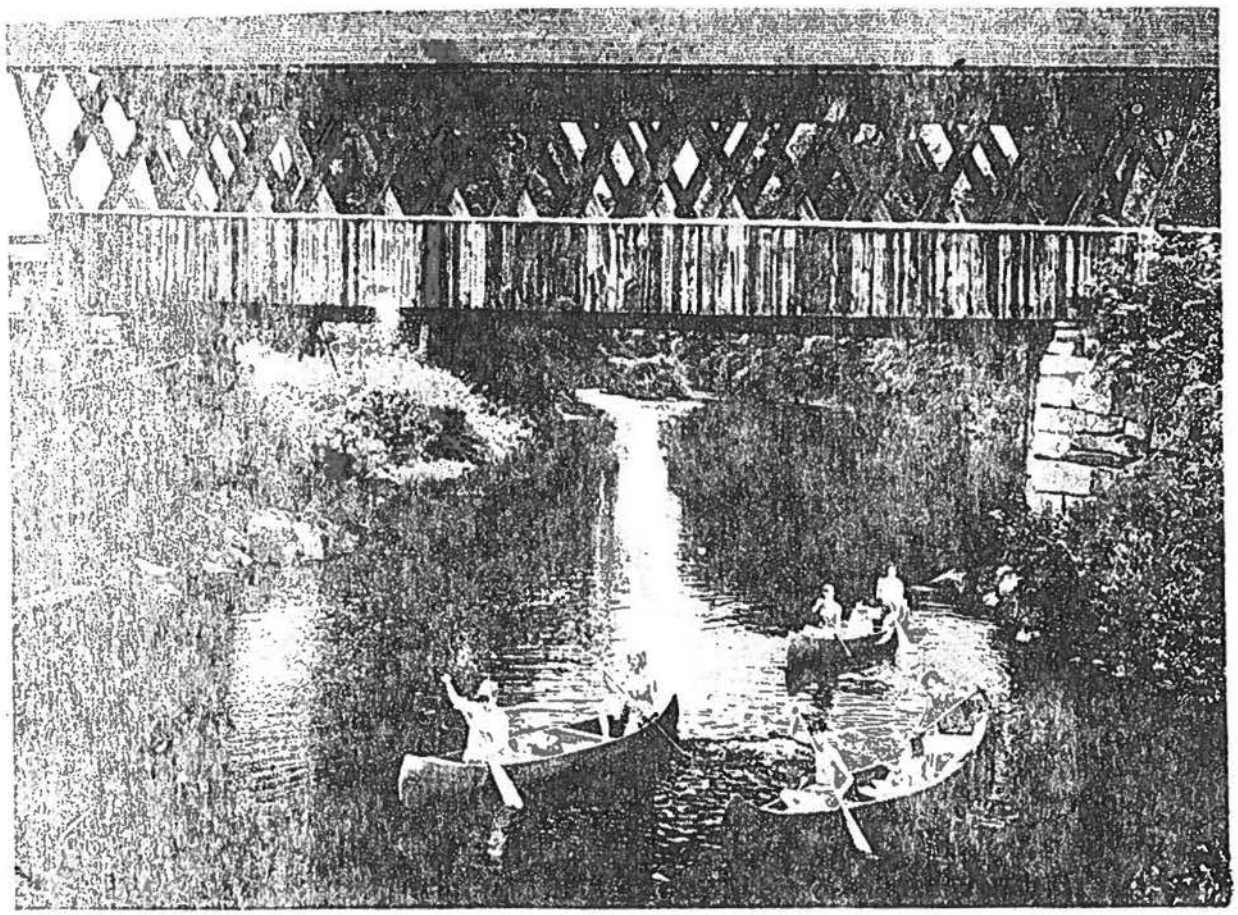


Reforested Field in Reservoir Photo No. 2



Well-Managed Forest in Reservoir Photo No. 3

11. Water Resources. The water quality in the Blackwater River and tributary brooks is classified as Class B by the New England Interstate Water Pollution Control Sommission. Class B waters are suitable for boating, recreation, irrigation and agricultural uses, good fish habitat, and good aesthetic value. The Blackwater River within the project limits is an excellent small boat stream and receives moderate use particularly by canoeists. The river, deep and slow flowing, meanders approximately 14 miles through the project at an average width of 100 feet. Photograph 4 illustrates a typical canoe party on the river 4 miles above the project in Andover, New Hampshire.



Canoe Party on Blackwater River
Andover, N.H.

Photo No. 4

Courtesy State of New Hampshire

IV. FACTORS INFLUENCING RESERVOIR DEVELOPMENT

12. Region Served. The Blackwater and Franklin Falls Reservoir are 10 miles apart and it is expected that these two Federal flood control reservoirs will serve approximately the same region. Therefore, a common zone of influence as shown on Plate 2 has been established for the two reservoirs. This zone covers a radius of 50 miles centered midway between the two reservoirs. A 10-mile radius is also shown for both reservoirs, on the basis that residents in this zone are expected to use the reservoir facilities more frequently.

13. Features of Region Served. The reservoirs are located in south central New Hampshire in close proximity to the industrial and population centers of the state. The White Mountain National Forest, about 30 miles north of the projects attracts sightseers, campers, mountain climbers, skiers, fishermen and hunters from considerable distances.

The Blackwater Reservoir is readily accessible to all sections of the heavily populated northeast region over a network of roads and interstate highways which is constantly being improved, bringing the resources of the project within reach of an increasing population. Interstate 93 passes 6 miles east of the project and Interstate 89 passes 5 miles south. These highways make the project area easily accessible to the heavily populated southern New England area. The Metropolitan Boston area is within one and one-half hours' driving time from the project.

The income generated by recreation, vacation and travel expenditures has a significant impact upon the economy of the State of New Hampshire. A report by the New Hampshire State Planning Project titled "Economic Impact of Recreation, Vacation and Travel on New Hampshire", estimated that total New Hampshire receipts from these sources in 1963 were $195,000,000, which generated approximately $320,000,000 through successive rounds of spending.

The report also pointed out that tourists play a major role in the State's economy. Tourists from the nine Northeast States comprise 96 percent of New Hampshire vacation home owners, 92 percent of its summer visitors, 88 percent of its summer lodging guests, and 99 percent of its skiers.

14. Population. The number of persons residing within the 50-mile zone of influence of the Blackwater and Franklin Falls reservoirs was 362,000 according to the 1960 census. This represents about 60 percent of the State's resident population. The

population growth rate within this zone from 1950 to 1960 was about 11 percent. The population within the 10-mile zone was 52,000.

In addition to the year round population, there were about 125,000 out of state seasonal residents. During the summer of 1963, youth camps accommodated 21,700 boys and girls and occupants at lodging establishments were estimated at 80,000 guests.

15. Existing Public Recreation Areas. Numerous public facilities, in addition to the many privately-operated recreational facilities, are located throughout the lakes and mountains regions. Plate 2 shows the number and location of developed public recreation areas within the zone of influence. A listing of the areas with the 1965 attendance and facilities offered is contained on that plate.

It is recognized that these areas will continue to provide needed recreation facilities for the public. However, many of the existing recreation areas are over-used and have reached maximum development with no further room for expansion. Attendance figures for the period 1951 to 1965 at state owned and operated public-use areas within New Hampshire indicated that visitation increased from 1,280,178 to 2,900,376. In 1963, a survey was conducted by the New Hampshire State park systems. The survey indicated that 78% of the users of day-use type parks were non-residents, 39% of which came from Massachusetts.

16. Anticipated Public Use. The growing demand for outdoor recreation and the overcrowding of existing public use areas requires expansion and development of present public areas. With adequate recreational development, full utilization of the Blackwater and Franklin Falls reservoirs will be assured. Even with inadequate public facilities, an increasing number of visitors have been attracted to the reservoirs, as shown in Table 1.

TABLE 1

RECORDED ANNUAL ATTENDANCE

Year	Blackwater	Franklin Falls	Total
1960	6,200	16,000	22,200
1961	6,500	17,000	23,500
1962	6,500	17,500	24,000
1963	7,400	37,400	44,800
1964	8,800	31,400	40,200
1965	9,400	30,900	40,300
1966	11,000	29,000	40,000

Since the Blackwater and Franklin Falls reservoirs are expected to serve about the same zone of influence, an estimate of annual attendance at both of the reservoirs has been made. The following factors, shown in Table 2 below, were considered in determining the allocation of estimated attendance for each reservoir: land and water area, water quality, terrain, cover, access, stream width and length, and past visitation.

TABLE 2

PROJECT DATA

	Area-Acres							
	Land	Water	Water Quality	Access Points (No)	Access Roads (Mi.)	Stream Length (Mi.)	Tree Cover (%)	Terrain
Blackwater	3412	170	Good	5	11.0	14.0	67	Rolling
Franklin Falls	3144	560	Poor-Good	12	18.0	15.0	68	Rolling

Franklin Falls, with over three times more water area than Blackwater Reservoir, will continue to attract a major portion of the visitors within the zone of influence. Another important factor in the projected use of the two projects is the recommended development of Franklin Falls as a Class II "general outdoor recreation area" which will have a larger facility development than Blackwater which will be developed as a natural environment area. It is estimated that Blackwater will attract 40 percent of the combined attendance.

The procedure used in estimating the combined annual attendance is based on consideration of all known factors such as population, accessibility, existing recreation facilities, recorded use at these projects and other Federal, State and public use areas in the zone of influence and the recommended outdoor recreation classifications of the projects. In addition, surveys have been conducted by the operator-in-charge at the project to determine place of origin of visitors, distance traveled, activities participated in, length of stay and other pertinent data. These surveys showed that about 70 percent of the visitors at Franklin Falls and Blackwater came from the 40-mile zone and about 30 percent from over 40 miles away.

The combined 1966 annual attendance at Blackwater and Franklin Falls was 40,000. It is conservatively estimated that with adequate facilities that the anticipated combined initial annual attendance (within the next 10 years) would be about 91,000 for two reservoirs. (See Figure 1). On the basis that 40% of the combined attendance will utilize Blackwater facilities, the annual attendance is expected to reach approximately 36,000 within the next 10 years. Future annual

attendance will depend largely on the extent and schedule of development at this reservoir and other public use areas within the area of project influence. These estimates will be revised periodically to reflect actual project attendance.

V. DEVELOPMENT PLAN

17. General. The Blackwater Reservoir will be developed as a "Natural Environment Area". Facility development at the project will be simple and in keeping with this classification. Concentration of facilities will be avoided and improvements will be designed and constructed in a manner which will minimize their affect on existing cover and terrain. Cost for development of the reservoir will be shared by the State of New Hampshire and the Federal Government in accordance with Public Law 89-72. Much of the site development can be performed by State forestry management crews.

18. Land Allocation. The allocation of reservoir lands for various purposes in shown on Plate 3. Of the 3,582 acres of fee-owned land, approximately 72 acres in the immediate vicinity of the dam and two dikes are reserved for project operation and maintenance purposes. Parking area and sanitary facilities to accommodate the visiting public are available at the dam.

The remaining 3,510 acres of project land is outleased to the New Hampshire Division of Resource Development for forestry, recreation, fish and wildlife and other management uses. Approximately 300 acres of the leased area are available to local farmers for agricultural uses.

19. Land Acquisition. It is recommended that land areas, as shown on Plate 3, be acquired. The recommended acquisition, totalling approximately 125 acres, would protect against private encroachment of the river area in the upper limits of the project and would put all land holdings between Clines Road and Mill Road in public ownership. This land taking is desired by the State and would be cost-shared according to provisions of Public Law 89-72. The land areas are mostly opened with some sparsely scattered tree cover and no improvements. Total cost of acquisition would be approximately $100 per acre, or $12,500.

20. Plan of Improvement. Plate 3 shows the general location of proposed development features of the project. A description of development is carried in the following sub-paragraphs 20 (a) to 20 (d).

(a) Roads & Trails. The existing road network within the project limits is adequate for the intended development of the

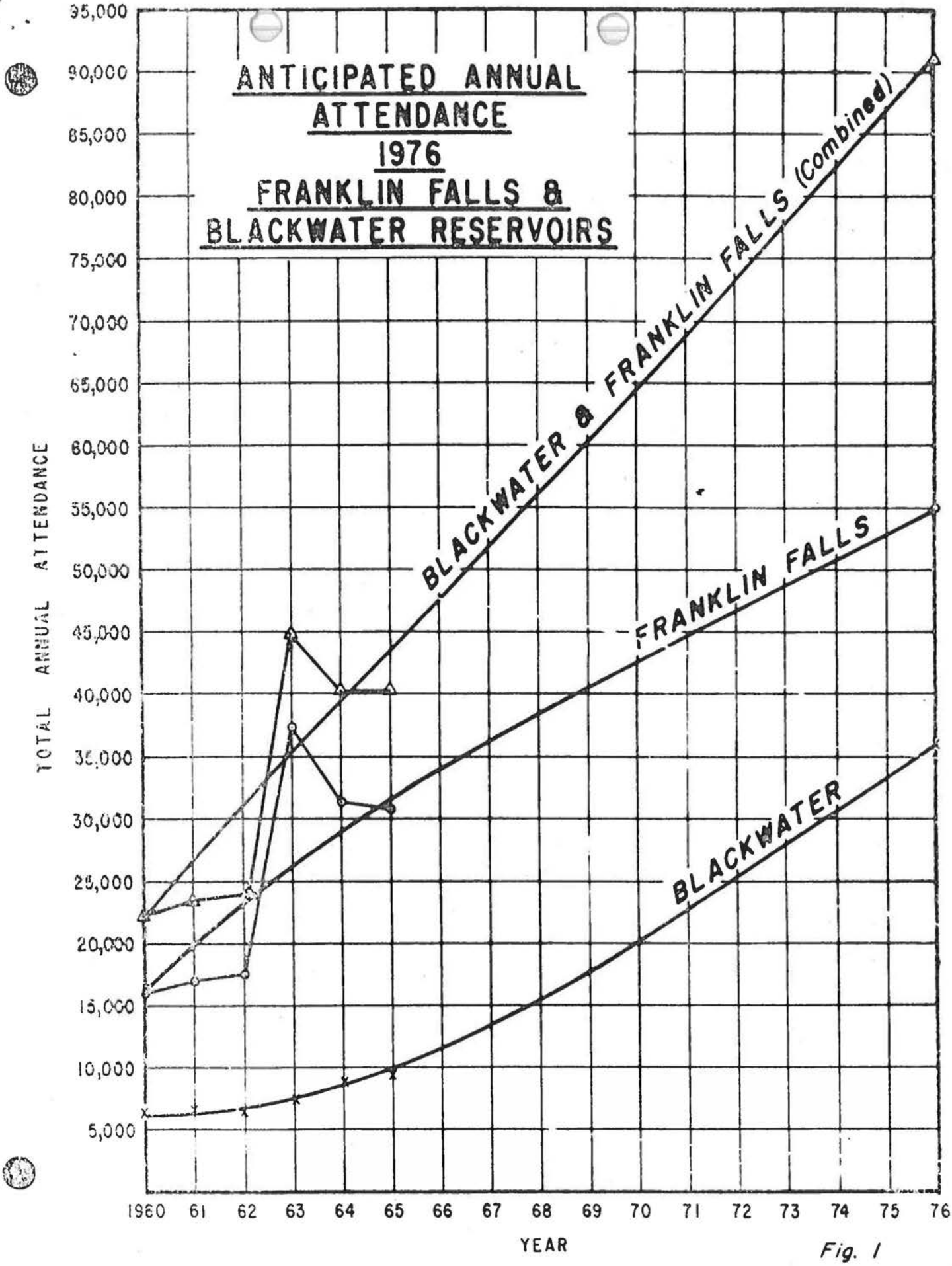

ANTICIPATED ANNUAL ATTENDANCE
1976
FRANKLIN FALLS & BLACKWATER RESERVOIRS
BLACKWATER & FRANKLIN FALLS (Combined)
FRANKLIN FALLS
BLACKWATER
TOTAL ANNUAL ATTENDANCE
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
1960 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76
YEAR

Fig. 1

project and should not be expanded. Future roads necessary for forestry management purposes should be kept to a minimum and maintained for public usage as foot and jeep trails.

A trail will be developed on both banks of the Blackwater River along its entire length within the reservoir limits. Alignment of the trail will be designed in such a way so as to have a minimum affect on the existing topography and cover of the area. The trail will be adequate to support passage of maintenance vehicles. However, public use will be restricted to foot traffic and horse back riding.

(b) Camp and Picnic Sites. Cover and terrain of the reservoir land areas are well suited for development of scattered camp and picnic sites with minor facility development. Picnic sites will be placed as near as possible to existing roads so that they may be accessible by car. Camp sites will be more remotely located along the trails bordering the Blackwater River. Spur trails will be constructed as necessary to give access to natural campsite areas. Facilities will be limited to shelters, picnic tables, fireplaces, dry pit toilets and drinking water wells with hand pumps. Natural beach areas along the river banks will be utilized for swimming.

(c) Boat Access. Boat landings for canoes and rowboats will be located in areas where reservoir roads cross the river. Construction will be limited to clearing and grading as necessary to provide parking areas for five cars each and simple ramps leading to the river. Mooring areas will be located along the river banks to provide boat access to camp sites.

(d) Signs. An important feature of development will be the institution of a sign program to orient the using public with the development and to give information on the flood control project, recreation and fish and wildlife features and forestry management. Directional signs will be placed on main roads to direct the public to the reservoir. Directional signs within the reservoir will indicate location of facilities. Boat access areas, picnic sites, camp sites and designated swimming areas will be marked.

A general information sign will be placed on the overlook area adjacent to the west abutment of the dam. This sign will have details on flood control features, recreation opportunities and description of the forestry management program. A simple map of the reservoir will show reservoir development features. The sign will also contain a listing of other NED reservoirs and recreational opportunities offered.

Simple signs will be placed in forestry management areas with an explanation of management activities.

21. Schedule of Development. Initial items of development will be the provision of boat access lanes for canoes and rowboats with necessary parking areas. Trail systems on either sides of the river banks will also be included as part of initial development. As the trail system is developed, picnic areas and camp sites will be located in areas readily adapted to such uses and necessary facilities will be constructed. As facilities are developed, a sign program will be instituted orient direct users.

The speed of development will be dependent on State and Federal allocations of funds for the project. Experienced use of facilities as they are provided will indicate needs for expanded development. Periodic review of project development will be made to insure that construction features and extent of development is in keeping with the "Natural Environment" classification of the project.

22. Estimate of Cost.

Boat Access Areas (7):

Parking (5 cars each)	7 @ $ 300.00 ea. =	$ 2,100
Landing Lanes	7 @ $ 200.00 ea. =	1,400

Trails:

10' wide gravel, both river banks 20 miles @ $1,500/mile =	30,000

Picnic Areas: (at selected locations along south road)

30 Tables (NED standard)	@ $ 80.00 ea. =	2,400
15 Fireplaces (NED stand)	@ 60.00 ea. =	900
4 Pit type Toilets (NED standard)	@ $2,000.00 ea. =	8,000
2 Wells w/hand pumps	@ $ 200.00 ea. =	400

Camp Sites: (at selected locations with adirondack type shelters, fireplaces, water & pit type toilets)

4 - 6 man shelters	@ $2,500.00 ea. =	10,000
4 - Fieldstone Fireplaces	@ 100.00 ea. =	400
4 - Pit type toilets (NED Standard)	@ 2,000.00 ea. =	8,000
4 - Wells w/hand pumps	¢ 200.00 ea. =	800

Sub-Total	$64,400
Contingencies, +15%	9,600
Sub-Total	$74,000
E&D and S&A +18%	13,000
TOTAL	$87,000

VI. RESERVOIR MANAGEMENT

23. General. A twenty-five (25) year license was issued to the Forestry and Recreation Commission of the State of New Hampshire for recreation, fish and wildlife, forestry and other management uses of the reservoir on 4 January 1955. The responsibility for the license has since been turned over to the Division of Resources of the New Hampshire Department of Resources and Economic Development by State legislation.

The license covers about 3510 acres of land and water upstream of the dam. The remaining 72 acres of fee-owned project land is in the vicinity of the dam and project structures and is reserved for project operation.

24. Corps Personnel Required. Permanent personnel required for operation and maintenance of the dam and project structures are a resident flood control operator and an assistant. Seasonal personnel are employed during summer months pending workload requirements. Public-use facilities in the vicinity of the dam are also maintained by the Corps.

25. Management by the State of New Hampshire. The management of the resources of the Blackwater Reservoir will be the responsibility of the New Hampshire Department of Resources and Economic Development. The designated functions of that agency are the direction and administration of the various resource management agencies of the State. Development and management of the reservoir resources will be a coordinated effort under the auspices of the Department.

The State agencies will be responsible for the maintenance and operation of the facilities provided in the initial development and any subsequent development. They will also budget funds for the development and management of additional public use areas and facilities.

The Corps will participate in future developments in accordance with Public Law 89-72.

The forestry management program has provided an excellent start and will also aid in the development of the other project resources. The improved cover, new plantings, new and improved roads all lend themselves to the natural environment setting of the reservoir. Coordination in planning and management is necessary to insure proper resource utilization.

Outleasing of project lands for agricultural or grazing purposes will be administered by the Corps in accordance with the overall land allocation plan.

The management plan will be submitted by the State of New Hampshire as a supplement to this Master Plan.

26. Fire Protection. About 67% of the reservoir is in woodland and brush. The danger of forest fires is ever present, particularly during dry periods of the year. Public recreational use tends to increase this hazard. The Forest Fire Prevention and Control Plan for the Blackwater Reservoir is contained in Appendix B. This plan includes the phases of Prevention, through public education, posters, control of fires in the reservoir, control of access roads and control and removal of slash in logged and improved areas, and along roadside and property lines; Pre-Suppression which includes wardens, lookout stations, and inventory of resources in the immediate area; and Suppression Action which includes immediate steps taken by the warden to activate local forces to suppress the fire.

27. Public Health. The principal insects of public health importance are pest mosquitoes. In order to minimize mosquito problems, flotage, secondary growth and aquatic plants will be removed after flood control regulation. Where possible, low areas will be graded to drain. As part of the maintenance program, surveys to determine the amount of mosquito breeding production will be made and chemical measures provided to control any significant production.

The New Hampshire State Department of Health tested the water of the reservoir area and found it suitable for bathing.

Any well or spring water for public consumption will be tested before such use, after any inundation, and at least annually to insure its safety. Any remedial measures indicated as a result of such tests will be instituted before any continued use is permitted.

28. Monumentation. Project boundaries will be established in accordance with current policies and as funds are available. Priorities shall be given to boundaries adjacent to project structures, public use areas and improved lands in private ownership. The New Hampshire Forestry Department has already marked, blazed and painted portions of the boundaries. The remaining boundaries will be established as soon as funds allow in order to utilize existing boundary markings and to eliminate encroachment by others.

VII. CONCLUSIONS AND RECOMMENDATIONS

29. Conclusions. The proposed plan of improvement and management will utilize to best advantage project lands which are desirable

for public access and recreation; and those lands which are valuable for forestry, fish and wildlife and conservation management purposes.

The proposed development of water based-outdoor recreation at the Blackwater Reservoir, as contained in Appendix A, would be highly beneficial and should be included in the long-range outdoor recreation plan of the State of New Hampshire. This plan has the potential to help meet the future needs of the State's residents and out of State visitors.

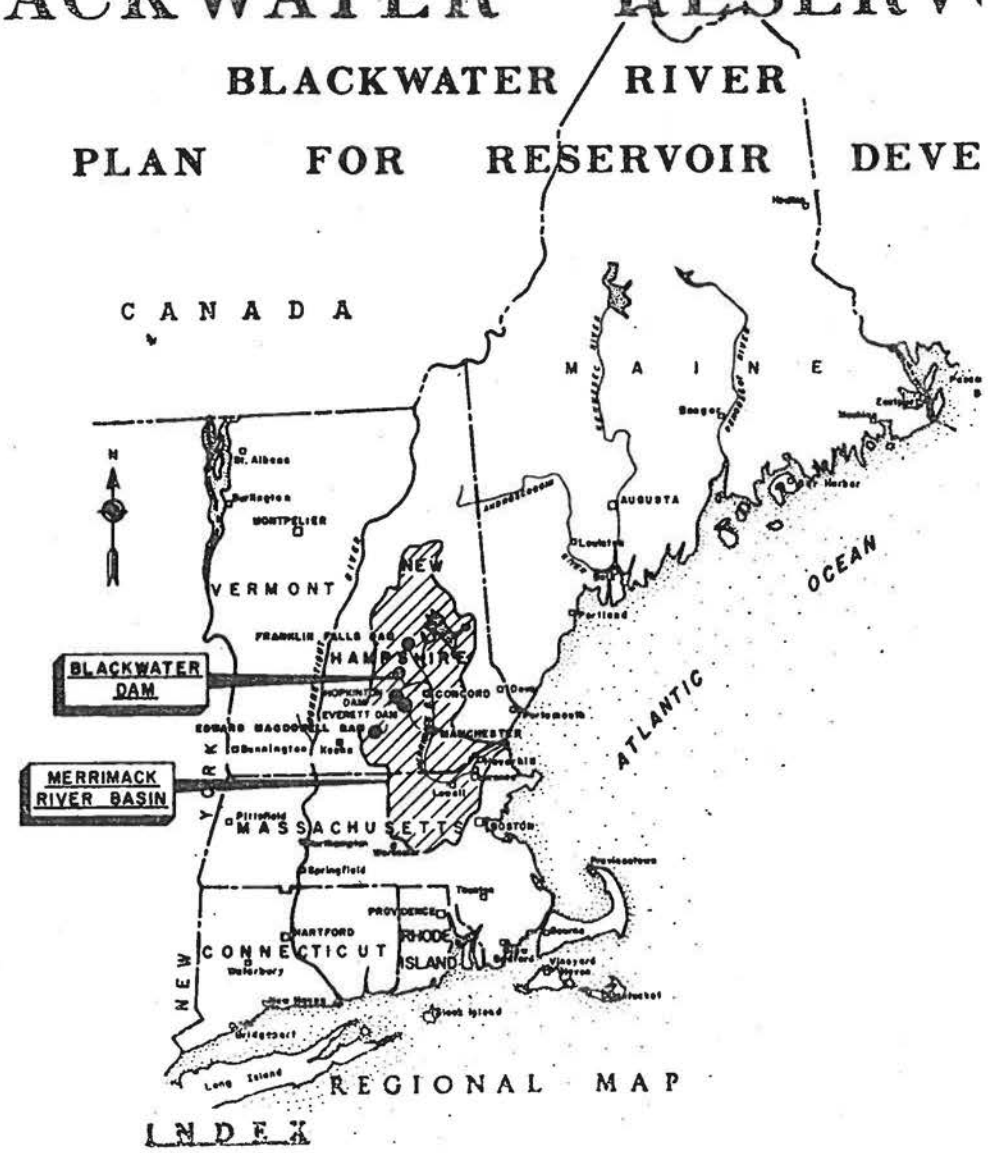
The Master Plan has the general concurrence of Federal and State agencies who are interested in the development of the reservoir area for maximum public benefits.

30. Recommendations. It is recommended that this Master Plan for Reservoir Development, Blackwater Reservoir, New Hampshire, be approved, in order that it may serve as a basis for orderly development of facilities and management programs by the Corps of Engineers and other cooperating agencies.

BLACKWATER RESERV

BLACKWATER RIVER

MASTER PLAN FOR RESERVOIR DEVE



REGIONAL MAP

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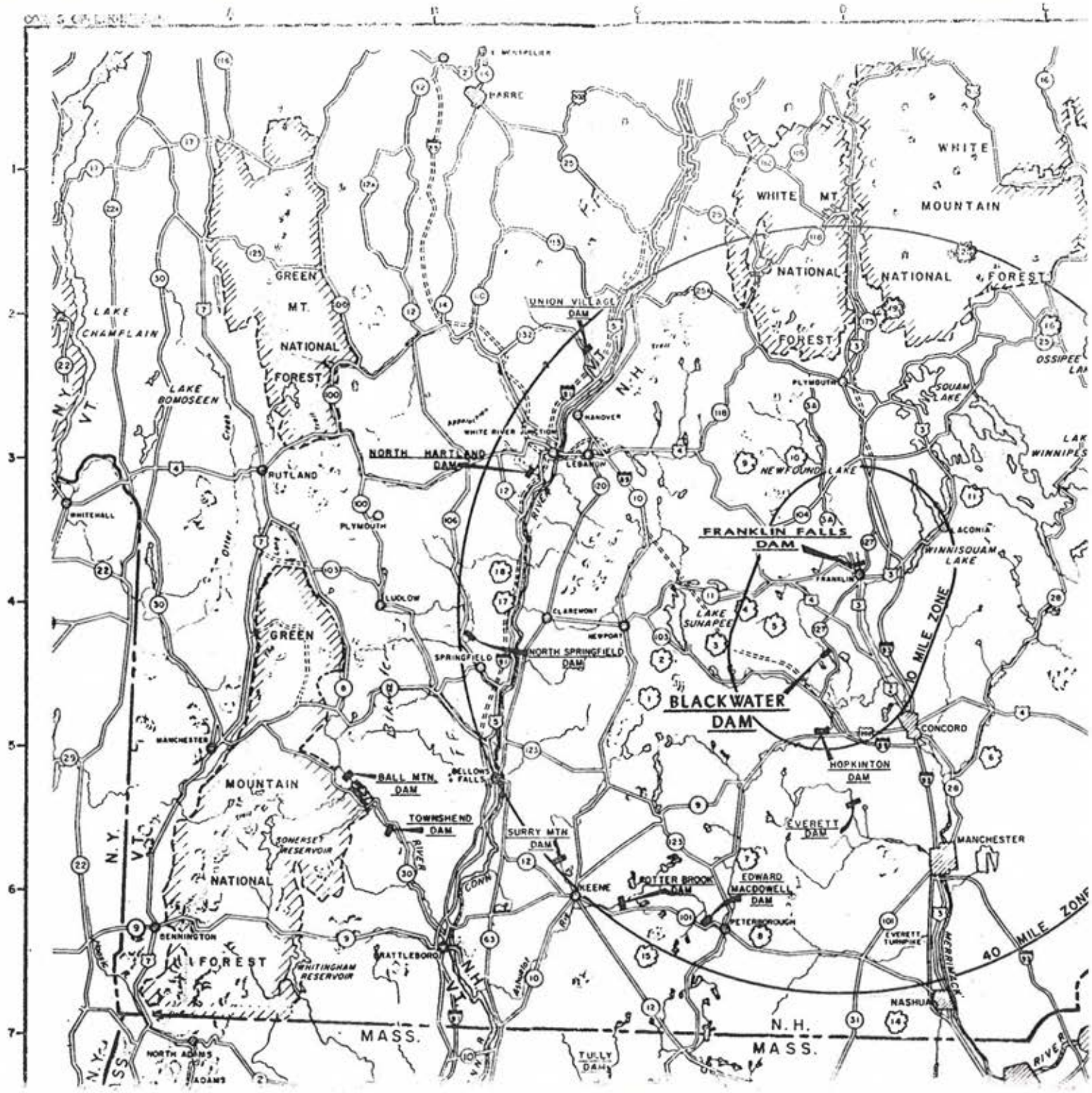
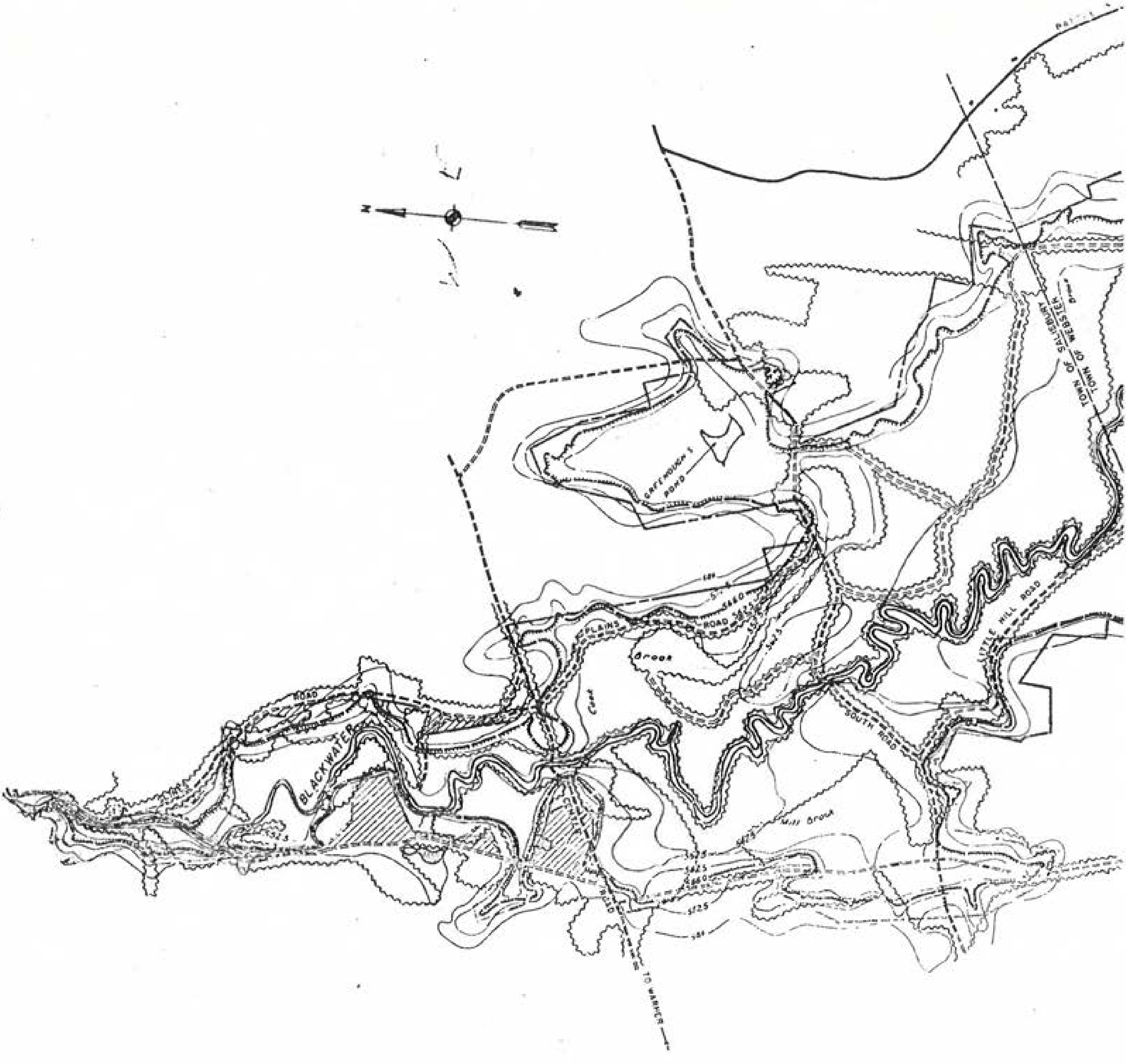
PLATE NO.

1. REGIONAL MAP AND INDEX
2. PUBLIC RECREATION AREAS
3. GENERAL DEVELOPMENT-LAND ALLOCATION
4. DEVELOPMENT PLAN


WHITE MT. NATIONAL FOREST
GREEN MT. NATIONAL FOREST
LAKE CHAMPLAIN
LAKE BOMOSEEN
UNION VILLAGE DAM
NORTH HARTLAND DAM
FRANKLIN FALLS DAM
BLACKWATER DAM
NORTH SPRINGFIELD DAM
BALL MTN. DAM
TOWNSHEND DAM
SURRY MTN. DAM
POTTER BROOK DAM
EDWARD MACDOWELL DAM
HOPKINTON DAM
EVERETT DAM
TULLY DAM
WHITINGHAM RESERVOIR
SOMERSET RESERVOIR
LAKE SUNAPEE
NEWFOUND LAKE
WINNISQUAM LAKE
SQUAM LAKE
40 MILE ZONE
EVERETT TURNPIKE
MASS.
N.H.
VT.
N.Y.
MONTPELIER
BARRE
RUTLAND
WHITEHALL
PLYMOUTH
LUDLOW
SPRINGFIELD
CLAREMONT
NEWPORT
HANOVER
LEBANON
CONCORD
MANCHESTER
KEENE
PETERBOROUGH
BENNINGTON
BRATTLEBORO
NORTH ADAMS
NASHUA
MERRIMACK RIVER


BLACKWATER
PLAINS ROAD
SOUTH ROAD
LITTLE HILL ROAD
TOWN OF SALISBURY
TOWN OF WEBSTER
TO WARNER
Mill Brook

APPENDIX A

Modification Of The Blackwater Project To Create A 2020 Acre Lake

In the "Master Plan" studies of the Blackwater Reservoir, the possibility of creating a major public outdoor recreation area at the project could not be ignored. How could a major area be possible at the Blackwater Reservoir? This appendix presents the possibilities, the needs and an engineering analysis of how it may be accomplished.

APPENDIX A

Modification Of The Blackwater Project To Create A 2020 Acre Lake

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Plate No.	Title
A-1	Water Resources Development Plan

I. PROPOSED MODIFICATION OF EXISTING PROJECT

1. General. A general description of the existing project is contained in paragraph 4 of this "Master Plan". Specific data on the project and features adaptable to modification for creation of additional conservation storage is contained in "Blackwater Dam - Analysis of Design" and related appendices dated 1940.

Provisions have been incorporated in the existing project structures to permit raising the dam and dike from the present top elevation of 584.0 feet m.s.l. to 600.0 feet m.s.l. for inclusion of conservation storage.

Master Plan studies have shown that the most desirable permanent pool elevation for recreation purposes and the most feasible from an engineering and economic point of view would be at approximately elevation 556 feet m.s.l. This pool, with a water surface of 2020 acres and shoreline of 20 miles, would make it necessary to raise the elevation of the dam, dikes and spillway six feet.

2. Hydrology. The existing project has a storage capacity of 46,000 acre-feet at spillway crest elevation 566, equivalent to 6.8 inches of run-off over its drainage area of 127.5 square miles. The permanent recreation pool at elevation 556 would utilize 21,000 acre-feet of storage. By adding 6 feet to the elevation of project structures, thereby raising the spillway crest to elevation 572, the combined reservoir storage would be increased to 67,000 acre-feet of which 21,000 would be for permanent recreation storage and 46,000 available for control of flood waters. Additional flood control storage would be made available in the fall and spring seasons by lowering the recreational lake after the summer use season. The following "Area-Capacity" curve (Figure A-1) illustrates storage allocations for the project.

II. FACTORS INFLUENCING DEVELOPMENT

3. General. Section IV of the basic report describes the region, its population, resources and development. The following paragraphs define these resources as they relate to the proposed development as contained in this appendix.

4. Use of Existing Public Areas. In general, the developed recreational resources in the area are heavily used and all factors indicate the trend will increase. Figure A-2 gives a graphical illustration of the increase in visitation of the New Hampshire State Park System for the period 1951 to 1965. In that period, visitation has almost tripled. Since active development of NED reservoirs began in the early 1960's, public usage has been heavy and it has not been unusual to turn away late-comers due to overcrowded conditions.

In 1963 and 1964, the New Hampshire State Planning Project made a study of all New Hampshire fresh water bodies over 10 acres in size. Findings of the study showed there were 768 such water bodies with 19 lakes over 1,000 acres in size. Many had no areas of public access and over 95% of all waterfront shoreline was in private ownership. The study pointed out a definite need for acquisition of additional areas for public use and access.

A major problem is the availability of public water frontage of significant size to attract more than local use. The larger and heavier developed areas are more appealing to the public and also are more economically feasible to develop and operate. Experience of the State has shown that small scale developments are not self-liquidating, whereas the larger areas with a diversity of development are. There is a basic lack in New Hampshire and New England of public areas appealing enough in size and development to be of regional significance.

5. Accessibility and Population. The Blackwater Reservoir is ideally located to be of service to a large portion of the New England population, particularly the heavily populated Eastern Massachusetts area. Interstate 93 makes the project an easy two-hour drive to over 3.5 million people. The 7.5 million people in Massachusetts and Connecticut are within 5-1/2 hours drive of the project. Listed below are the populations of selected Standard Metropolitan Statistical areas which would affect use of the project, driving distance, and estimated travel time.

S.M.S.A.	Population 1960	Highway Distance	Estimated Travel Time Hrs. & Mins.	
Lowell, Mass.	158,000	70	1	15
Lawrence-Haverhill, Mass.	188,000	70	1	15
Boston, Mass.	2,600,000	90	1	45
Worcester, Mass.	323,000	110	2	0
Providence-Pawtucket, R.I. & Mass.	816,000	140	2	45
Springfield-Chicopee-Holyoke, Mass.	479,000	155	3	0
Hartford, Conn.	525,000	168	3	15
New York-Northeastern N. J.	14,800,000	290	6	30

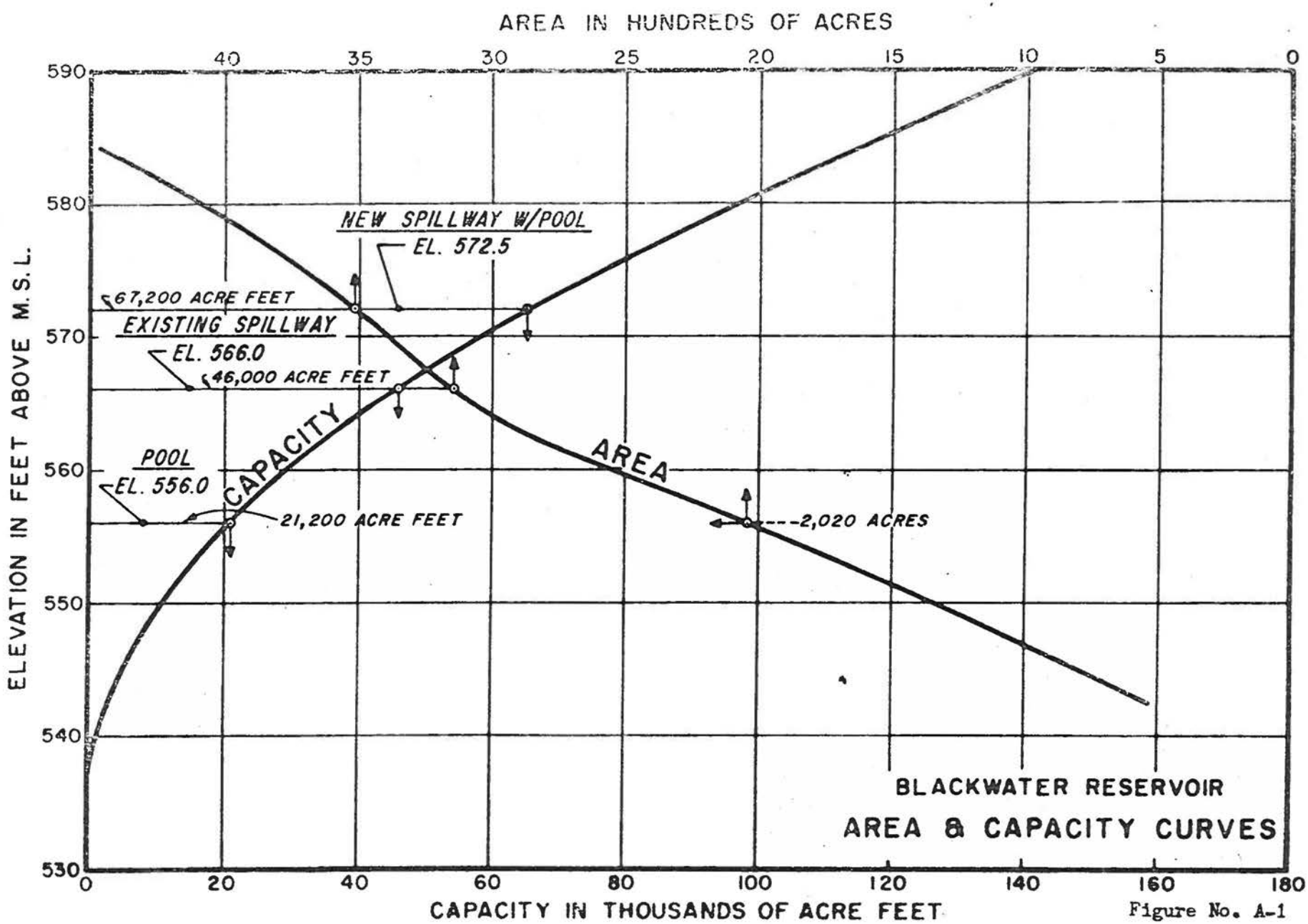

AREA IN HUNDREDS OF ACRES
40
35
30
25
20
15
10
5
0
590
580
570
560
550
540
530
ELEVATION IN FEET ABOVE M.S.L.
NEW SPILLWAY W/POOL
EL. 572.5
67,200 ACRE FEET
EXISTING SPILLWAY
EL. 566.0
46,000 ACRE FEET
POOL
EL. 556.0
21,200 ACRE FEET
CAPACITY
AREA
2,020 ACRES
BLACKWATER RESERVOIR
AREA & CAPACITY CURVES
0
20
40
60
80
100
120
140
160
180
CAPACITY IN THOUSANDS OF ACRE FEET

Figure No. A-1

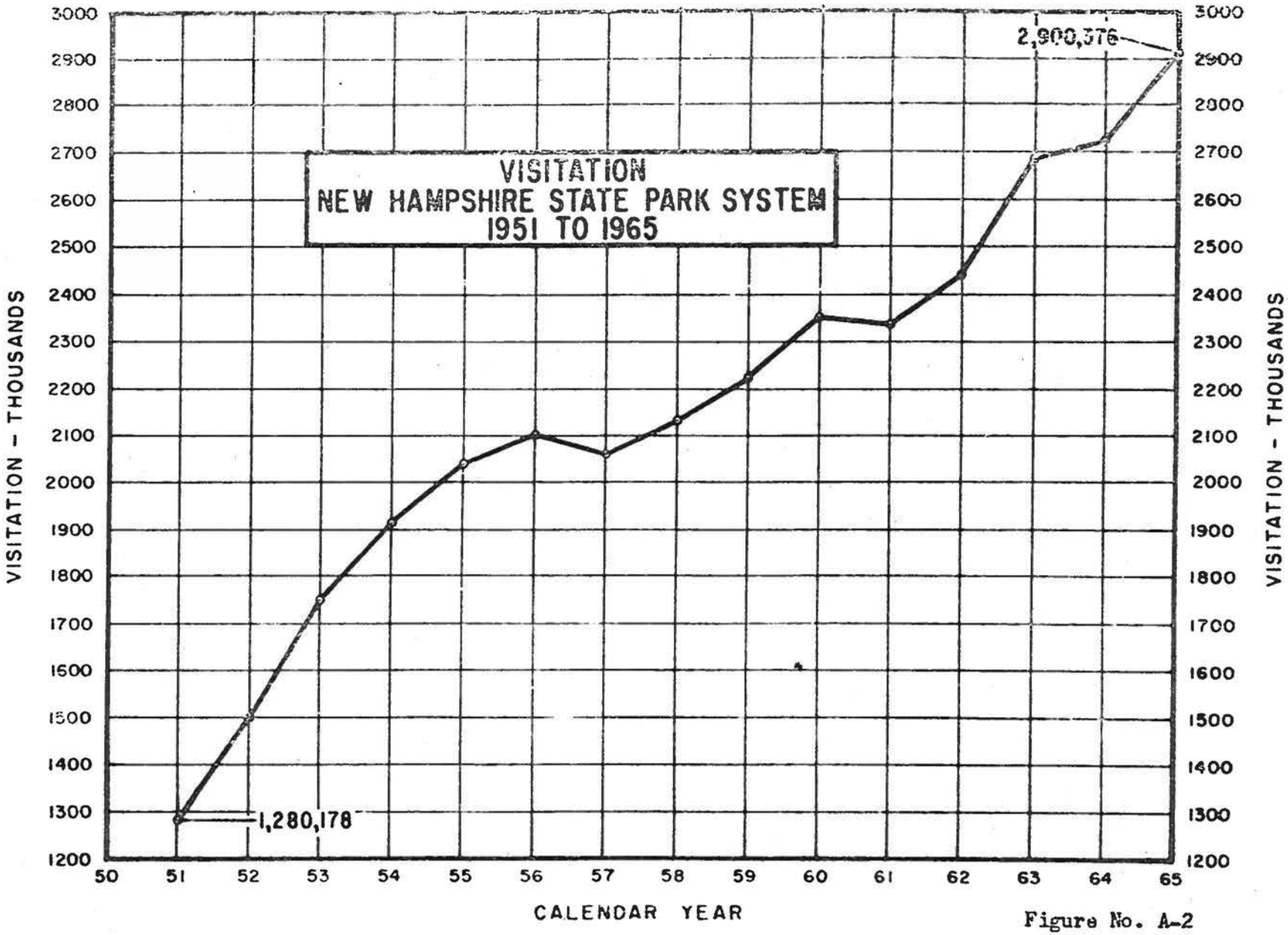

VISITATION
NEW HAMPSHIRE STATE PARK SYSTEM
1951 TO 1965
2,900,376
1,280,178
VISITATION - THOUSANDS
VISITATION - THOUSANDS
CALENDAR YEAR
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

Figure No. A-2

III. POTENTIAL OF PROJECT RESOURCES

6. Water Resources. The proposed modification of Blackwater Dam would allow for the creation of a 2020 acre permanent water surface with a 20-mile shoreline and maximum depth of 40' at the dam. If developed, it would be the tenth largest lake in New Hampshire and, more significant, it would be the only major water body entirely in public ownership and devoted to public recreation. In contrast to existing flood control projects in New England, the lake would have a minor amount of fluctuation for flood control purposes. The maximum flood pool at spillway crest would be only 16 feet above the permanent water surface.

The water quality of the lake would be suitable for all forms of recreation use.

7. Land Resources. The shoreline of the lake would be gently sloping and would be suitable for development of swimming beaches with a minimum amount of construction. The immediate land areas adjacent to the lake shore range in terrain from gently sloping to steep and rugged. These land areas being diverse in character would accommodate diverse development for such uses as bathing beaches, picnicking, tent and trailer camping, hiking, and overnight pack trips. The majority of the land areas are forested with some scattered open fields presently being used for agricultural purposes. A large portion of the forested areas are presently within the State lease area and the forestry management practices have enhanced their value and ability to support recreational use.

8. Mountain-Lake Feature. The photograph in the front of this report illustrates the mountain-lake setting that the project would have. The summit of Mount Kearsarge (Elevation 2937) would be approximately 4 miles from the shores of the proposed 2,000 acre lake.

The Kearsarge range and its foot-hills would dominate the view from the lake waters and its shoreline. It would be a compelling feature to campers who, using developed camp sites on the shore of the lake as their base, could embark on overnight pack trips to the mountain summit.

IV. PLAN OF DEVELOPMENT

9. General. The water resource development combined with the Kearsarge Mountain Range would offer an area suitable for a

wide range of outdoor recreational opportunities. High density recreation facilities for swimming, picnicking, and overnight tent and trailer camping would be developed on the shores of the 2020 acre man-made lake. Access for fishermen and boaters would be provided to the lake, as well as marina facilities. Trails would be developed along the shores of the lake and to the summit of Mount Kearsarge and shelters for overnight pack trips would be provided. Selected areas could be kept open for ice fishing, snowshoeing, cross-country skiing and winter camping. It is estimated that the project, if properly developed, would attract visitation amounting to at least 1 million visitors annually.

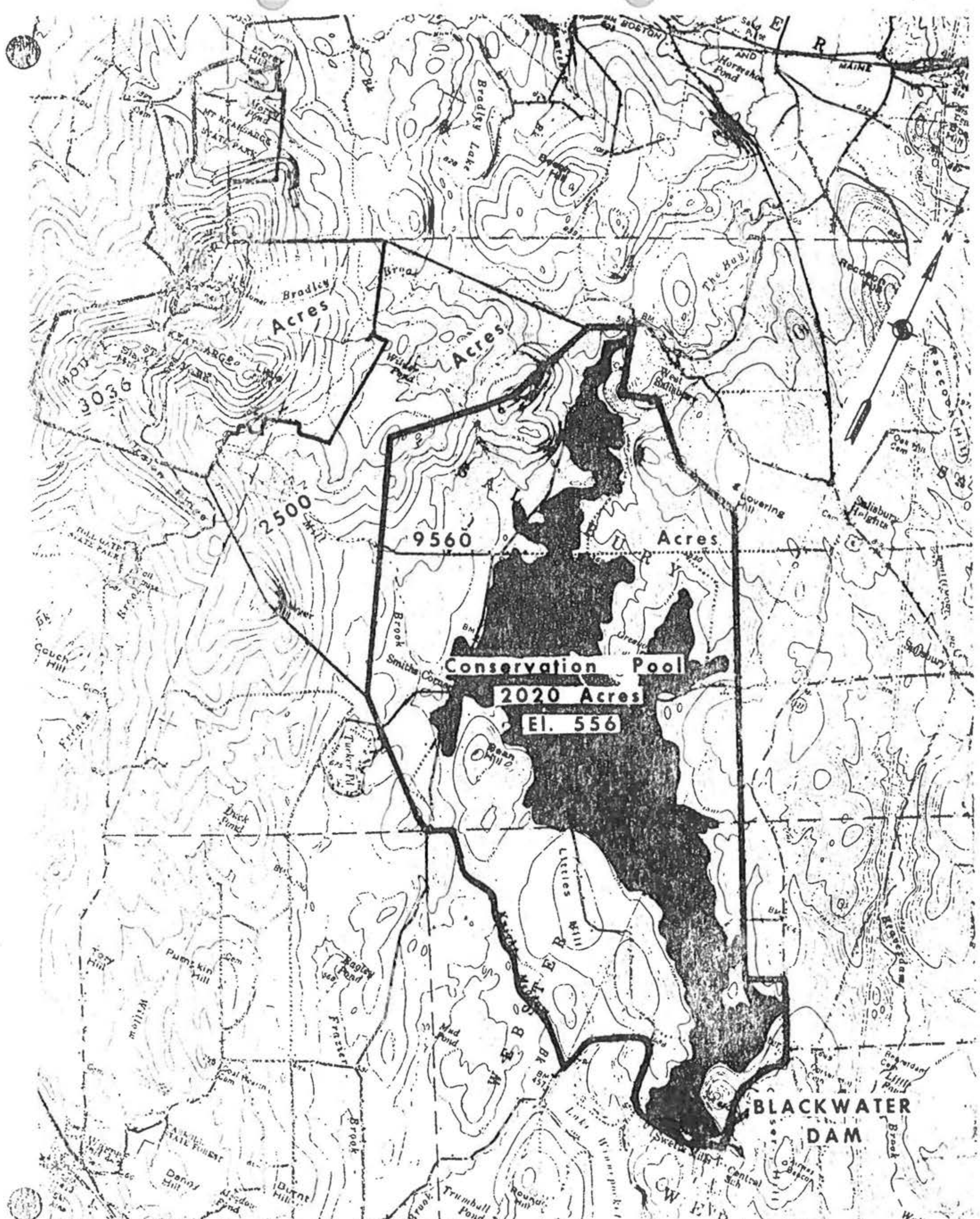
10. Land Acquisition. The desired land acquisition plan is shown on Figure A-3. The total area proposed for the mountain-lake complex is approximately 15,096 acres. The area shaded in green contains the State holdings at Mount Kearsarge of 3036 acres. The area shaded in red is the amount of land considered necessary for development of the water resource project and would be acquired under the cost-sharing policy of Public Law 89-72. This area amounts to approximately 9560 acres of which 3582 acres are presently in Federal ownership for the Blackwater Reservoir. The remaining 2500 acres, if acquired, would make the mountain-lake complex contiguous and would be acquired by the State. The area recommended for acquisition consists of second and third growth woodland. Total cost of acquisition is estimated at about $100 per acre.

11. Day Use Development. The major type of day use will be swimming, picnicking and boating. As shown on Plate A-3, the development of a beach area and several picnic areas will be located on the northeast shore of the lake. A main entrance will be provided off Route 127 and a shore drive will be constructed along the perimeter of the pool for access to all areas. Necessary toilet and bathhouse facilities will be provided at developed day-use areas.

Boat access areas will be provided at selected locations. A marina will be situated, as shown, on the eastern shore of the project for operation by either the State or a private concessionaire. The project will have a sizeable water surface and seasonal marina rentals will be necessary.

Other day-use facilities will include hiking trails, vista areas and a small picnic area for boaters on the 70-acre island which will be created.

Summer use facilities can also be used for winter activities. The main access and parking area adjacent to the lake can be kept open for winter ice fishing and snowshoeing which is becoming a popular winter sport. Roads and trails can be marked for cross-country skiing as well as snowshoeing.



Acres
Acres
3036
2500
9560
Acres
Conservation Pool
2020 Acres
El. 556
BLACKWATER
DAM

Figure No. A-3

12. Overnight Camp Use Development. The lake can be expected to become a popular area for overnight tent and trailer camping and could be one of the most popular camping areas in New England. Due to the size of the lake, the diverse activities that would be offered and the many tourist attractions in adjacent areas of New Hampshire, the area would be a base for one or two-week vacation trips. On this basis, it can be assumed that week-day use of the camping facilities would be almost as intensive as weekend use, thus providing a larger ratio of income to expenditure.

Two separate camping areas would be developed, one for tent camping and one for trailer camping. These areas would be located on the southern shore of the lake and would be accessible by the shore drive. Bathing beaches would be developed at both sites and a centrally located boat landing provided with simple mooring facilities for campers' boats. Necessary sanitary facilities and utility hook-ups would be provided.

To supplement the overnight facilities at the water resource project, rustic shelters could be placed along hiking trails at or leading to Mount Kearsarge for use in overnight pack trips. Shelters would be spaced at one day hiking intervals and located close to natural springs or clear brooks for drinking and wash water needs.

In order to meet the varied desires of outdoor recreation users and to supplement the above-mentioned overnight facilities, it would be feasible to set aside an area for overnight cabin development. The cabins could be developed and managed by a private concessionaire. Strict criteria would be necessary to keep the cabin development in keeping with the natural environment of the area.

V. COSTS AND BENEFITS

13. Estimate of Costs. The following estimate of cost is based on raising project structures 6 feet to accommodate the 2,020 acre lake and development of facilities for approximately 750,000 annual visitors.

SUMMARY OF COSTS

Modification to Project Structures	$ 221,580
Lake Vista Area	12,400
Shore Drive	400,000
Boat Launch and Marina Area	72,700
Day Use Area - Picnic & Beach Area	587,300
Tent Camping Area	464,500
Trailer Camping Area	343,000
Camping Areas Boat Launch	28,600
Administration Building	15,000
Sub-Total	$2,145,080
Contingencies, 20%	429,020
Sub-Total	$2,574,100
Engineering and Design, 10%	257,400
Supervision and Administration, 8%	205,500
TOTAL	$3,037,000

ESTIMATE OF COST - BLACKWATER WATER RESOURCE DEVELOPMENT PLAN

PROJECT MODIFICATIONS

Raise Dam & Dikes El. 584 to 590 - Spillway 566 to 572

Compacted Impervious Fill	17,000 c.y. @ $	.80	$ 13,600
Compacted Pervious Fill	23,000 c.y. @	1.00	23,000
Dumped Rock	7,000 c.y. @	1.50	10,500
Sand & Gravel	4,700 c.y. @	1.10	5,170
Topsoil & Seeding	6 acre @	1,000/acre	6,000
Stripping	6,300 c.y. @	.70	4,410
Riprap (1 foot)	2,000 s.t. @	1.50	3,000
	Sub-Total		$ 65,680

Six-foot Raise of Non Overflow Penstock and Spillway Sections (includes cost of cutting & joining new concrete)

Concrete	1,800 c.y. @ $	75.00	$135,000
Reinforcing Steel	90,000 lbs. @	.15	13,500
Guides, closure & stoplogs		L.S.	7,400
	Sub-Total		$221,580
	Contingencies, 20%		44,320
TOTAL CONSTRUCTION COSTS - PROJECT MODIFICATIONS			$265,900

NOTE: Clearing for the pool would consist of about 1,400 acres of merchantable timber. It is felt that the income received from timber sales would more than offset clearing costs; therefore, no item for clearing has been included in the estimate.

RECREATION DEVELOPMENT

Roadwork - 24' gravel base road - double bituminous surface.

Main Entrance	3,000 l.f.		
Shore Drive	60,000		
Road to Lake Vista	500		
Road to Marina	3,500		
Road to Beach Parking	1,200		
Road to Picnic Area Parking	700		
Camp Area Roads	25,100		
TOTAL ROADWORK	94,000 l.f.	@ $5.00	$470,000
Parking Areas			
Beach Area	30,000 s.y.		
Picnic Areas	18,750		
Vista Areas	5,500		
Boat Launch Area	7,000		
Marina Area	14,000		
TOTAL PARKING	75,250 s.y.	@ $1.80	$135,500
Bridge Crossings			
2 at $50,000			$100,000
Beach Areas			
Day Use Area Beach	55,000 s.y.		
Camp Area Beaches	30,000		
TOTAL BEACH	85,000 s.y.	@ $2.00	$170,000

RECREATION DEVELOPMENT (Cont'd)

Buildings

Administration & Maintenance Bldg. (NED Standard)	1 @ $15,000	$ 15,000
Bathhouse - Includes Change Facilities, Toilets & Concession (Cost based on facilities & comparable area)	1 @ 150,000	150,000
Toilet Buildings - Picnic Areas (NED Standard)	6 @ $15,500	93,000
Toilet Buildings - Tent Camping Area (NED Standard)	10 @ $16,000	160,000

Water Supply

Day Use Area	System	100,000
Trailer Camp Area	System (does not include distribution)	40,000
Tent Camp Area	System	55,000

Site Development - Trailer Camp Area

Includes grading, clearing and Water, Sewerage & Electrical Service for Each Camp Site.

200 Sites @ $850	170,000

Site Development - Tent Camp Area

Includes grading & clearing

400 Sites @ $200	80,000

Picnic Facilities

Picnic Tables (NED Standard)	800 @ $ 80	64,000
Fireplaces - Day Use Area Manufactured Cook Grill Type	100 @ $ 60	6,000

RECREATION DEVELOPMENT (Cont'd)

Picnic Facilities (Cont'd)

Fireplaces - Camping Area NED Standard - Brick Camp Area Unit	600 @ $125	$ 75,000
Launching Lane	2 @ $10,000	20,000
Piers	Lump Sum	20,000
	Sub-Total	$1,923,500
	Contingencies, 20%	384,700
TOTAL CONSTRUCTION COSTS - RECREATION DEVELOPMENT		$2,308,200

SUMMARY OF COST:

Project Modification	$ 265,900	
Recreation Development	2,308,200	
		$2,574,100

14. Benefits. Using the "Evaluation Standards for Primary Outdoor Recreation Benefits" as developed by the "Ad Hoc Water Resources Council" the use of the Blackwater Reservoir would be classified as "General". Due to the large diversification of activities to be offered for outdoor recreation, a value of $1.25 per user day has been chosen. Based on the proposed development to accommodate 750,000 annual visitors, the annual recreational benefits for the development would amount to $937,500.

An alternative means of measuring benefits is that of accessing the land enhancement value which would be attributed to the man made lake. Shore frontage on lakes in southern and central New England is at a premium. At lakes comparable in size and terrain to the potential Blackwater lake, the average price is $80 per running foot of shore line for lots 200 feet in depth. Applying this figure, the 20 miles of shoreline at the proposed Blackwater impoundment would be valued at approximately 8.5 million dollars. The value of secondary lots away from the shoreline would also have land enhancement value.

15. Conclusions. It is concluded that the development of the proposed water based outdoor recreation area at the Blackwater Reservoir will be highly beneficial. It should be included in the long-range outdoor recreation plan of the State of New Hampshire.


SALISBURY
WEBSTER
West Salisbury
MOUNT KEARSARGE
PARKING
BEACH
PICNIC
CONSERVATION POOL
ELEV. 556 - 2020 ACRES
SHORE DRIVE
BOAT & PICNIC
DIKE
WILDER POND
RECOMMENDED ACQUISITION - WATER RESOURCES DEVELOPMENT PLAN
TUCKER POND

APPENDIX B

MANAGEMENT REPORT

BLACKWATER RESERVOIR

Prepared By The

DIVISION OF RESOURCES DEVELOPMENT

State of New Hampshire

1965 ANNUAL REPORT

BLACKWATER FLOOD CONTROL AREA

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Department of Resources and
Economic Development
Resources Division

February 1966

STATE OF NEW HAMPSHIRE
DEPARTMENT of RESOURCES and ECONOMIC DEVELOPMENT
DIVISION OF RESOURCES DEVELOPMENT
STATE HOUSE ANNEX · · · CONCORD, NEW HAMPSHIRE
TELEPHONE - CAPITOL 5-6611

February 14, 1966

U. S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham 54, Massachusetts

Attention: Chief, Real Estate Division

Re: NEDRE-M
License November 4, 1954
Blackwater Dam and Reservoir

Dear Sir:

The following pages report the calendar year 1965 forestry activities of the Division of Resources Development, Department of Resources and Economic Development of the State of New Hampshire at the Blackwater Flood Control Area, located in Salisbury and Webster, New Hampshire.

Plans for the calendar year 1966 are also included as well as a projection of plans through the year 1968.

Sincerely,

Theodore Natti

Theodore Natti, Chief
State Lands and Forest Operations

TN:spw
Enclosures

Financial Report for Calendar Year 1965

January 1, 1965
to
December 31, 1965

Reference: Department of the Army License No. _____ dated November 4, 1954, to Division of Resources Development, Department of Resources and Economic Development, State of New Hampshire.

A. Receipts: (Enumerate items of revenue)	Amount
Sale of Timber Products	$1246.97
Total 1965 Receipts	$1246.97

B. Expenditures: (Enumerate expenditures)	
Blister Rust Control	$426.08
Timber Tax	15.36
Fire Control	$100.00
Administration and Overhead	$160.48
Total 1965 Expenditures	$701.92
C. Profit	$545.05

D. Disposition of Profits

Profits will be used in further development of the forest resource.

Department of Resources & Economic Development
Division of Resources Development
(Agency)

By Theodora Crane
(Signature)

Title Chief, State Lands

Submit in duplicate

Forestry operations were limited to the cleaning up of the hardwood pulpwood inventory. This wood was cut during 1964 from previously chemically weeded stands.

An operational map showing all forestry operations from the inception of the State's forestry program has been included in this year's report. This will be maintained in a current status.

The usual maintenance activities - fire prevention measures, inspection for insect and disease outbreaks, periodic patrols to keep roads open - were carried on as in previous years.

The entire area was scouted for the presence of Ribes, the alternate host for white pine blister rust. According to Thomas J. King, Chief of the Forest Pest and Disease Section, 2673 acres were scouted and 1357 currant and gooseberry bushes were destroyed. The next scheduled inspection is set for the year 1975, except in areas operated for timber. More frequent inspection is necessary where surface disturbances take place.

SUMMARY

COST DATA

1965

Costs for 1965

*Operating Cost - Blister Rust Control payrolls	$308.00	
Blister Rust Control mileage	$118.08	
*Timber Tax	$15.36	
Fire Control	$100.00	
Sub-total		$541.44
Administration Charge (5% of above)	$27.07	
Account Clerk (one day @ $15.83)	$15.83	
Field Overhead	$117.58	
Sub-total		$160.48
Transferred to Forest Improvement Fund a/c Personal Service and Field Overhead 1/1/64 to 12/31/64	$1242.76	$1242.76
TOTAL EXPENSES FOR 1965		$1901.78

INCOME FROM BLACKWATER - 1965

Oxford Paper Company, New York, New York

9/17	4.47 cds. peeled, hardwood pulpwood @ 26.25/cd. less trucking at 7.25/cd (pl-44)	$84.93
10/1	17.88 cds. " " " " "	$339.72
10/8	8.88 cds. " " " " "	$168.72
10/28	23.71 cds. " " " " "	$450.49
11/5	8.69 cds. " " " " "	$165.11
11/22	2.00 cds. " " " " "	$38.00
		$1246.97

SUMMARY - BLACKWATER PROJECT

YEAR	BLACKWATER	F. I. F.	INCOME	TRANSFERS TO F.I.F.
1955		$526.00		
1956		$17,429.36	$10,483.76	
1957	$11,836.19	$2891.77	16, 949.16	$10,000.00
1958	$9330.80	3634.52	16,171.08	9200.00
1959	14,777.84	4298.66	21,279.50	4818.59
1960	8674.88	1995.39	13, 359.44	4761.72
1961	7421.09	1732.29	7315.19	1995.39
1962	409.72	256.05		1732.29
Refund of Revenue	$171.12			
1963	4.68	390.18	244.34	256.05
1964	7117.48	1242.76	8029.15	390.18
1965	441.44	260.48	1246.97	1242.76
	60,185.24	34,657.46	95,078.59	34,396.98

Recapitulation - 1955 to December 31, 1965

Total Income from Blackwater to date:		$95,078.59
Blackwater direct expenditures to date:	$60,185.24	
Blackwater indirect expenditures to date: (Transfers to F.I.F. fund)	34,396.98	94,582.22
Book Balance, December 31, 1965		$496.37
Due F.I.F. @ 1965 Overhead Costs		260.48
Balance December 31, 1965		235.89

Wood and lumber inventory for December 31, 1965 - None

BLACKWATER FLOOD CONTROL AREA

Management Plan - 1966

Timber harvest will be resumed during 1966, offeringo on public bid sale an estimated volume of 150,000 bd. ft. of saw timber, mostly white pine and hemlock. Timber stand improvement will be done within the sale area either in conjunction with the timber harvest or immediately upon completion of the operation. This work will eliminate cull hardwood with no present or future commercial value.

Boundary lines which were tree-painted in 1954-1956 have become somewhat obscure. These will be refurbished during 1966. Boundary detail such as types of corner markers, fences, walls and the like will be noted on base maps. This is at the request of Mr. Humphries of the Corps of Engineers. In addition to the above projects, normal maintenance and protection functions will be continued.

During 1967 and 1968, timber sales of approximately 100,000 bd.ft. will be offered on public bid. Timber stand improvement will also continue within the limit of available funds.

Estimated income and expenditures for the years 1966, 1967, 1968 follow:

		1966	1967	1968
1966	Income - 150000 bd. ft. sawtimber			$2250.00
	Expenditures- Administration			$1500.00
	Timber Stand Improvement			500.00
	Maintenance			250.00
1967	Income - 100000 bd. ft. sawtimber			1500.00
	Expenditures-Administration			700.00
	Timber Stand Improvement			500.00
	Maintenance			100.00
1968	Income - 100,000 bd. ft. sawtimber			1500.00
	Expenditures - Administration			700.00
	Timber Stand Improvement			500.00
	Maintenance			100.00

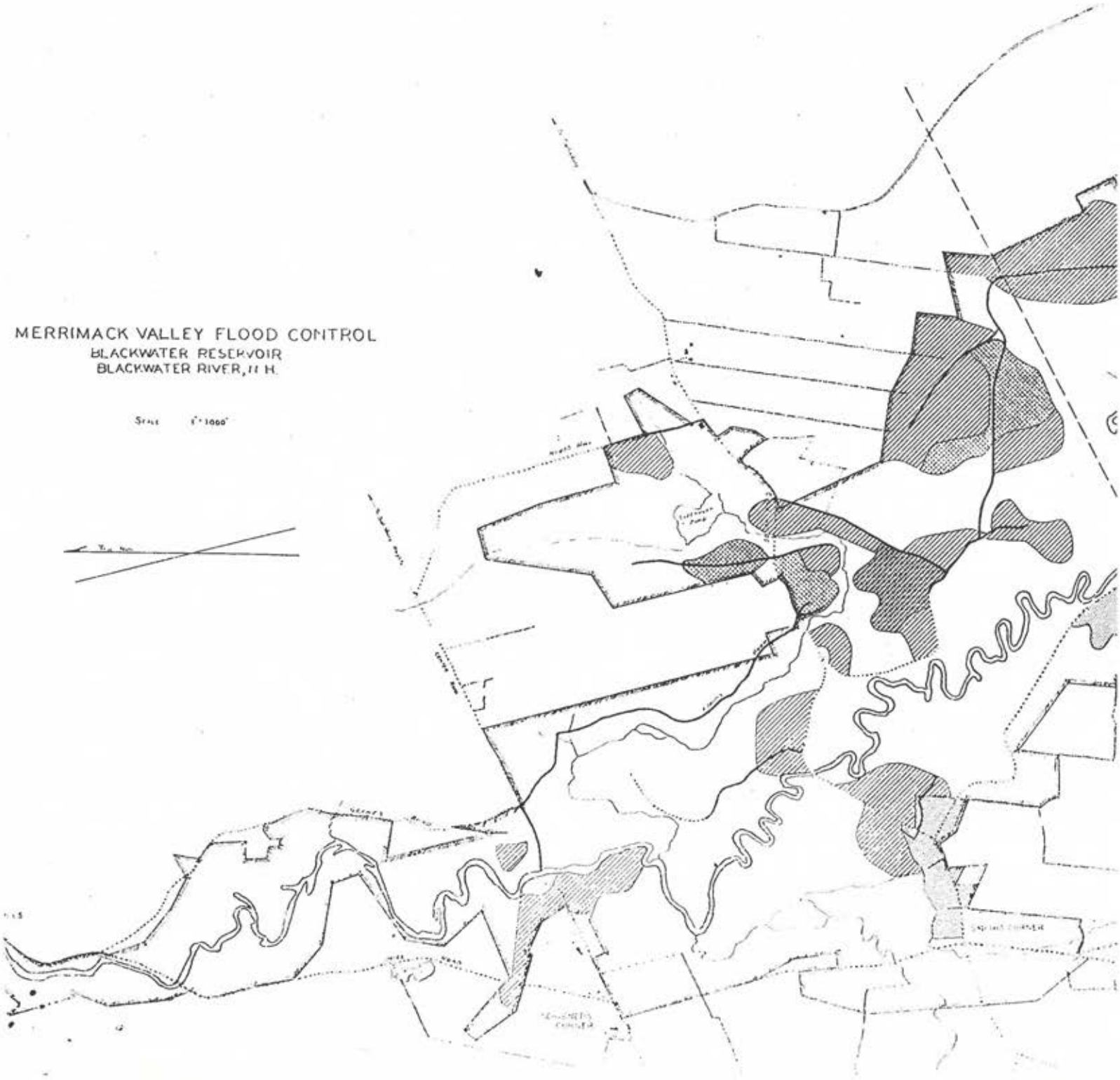
BLACKWATER OVERHEAD SUMMARY - DETAIL

1965

Administration:	2½ hours @ $2.99	$7.48	
Inspections:	2 hours @ $3.71	$7.42	
	3 hours @ $4.03	$12.09	
	2½ hours @ $4.16	$10.40	
	3 hours @ $4.98	$14.94	
Checking:	4½ hours @ $3.71	$16.70	
	2 hours @ $4.03	8.06	
Scaling:	2½ hours @ $3.71	9.27	
			$86.36
Mileage:	355 mi. @ .08	$28.40	$28.40
Meals		2.82	2.82
	TOTAL		$117.58

BLACKWATER OPERATING COST - DETAIL

Blister Rust Control:		
Mileage for Scouts	$118.08	
Payroll	$308.00	
		$426.08
Timber Tax - Town of Salisbury	$15.36	$15.36
Fire Control		$100.00


MERRIMACK VALLEY FLOOD CONTROL
BLACKWATER RESERVOIR
BLACKWATER RIVER, N.H.
Scale 1" = 1000'

FOREST FIRE PREVENTION

AND CONTROL PLAN

FOREST FIRE
PREVENTION AND CONTROL PLAN
for
MERRIMACK FLOOD CONTROL
BLACKWATER RIVER RESERVOIR

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Foreword

The Blackwater River Reservoir project, a portion of the overall Merrimack Flood Control Plan, is located in the townships of Salisbury and Webster and involves some 3,510 acres of woodland and open areas. Public highways run through and around portions of the area, making it susceptible to the normal hazards of fire - human activities plus the unpredictable so-called acts of God, such as lightning, etc.

In an effort first to prevent fires and then to successfully combat such fires as do occur, the following fire plan has been prepared.

FIRE PLAN

Prevention

The policy of the New Hampshire Forestry Department, in its overall dealings with the public on fire as it relates to woodlands, is to stress as strongly as possible the idea of prevention. Prevention plans for the Blackwater River Reservoir contemplate such activities as may be necessary to protect this sizeable and valuable tract from fires resulting from human carelessness.

Posters

Suitable and pertinent posters will be placed on highways bordering the reservoir area, at points of entry into the area and occasionally along main woodroads running through the area.

Fire

Fires of all description will be banned in the area, except when specifically approved by the state forester or his authorized representative.

Closing Access Roads

Access roads, leading to high hazard areas will be barred to the general

public. It will be the responsibility of the state and district chief to keep the wardens of Salisbury and webster and other authorised personnel informed as to the status of roads in this category.

Slash

Logged and improved areas, with resulting slash conditions, will be barred to public entry for as long as high hazard conditions make such action necessary.

Roadside and property line - Slash shall be removed the required legal distance of 50 feet from the traveled edge of public highways and 25 feet along boundary lines on the part of the state, town and individuals. Slash along main haul roads will be moved a distance of 25 feet from the edge of such roads.

Pre-Suppression

Wardens

Wardens of Salisbury and Webster will be briefed and given all pertinent area information, provided area maps indicating roads, existing slash areas, location of available water and urged to keep an alert eye on the area. Wardens will instruct and inform their deputies.

Detection Service

Kearsarge Mountain has the only lookout station overlooking the Blackwater River Reservation area. It has, however, a good view of the entire area. Watchman will be provided with both a special USGS map showing the location of the area and a copy of the area map. He will be instructed to keep special watch over this area. Watchman will also have list of available members of the warden force in both towns and the order of their availability.

In this particular situation, since the towns will not share in the expense of suppressing fires, watchman will be instructed, in case of inability to handily contact members of warden force of the town in which fire is located, to secure most available warden/deputy warden to insure prompt suppression action.

Inventory of resources

Personnel

Salisbury	-	warden and 3 deputy wardens total manpower - 50
Webster	-	warden and 5 deputy wardens total manpower - 50
Forestry Dept.	-	woods working crews when operating in the area
Outside towns	-	unlimited

Equipment

Salisbury	-	2 tank trucks - 650 and 800 gallons respectivily 2 portable pumps 1700 feet of 1½" hose hand tools for 50 men
Webster	-	3 tank trucks - 420 - 620 - 700 gallons respect. 3 portable pumps 1400 feet of 1½" hose hand tools for 75 men
Forestry Dept.	-	woods working crew operating in the area will be furnished with firetools kept in boxes.
Outside towns	-	unlimited

Mutual Aid

The department has in force a mutual aid system which makes available to any warden in difficulty, sufficient manpower and equipment to meet any emergency.

1. Warden is authorized to personally call manpower and equipment from towns immediately abutting his. In this instance the following towns would furnish such aid to the towns of Salisbury and Webster.

Andover	Concord	Hopkinton
Boscawen	Franklin	Warner

2. If more aid is needed, warden is directed to contact district dispatcher and place his request. Dispatcher takes over and fills the order.

Available Water - suitable for pumping

1. Blackwater River runs through entire length of reservoir area.
2. Greenough Pond - located in most easterly tongue of reservoir area, one-fourth mile north of South Road and one-third mile west of Heath Highway.

3. Small pond (unnamed) beside road four-fifths mile north of Scribner Corner.

Suppression Action

When warden has been informed of a fire in the reservoir area, either by look-out watchman or a resident, he will take immediate steps to activate his local forces to suppress it. The size of the force will depend upon the initial information given him, location of the fire, weather conditions, etc. He will continue to work on the fire until it is completely extinguished.

When a fire occurs on the area, the district chief will be alerted. He will go to the scene of the fire and direct the suppression job.

Reports

Complete report of the fire will be made by the warden involved on the regular department form. Supplemental report as needed can be made by the district chief.

Bills

Bills covering the services of the suppression force and equipment will be made on regular department form. Since this is publicly owned land, bills will be paid from public funds and the towns will not share.