EAST BRIMFIELD LAKE
FISKDALE, MASSACHUSETTS

FOREST MANAGEMENT PLAN
MASTER PLAN APPENDIX B

AND

FISH AND WILDLIFE MANAGEMENT PLAN
MASTER PLAN APPENDIX D

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
OPERATIONS DIVISION
WALTHAM, MASSACHUSETTS

MARCH 1982

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT
NEDOD-P	Master Plan Appendices B & D, Forest and Fish and Wildlife Management, East Brimfield Lake

TO See Distribution

FROM Actg Chf, Operations Div

DATE 27 September 1982

CMT 1

MITCHELL/lsd/284

1. The subject appendices, prepared in accordance with ER 1130-2-400, dated May 1971, has been approved by the Division Engineer.

2. The plan has been developed to increase the value of reservoir lands for recreation and wildlife, and to promote natural ecological conditions by following accepted conservation practices.

3. This plan has been developed in coordination with the Massachusetts Department of Environmental Management; the U.S.D.A. Soil Conservation Service and the Town of Sturbridge. This plan should be used as an informational copy.

Incl
as

J. C. WONG
Acting Chief, Operations Division

Distribution:

(2) CDR USACE (DAEN-CWO-R)
WASH, DC 20314
(15) Operations Division, NED
(1) Planning Division, NED
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DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT
EDOD-P	Master Plan Appendices B and D, Forest and Fish and Wildlife Management Plan - East Brimfield Lake

TO	FROM	DATE	CMT 1
Division Engineer	Acting Chief, Operations Division	1 September 1982 Mr. Mitchell/cp/284	

1. Inclosed for your approval is the Forest and Fish and Wildlife Management Plan for East Brimfield Lake. This plan will serve as Appendices B and D to the Master Plan for this project.

2. It has been prepared in conjunction with ER 1130-2-400, dated 28 May 1971. It has been reviewed by NED Planning and Real Estate Divisions, the U.S. Fish and Wildlife Service and the Massachusetts Department of Environmental Management.

3. Division Engineers have been designated as approval authority for these plans by ER 1130-2-400. Information copies are to be forwarded to OCE upon approval.

1 Incl
as

for J.C. WONG
Acting Chief, Operations Division

CF: Opers Div File

NEDDE

TO: Acting Chief, Operations Division FROM: Division Engineer DATE: 7 Sep 82 CMT 2

☑ APPROVED ☐ DISAPPROVED

CARL B. SCIPLE
Colonel, Corps of Engineers
Division Engineer

DA FORM AUG 80 2496 PREVIOUS EDITIONS WILL BE USED

EAST BRIMFIELD LAKE
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FOREST MANAGEMENT PLAN
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DEPARTMENT OF THE ARMY
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OPERATIONS DIVISION
WALTHAM, MASSACHUSETTS

MARCH 1982

ACKNOWLEDGEMENTS

The Corps of Engineers, New England Division, wishes to thank the following people for their effort in developing this natural resource management plan:

Mr. John Clarkin - Park Manager, TRB

Ms. Joan Cyr - Park Ranger, TRB

Ms. Nancy Moore - Park Ranger, TRB

Mr. Charles Freeman - Planning Division

Mr. Russell Keeler - Real Estate Division

Mr. John Mitchell - Operations Division

Ms. Louraine Bogosian - Word Processing

Reprographics Section - Graphics and Reproduction

Also, thanks to the U.S. Fish and Wildlife Service and the Massachusetts Department of Environmental Management for their review comments of this plan.

EAST BRIMFIELD LAKE
FISKDALE, MASSACHUSETTS

INTRODUCTION

SECTION 1

PURPOSE

The lands, forest, and water of East Brimfield Lake are valuable assets to the surrounding areas providing diverse recreational opportunities and preserving natural areas in public ownership as well as protecting the lakes and streams within the flood control project. The intelligent management of the lands and waters according to sound practices will insure their existence and continued productivity for future generations.

The purpose of the forest management portion of this plan is to describe the forest resources contained within the project boundaries, and to provide a framework for managing these resources. The fish and wildlife portion of this plan describes the fish and wildlife resources of the project and serves as a guide for their management. The plan will enhance the value of the natural resources in the project area for recreation, aesthetics, and provision of forest products for future generations.

AUTHORITY

This plan constitutes Appendix B (forest management plan) and Appendix D (fish and wildlife management plan) to the project Master Plan authorized under ER-1130-2-400 dated 28 May 1971.

MANAGEMENT OBJECTIVES

The objectives of this management plan are to outline management practices which are compatable with flood control operations, multiple-use practices for project lands and waters, and the ecology of the project area. Specific objectives are to protect and enhance the natural beauty and character of the area: to provide for diversified recreational use of project natural resources including hunting and fishing, nature and interpretation: sports, athletics, and general physical fitness; to maintain and enhance conditions desirable for fish and wildlife habitat; to maintain a thrifty, vigorous forest; and to, where compatable and practical, provide wood products for project use, national defense, and commercial purposes.

COORDINATION

Development of this management plan has been coordinated with the Massachusetts Department of Environmental Management (Division of Fisheries and Wildlife and Division of Forest and Parks); the U.S.D.A. Soil Conservation Service, and the town of Sturbridge.

PROJECT DESCRIPTION

SECTION 2

LOCATION

East Brimfield Lake is located on the Quinebaug River one mile southwest of the village of Fiskdale in the town of Sturbridge. The lake extends into the towns of Brimfield and Holland in Hampden and Worcester Counties. Access to the area is by Massachusetts Route 20.

ACQUISITION

East Brimfield Lake is an element of the flood protection plan for the Thames River Basin which was approved by the Flood Control Act dated 18 August 1941 (public law No. 228, 77th congress, 1st session). The total area of the project is 2,787 acres, of which 2,138 acres were purchased in fee and 649 acres are held in flowage easement. Construction of the project was completed in June, 1960.

HISTORY

The town of Brimfield was settled in the 1730's as an agricultural community. By the 1820's a typical family owned 6-12 sheep, chickens, a team of oxen, 4-6 cows and a couple of pigs. Coopers, potters, blacksmiths and other artisans likely would be farmers also, but perhaps on a smaller scale, expecting payment of farm produce for their services.

Although Brimfield had limited water power, the lure of industrialization proved irresistable. The Brimfield Cotton and Woolen Company erected a building in East Brimfield in 1815 to manufacture cotton warp to sell to domestic weavers through the store. Later, as mill technology improved, weaving machines replaced the home hand weavers. Within 3 years, in a general economic crisis, the mill failed and was sold. It changed hands several times before it burned down in 1854.

Farmers responded to the woolen factories in Brimfield and nearby towns by increasing their flock of sheep, improving the breeds, and selling fleece to the manufacturing companies.

By the 1830's small business and home industries which had been closely tied to farming were expanding independently. Both men and women were employed to produce shoes and boots to send to such places as Hartford, Connecticut and Richmond, Virginia.

In 1880, Snelling Manufactoring Company of Fiskdale, bought the old textile building in East Brimfield as well as the local grist mill and sawmill. In these buildings they produced augers and bits until 1921 when the Snelling Manufacturing Company closed.

East Brimfield Lake was made by the construction of the dam. The impoundment covers what once was agricultural land.

Today Brimfield remains a small town with a substantial number of residents employed in dairy farming and agriculture. Important tourist dollars are brought into the Brimfield economy three times a year when people from all over the country attend the Brimfield flea markets.

PHYSICAL AND ECOLOGICAL CHARACTERISTICS

SECTION 3

TOPOGRAPHY

The general terrain around the project is hilly with mountain ranges oriented in a north-south direction. In contrast, much of the reservoir area is lowlying swamp land which would be flooded at full pool elevation. There are numerous lakes, ponds and marshes in the towns of Sturbridge, Brimfield, and Holland situated in valleys formed by rounded hills rising to an elevation of 1,000 feet NGVD and higher.

CLIMATE

The average annual temperature for the project area is about 47°F. Average temperatures for August and July are 22°F and 71°F, respectively. Extremes of over 100°F and minus 15° occur infrequently. The length of the frost-free period is approximately 180 days.

Precipitation is evenly distributed throughout the year, averaging 46 inches annually. Snowfall varies over the Quinebaug Basin with an average annual depth of 59.2 inches in Southbridge at elevation 720 msl.

Average annual runoff is 22.5 inches for the Thames River Basin which is just over 50 percent of the average annual precipitation.

GEOLOGY AND SOILS

The Quinebaug River Basin is a geological part of the Central Highlands of Massachusetts and Northeastern Connecticut.

The soils of the swampy portions of the reservoir are classified as peat and muck, originating from accumulated decaying organic matter in what apparently was an ancient lake bed. The high water tables in these pre-existing swamps has deterred use of the rich lands for agriculture. However, the land underlying the Conservation Pool was originally a high-yield agricultural area, rich in nutrients. Soils on the slopes are of the Gloucester series, coarse in texture having developed mainly from weathering of crystalline schists and gneisses and accumulated by glacial action. The upland soils are mostly gravel and hardpan covered with a layer of humus, and thus would be resistant to any erosion caused by increased recreational activity in this area.

An accurate updated soils map has not been prepared for the East Brimfield Lake Area. The USDA Soil Conservation Service is presently working toward mapping the soils of the entire state by the early 1980's. When available, this information will help guide management efforts.

AREA CLASSIFICATIONS

FOREST INVENTORY

A timber cruise was conducted during the fall of 1980. Aerial photos were used to delineate forest types and to determine height classes and percentage of crown closure. Field surveys were then conducted to classify each type according to the guidlines in Forest Cover Types of North America. published by the Society of America Foresters (1975). Exhibit A, Table 1 gives a list of land classifications and forest cover types with acreages of each. A list of common and scientific names of trees is in Table 3.

Variable radius plots were taken at random locations in each forest type using a prism with a 10 basal area factor. Table 2 gives estimates of timber volume by species on the project. The estimates were based on the International 1/4 inch rules and Gerard form class 78. Volume estimates occurred at the 90% confidence level.

FOREST TYPES

There are six forest types at East Brimfield Lake on 25.7% of the total fee acreage. The most extensive type is type 20, White Pine-Northern Red Oak- White Ash, which is found on 324.8 acres. Generally found on fertile, well-drained soils, Eastern White Pine and Northern Red Oak are the dominant trees of the canopy, Red Maple, Black Cherry, and White Oak are the chief associates.

The second largest type is type 54, Northern Red Oak-Basswood-White Ash. The mixed hardwood association is found on deep fertile, moist, well-drained soils. The most prominent trees in the stand is Northern Red Oak and with associates including Red Maple, White Pine, Yellow and Paper Birch, Quaking and Bigtooth Aspen, Black Cherry, and Eastern Hemlock. This type covers 159.2 acres.

The third forest type to be found is White Pine, type 21. White Pine occurs in nearly pure stands with scattered Northern Red Oak and Red Maples. White Pine is a long lived species that seldom succeeds itself, except when proper silvicultural management is used. This type covers 152.6 acres.

White Pine-Hemlock, type 22 is found on 33.8 acres. This type is composed mainly of Eastern White Pine and Northern Hemlock. Its occurrence is scattered in small bodies. The associates are numerous including, Sugar Maple, Red Maple, Basswood, Yellow Birch, Black Cherry, and Red Oak.

Northern Red Oak, type 55, is found in two small stands on the east bank of Long Pond and Northwest of Holland Pond. Northern Red Oak is pure or predominant with associates of Scarlet Oak, Chestnut Oak, and Yellow Poplar.

The least common type, Aspen, type 16 is found on 14.7 acres. Aspen is a pioneer type occurring after wildfire and clearcuts, and is usually succeeded by White Pine or Northern Hardwoods. Aspen is found on the wet sites near Green Pond. Associates are Red Maple, Gray Birch, and White Pine.

DAM AND RECREATION AREAS

The project area immediately around the dam (approximately 10 acres) is an aesthetically pleasing combination of water, field and forest. The parking lot at the dam site accommodates 10 vehicles for unstructured types of outdoor recreation on a day use basis. The dam overlook provides a viewing point for the surrounding area suitable for fishing and all forms of non-consumptive recreation activities i.e, hiking, wildlife observation, picnicking, physical fitness and sports.

Holland Pond is operated by the Massachusetts Department of Environmental Management, Division of Forest and Parks, as a day use area.

The Streeter Road day use area is also managed by the Division and includes, picnicking, swimming, and boat launching facilities.

The Lost Lake area consists of a group outing area and is managed by the Massachusetts Department of Environmental Management.

WATER

Water areas include the conservation pool, Long Pond (part of conservation pool), Holland Pond, Lost Lake, Green Pond, Pork Barrel Pond, the Quinebaug River and its tributaries. Water surfaces total 590 acres.

FOREST MANAGEMENT

SECTION 4

FACTORS INFLUENCING FOREST MANAGEMENT

Several factors influence the management of forest resources at East Brimfield Lake. These factors need to be evaluated when developing viable programs for forest management that will minimize adverse effects and optimize the benefits obtainable from the project resources.

ACCESS

Access throughout the East Brimfield area is moderately good via recreation areas, and abandoned county and state roads. Access in the Long Pond area is limited due to abutting private land.

AESTHETICS

East Brimfield Dam and recreation areas are intensively used recreation areas. Due to the location of the project in a densely populated area, and the wide variety of recreational opportunities available, the recreational impact on the natural features must be closely monitored and protected. Silvicultural operations will not degrade the aesthetic quality of the area, and tree removal from recreation areas and the lake shore will be restricted. Selective tree removal will be favored and applied to only trees presenting a safety hazard to the public or a health problem to surrounding trees.

FOREST PROTECTION

The most effective method of protecting the forest from disease and insect pests is the maintenance of vigorous, healthy forest stands. Proper silvicultural practices providing a diversity of species and age classes with good vigor will normally prevent major infestations.

Direct approachs, i.e.; chemical spraying for disease and pest problems will be used only to deal with individual trees of extremely high value or with an infestation that has attained or is likely to attain epidemic proportions. In such cases only EPA registered pesticides will be applied and treatment will be coordinated with the Massachusetts Department of Environmental Management.

INSECTS

Several insect pests occur throughout the reservoir but have not as yet caused serious damage. These include the white pine weevil (Pissodes strobi), saddled prominent (Heterocampa guttivitta), fall webworm, (Hyphantria cunea), tent caterpillars, (Malacosoma spp.), and the gypsy moth, (Porthetria dispar). The female white pine weevil burrows into the

terminal shoot, to lay her eggs. This results in a crooked or multistemmed pine of reduced aesthetic and commercial value as lateral branches assume apical dominance. Young pine growing in partial shade have a reduced incidence of infestation.

Gypsy moths defoliate hardwood trees, black cherry and oaks being preferred host species. Vigorous hardwoods will die if repeatedly defoliated over several years, unhealthy trees and any evergreens can succumb after a single infestation.

Numerous gypsy moth egg masses were noticed during the forest inventory. Infestation should be monitored and any trees killed should be salvaged if accessible.

DISEASES

No tree diseases were found to be occurring in significant numbers to pose an immediate problem. Should a serious outbreak of disease or insect damage occur, entomologists or pathologists from the U.S. Department of Agriculture, and/or the University of Massachusetts will be asked for technical advise.

AIR POLLUTION

Air pollution is not known to be a serious threat to the forests at East Brimfield Lake. The effects of acid rain on the forest and aquatic resources of northeastern North America due to the increased fossil fuel consumption is becoming a serious concern. The soils in New England lack the ability to buffer the acidity leading to decreased pH levels in streams and lakes. Fish populations cannot tolerate low pH (< 5.5) on a sustained basis and will die. Stream acidity will be monitored in the future to warn of impending problems.

EROSION CONTROL

An erosion problem exists along the northwestern bank of the Quinebaug River. The problem exsists due to an encroachment by an adjacent land owner. The land owner has been notified and procedures have been taken to correct this problem.

Frequent fluctuations in the water level may initiate erosion and slumping. Therefore, susceptible areas should be monitored frequently, especially after periods of high water.

Any newly detected erosion problems will deserve immediate corrective action and subsequent revegetation to prevent further damage.

PLANTINGS

Natural regeneration is expected to perpetuate the forest stands now existing on the reservior. Buffer strips of trees and shrubs may be planted to screen undesirable features of the landscape, to provide food and cover for wildlife, or for erosion control.

THINNINGS

A complete forest inventory conducted in 1981 determined thinning needs for immature stands. Once stand examinations begin, the method and timing of all intermediate cuttings and all prunings will be designated for specific stands.

Thinnings reduce competition around trees for light, moisture and nutrients and encourage the development of understory and ground vegetation which is needed for wildlife food and cover requirements. Thinnings are used to increase growth in stagnated stands to maintain growth in young stands, and in desired trees, to regulate stand density, and to create a diversity of species and age classes. The operation usually involves removing trees that are of poor quality have no commercial or wildlife potential, or are competing for space.

Maintenance of stand vigor is important but will be subordinated to stand attractiveness in recreation developments. In the vicinity of recreation sites, ponds and streams, harvesting will also be limited to removing hazards, dying or diseased trees that threaten the health and beauty of the forest or the safety of its users. Care will be taken to prevent damage to residual trees and ground vegetation, slash may be chipped and used as mulch on critical sites. If the slash is to be piled, it will be done in such a manner as to provide cover for wildlife.

All harvests will be done with attention on how residual stands will look, and will create an interesting variety of forest patterns. Trees and shrubs that add to the beauty of flowers in the spring and of colorful fruit and foliage in the autumn will be favored. In some stands, thinnings will be used to release promising young oaks and other trees having potential for greater mast production.

TIMBER HARVESTS

Forest areas in the reservoir are in need of silvicutural treatments to increase tree vigor, improve form, release suppressed trees, harvest mature timber and otherwise enhance the productivity of forest species desireable for aesthetics, wildlife, and forest products.

The white pine stands northeast of Five Bridge and Brimfield Roads, and north of the gravel pit will undergo a selective thinning. These areas both have a vigorous Oak/Hemlock understory and will be managed for these species.

MANAGEMENT DIRECTIONS

All silvicultural operations will be implemented under the direction of a Corps Park Ranger or Forester. The Ranger/Forester will mark trees to be cut prior to undertaking silvicultural work.

OTHER FOREST MANAGEMENT OPERATIONS

BOUNDARY MAINTENANCE

A boundary survey was completed in 1972. Boundary lines of sight will be cleared to a 3' wide path. Corner monuments will be marked by posting standard aluminum boundary signs as well as painting adjacent trees with red and white bands (each 3" wide). The boundary lines between monuments will be marked by posting a standard boundary sign at each 200'-300' intervals. Trees will also be blazed in the line of sight. Rectangular blazes will be cut approximately 6" long and painted red and white. All signs will face adjoining property with blazes facing the line of sight on both sides of the tree.

In areas near private homes, signing and blazing may be reduced to a minimum if they are a visable nuisance to adjacent landowners.

This distinct boundary marking technique will make it easier for the public to know when they enter or leave Federal property to minimize the possiblity of encroachments. This will also facilitate maintenance and resource management activities for Corps personnel.

The Park Rangers will have primary responsibility for the periodic inspection of the boundaries.

AQUATIC MANAGEMENT

SECTION 5

EXISTING MANAGEMENT

Fisheries management is performed by the Massachusetts Division of Fisheries and Wildlife (referred to as the division) at East Brimfield Lake. The reservior supports a successful warm water fishery with an excellent bass population.

The Division stocks rainbow trout in tributary streams, usually in the 12" class.

In the past the Division has stocked Northern Pike when available. However, no Pike reproduction has been noticed and the Division now stocks Tiger Muskies.

A general limnological survey was conducted throughout the summer of 1981 by the Corps Water Quality Laboratory to thoroughly assess the biological community. A list of fish species inhabiting East Brimfield Lake is found in table No. 4.

ENDANGERED SPECIES

No endangered aquatic species are known to exist in East Brimfield Lake.

FACTORS INFLUENCING AQUATIC MANAGEMENT

HABITAT

The principal factor influencing fisheries management is the nature of the habitat. East Brimfield supports a variety of aquatic habitats. The conservation pool, which includes Long Pond is a deep 470 acre reservoir.

Holland Pond is a natural 65 acre pond, as are Lost Lake (15 acres) Green Pond (5 acres) and Pork Barrel Pond (3 acres).

The Quinebaug River flows between Holland Pond and the conservation pool and above the reservoir. It is a generally slow moving river.

WATER QUALITY

East Brimfield supports a successful warm water fishery. The reservoir and its tributary streams have a class B water quality according to the Massachusetts Division of Water Pollution Control, and was determined to be mesotrophic. Water quality characteristics are routinely gathered and analyzed as part of the NED water quality management program.

Water quality parameters are also measured prior to stocking fish by the Division to insure adequate fish survival and highest fishing success. At present, the water quality is sufficient to support the fishery. It is necessary to maintain and monitor conditions to prevent or correct problems. Off-site pollution presents the greatest threat of water degradation.

WATER LEVEL FLUCTUATION

Reservoir regulations for flood control will continue to periodically alter the lake level, but this environmental change is not considered significantly disruptive to aquatic life. Water level fluctuations can be instrumental in controlling excessive macrophyte populations as they occur.

Regulation is normally short-termed and does not usually result in environmental degradation. Flooding regulation increases the productivity of water, and may benefit the spawning of warm water species such as Pickerel and Perch. Flooding in May or June is rare, but could be detrimental to the spawning of some species by leaving the eggs exposed to air or in too shallow water following subsequent drawdown.

AQUATIC WEEDS

Aquatic plants are common along the shorelines of the various ponds and conservation pool. Milfoil (Myriophyllum exalbescens), pickerel weed (Pontederia cordata), arrowhead (Sagittaria teres) and sedges (Cyneraceae) are common. Other aquatic vegetation includes water shield, (Brasenia schregeri), broad leaved cattail (Typhas latifolia) and pond weed (Potamogeton sp.).

In the past milfoil growth has increased rapidly and caused problems. This problem must be constantly monitored and treated with pesticides if necessary.

PESTICIDE USE

Herbicides are used on rock slopes, riprap, and the emergency spillway channel to control nuisance plant growth.

Future applications of herbicide will be held to a minimum and be applied by licensed applicators using chemicals that are in compliance with regulations set by the Environmental Protection Agency.

ACCESS AND FISHING PRESSURE

The conservation pool and Long Pond are accessible to fishermen by footpaths and boats. Boats can be launched from the Streeter Point boat ramp or boat access east, both located off route 20.

Holland Pond is accessible by boat and footpaths, as is Lost Lake, Green Pond and Park Barrel Pond.

Fishing pressure is estimated by the Division of Fisheries and Wildlife as heavy.

A creel census should be conducted to determine species taken and fishing pressure.

AQUATIC MANAGEMENT PROGRAM

HABITAT IMPROVEMENT AND MAINTENANCE

The creel census will assist in determining the adequacy of current management efforts, obtain harvest dates, and monitor fishing pressure.

The condition of the tiger muskie will be monitored to determine if they have become successfully established.

WILDLIFE MANAGEMENT

SECTION 6

MAJOR SPECIES

Wildlife that can be seen in the area include red fox (Vulpes fulva), raccoon (Procyon loter), porcupine (Erethizon dorsatum), woodchuck, (Marmota monax), snowshoe hare (Lepus americanus), cottontail rabbit (Sylvilagus floridanus), beaver (Castor canadensis), skunk (Mephitis mephitis), muskrat (Ondatra zibethica), gray squirrel (Sciurus carolinensis pennsylvanicus), and white tailed deer (Odocoileus virginianas).

Upland bird species include woodchuck (Philohela minor), and ruffed grouse (Bonasa umbellus).

Several species of ducks have been seen on project waters including mallards, (Anas platyrhynchos), black ducks (A. rubripes), and wood ducks (Aix sponsa).

Canada Geese (Branta canadensis) and Great Blue Herons (Ardea herodas have also been sited.

ENDANGERED SPECIES

Rare or endangered species generally are associated with rare habitat types or have exacting requirements with respect to a host of environmental factors. The habitat at East Brimfield is not uncommon and no rare or endangered species have been found.

FACTORS INFLUENCING WILDLIFE MANAGEMENT

FOREST MANAGEMENT EFFECTS ON WILDLIFE

Timber stand improvements such as thinnings and small patchcuts may result in attracting wildlife by enhancing the habitat for those that take advantage of the new herbaceous and woody plant growth. A diversity of habitats provides for a varied ecotone which is preferred by most wildlife species.

Thinning around vigorous young oak will be done to increase mast production. Small clearings will favor the regeneration of Aspen, Cherry, Birch and other intolerant species commonly used by many animals.

HUNTERS ACCESS AND DESIGNATION OF HUNTING AREAS

Hunting is allowed at various areas throughout the East Brimfield area subject to Massachusetts Division of Fisheries and Wildlife regulations.

Access is generally good via old woods roads and recreation areas. The only exception is in the area around Long Pond where access is limited due to abutting private property.

WILDLIFE OBSERVATION

The aesthetic values of wildlife observation are the most important human values of wildlife management at East Brimfield. Small mammals and birds residing on the fringes of picnic areas, along roadsides, and the lakes are perhaps the most noticeable residents. Visitation by sightseers will be enhanced by good cultural practices aimed at providing adequate food and cover near these sites.

WILDLIFE MANAGEMENT PROGRAM

HABITAT IMPROVEMENT AND MAINTENANCE

The diversity of habitats at East Brimfield is a great asset to wildlife populations. The combinations of mature forest, young forest stands, swamps and open fields provide many ecotones. This diversity will be encouraged by keeping open fields down to brush and halting normal succession.

The open area at the southeast end of Holland Pond should be kept in primary succession as a wildlife area, as should the open area along the southern end of the conservation pool.

Timber stand improvement should be performed along the abandoned road between Lost Lake and Holland Pond to improve wildlife habitat.

Brush piles should be constructed in the large open area between Lost Lake and the Quinebaug River. Numerous animal trails were found here during the inventory. Wildlife shrubs should be planted in this area.

Beaver works were found along the old railroad bed in the conservation pool. Trapping should be monitored to prevent the elimination of the beaver population.

The wetlands on the edges of the Quinebaug and the various lakes offer good potential for habitat improvement. Wood duck boxes will be erected in these areas and checked and cleaned annually by project personnel. Placement of these boxes, as well as boxes for kestrels, purple martins, bluebirds and other songbirds cost little, are easily built, require little maintenance beyond annual checks, and attract colorful birds that are enjoyed by visitors.

Den trees, fruit trees, emerging vegetation, and forest successional types will be kept in balance to perpetuate the greatest diversity of species at East Brimfield Lake.

LAW ENFORCEMENT

The enforcement of fish and wildlife laws is accomplished by the Natural Resources Officers of the Department of Environmental Management. Additional enforcement is done by personnel of the Division of Fisheries and Wildlife, the Division of Forest and Parks, and the State Police.

SPECIAL NEEDS

SECTION 7

TRAINING

Cooperation with all resources agencies in the planning and action stages of wildlife management will incorporate interagency training and university instruction for field managers.

Implementation of current programs by the Massachusetts Division of Forest and Parks will involve sharing of personnel as part of the desired cooperative assistance.

Multi-disciplinary training will receive high attention, but participation in on-site resource management activities will also be stressed. Procedures and standardization of user surveys and state fish and game laws are among many items in which Corps Rangers need instruction.

As conditions arise, managers are urged to identify other training needs and coordinate programs applicable to their management activities.

RESEARCH COOPERATION

The Corps of Engineers supports university research and studies that attempt to solve current forestry, fish and wildlife management problems. East Brimfield Reservoir is open for any such activities that will benefit the education of university students, research personnel and environmental programs at East Brimfield. Resulting research will lead to better resource management.

INFORMATION AND EDUCATION

Information and education are important aspects of the forest, fish and wildlife management program. It is imperative that the public be informed of management decisions and programs. Efforts will be made to publicize programs and actions, such as timber sales and habitat improvement work.

Educational efforts will be directed at explaining the purposes behind natural resource management and broadening the general public's understanding of ecological relationships.

The image and understanding for the Corps recreation-resource management program can only be enhanced by public contacts initiated through an organized public relations program.

Current information and education efforts concerning forests, fish and wildlife at East Brimfield Lake will be expanded to include attractive brochures that are educational, informative, and specific to the property.

INTERPRETIVE PROGRAM

The possiblity of presenting interpretive programs at the various recreation areas at East Brimfield will be discussed with personnel from the Massachusetts Department of Environmental Management. Topics could include natural history, resources management and the operation and role of East Brimfield Dam for flood protection.

SECTION 8 PERSONNEL RESPONSIBILITIES AND FUNDING REQUIREMENTS TO IMPLEMENT THE PLAN

The Park Ranger under the general supervision of the Basin Manager and in close coordination with the Project Manager, will be responsible for the following resource management tasks:

a. Data collection, such as timber inventory and wildlife surveys.

b. Preparation and periodic updating of compartment prescriptions.

c. Preparation of annual work plans for vegetation, wildlife and fishery management.

d. Scheduling and supervision of management work carried out.

e. Preparation and supervision of contracts dealing with resources management.

f. Inclusion of requests for needed funds in project budget submittals.

g. Maintenance of records for work accomplished, maps and costs.

h. Updating of plan on a 5-year cycle in coordination with appropriate divison elements and other agencies.

The Park Ranger will divide work time between recreation and management responsibilities and other assigned duties here and at the other basin reservoirs. Below is a current estimate of average annual field costs for hired labor and contracts for materials and services distributed over the 5-year cycle. Funds required for natural resource management work will be given equal consideration with other items in the project O&M budget.

Personnel Position	Duties	Average-Annual M-H/Costs
Park Ranger, (GS-09)	1. Planning, coordination records management, contracts	40 M-H
	2. Data collection	24
	3. Field work (inspection, supervision, marking, planting)	40
	4. Training	16
	SUBTOTAL:	130 ($1,160)

Position	Duties	Average-Annual M-H/Costs
Forestry/or Biological Aid, (GS-04)	1. Data Collection	
	2. Field work (inspection, marking planting, T.S.I.)	40
	3. Other field and office duties as assigned	24
	SUBTOTAL:	84 ($440)
Dam Operator's Helper, WG-05	1. T.S.I., habitat improvement	24 M-H
	2. Planting, erosion control	24
	3. Fire road/break, boundary, maintenance, equipment operator	24
	SUBTOTAL:	72 ($450)
Summer Aid, Min. wage	1. T.S.I. habitat improvement	24
	2. Planting, erosion control	24
	3. Fire road/break, trail maintenance	24
	SUBTOTAL:	72 ($250)
	TOTAL:	$2,290

Materials and Services

Supplies (drafting, I&E, paint, marking gun, signs, etc.)	$300
Materials (plants, seeds, fertilizer, culverts, etc.)	500
Equipment rental (dozer, grader, disk plow, P/U truck, etc.)	1,500
Contract services (tree pruning, wood products, boundary maintenance, mowing)	1,000
TOTAL:	$3,300

The above annual estimated costs do not include: (1) applicable costs of project-owned vehicles, equipment and tools; (2) special projects.

FIVE-YEAR WORK PLAN

SECTION 9

GENERAL

The short range management programs delineated in this plan will be implemented within the next five years. Annual work plans will be developed in detail for a five-year period by project personnel, and updated annually. Work plans will be consistent with the overall objectives of the management plan, acceptable Corps of Engineer practices and available funds.

INITIAL WORK PLANS

Year 1 Construct and place bird boxes.

Year 2 Clear and burn field, plant wildlife crops, (construct brush) piles.

Year 3 Thin white pine stand.

Year 4 Assess Milfoil expansion.

Year 5 Thin white pine stand.

DISPOSAL PLAN

When commercial thinning and timber sale opeartions are carried out, and forest products are determined to be surplus to project needs, a disposal plan will be prepared.

REFERENCES

Clark, F.B. et al 1970 The Silviculture of Oaks and Associated Species. USDA Forest Service Res. Pap. NE-144, 66pp.

Lancaster, K.F. and W.B. Leak 1978 A Silvicultural Guide for White Pine in the Northeast. USDA Forest Service Gen. Tech. Report NE-41.

Society of American Foresters 1975 Forest Cover Types of North America. Bethesda, Maryland 67pp.

EXHIBIT A

TABLE 1

LAND CLASSIFICATION AND FOREST TYPES
(ACRES)

PROJECT OPERATIONS/RECREATION	181.5
MARSH	362.5
OPEN	30.1
WATER	398.5
FOREST	714.5
HARDWOOD SWAMP	382.9
TOTAL	2,070.0

FOREST TYPE

NORTHERN RED OAK/BASSWOOD/WHITE ASH TYPE 54	159.2
WHITE PINE/HEMLOCK TYPE 22	33.8
WHITE PINE/RED OAK/WHITE ASH TYPE 20	324.8
ASPEN TYPE 16	14.7
NORTHERN RED OAK TYPE 55	29.4
WHITE PINE TYPE 21	152.6
TOTAL	714.5

EXHIBIT A

TABLE 2

TIMBER VOLUME ESTIMATES FOR INDIVIDUAL SPECIES AND FOREST COVER TYPES
(TENS OF BOARD FEET: INTERNATIONAL 1/4 INCH RULE)

	SAF 16	SAF 20	SAF 21	SAF 22	SAF 54	SAF 55	SPECIES TOTAL
W. Pine		48,910	146,995	27,470			223,375
R. Maple		8,040					8,040
R. Oak		144,050	670			40,535	185,225
W. Oak		469	1,005		335		1,809
Hemlock		2,345		6,700		4,020	13,065
Aspen	46,385				2,680		49,065
TOTAL	46,385	203,814	148,670	34,170	3,015	44,555	480,609

TABLE 3

COMMON AND SCIENTIFIC NAMES OF TREES AT EAST BRIMFIELD LAKE

Acer rubrum	red, swamp or soft maple
Acer saccharum	sugar, rock or hard maple
Betula alleghaniensis	yellow birch
Betula populifolia	gray birch
Carya ovata	shagback hicory
Fraxinus americana	white ash
Pinus strobus	eastern white pine
Pinus sylvestris	scotch pine
Populus grandidentata	bigtooth aspen
Populus tremuloides	trembling or quaking aspen, poplar
Prunus pensylvanica	pin cherry
Prunus serotina	black cherry
Quercus alba	white oak
Quercus rubra	northern red oak
Tilia americania	american linden, basswood
Tsuga canadensis	eastern hemlock

Table 4

COMMON AND SCIENTIFTC NAMES OF FISH AND WILDLIFE AT EAST BRIMFTELD LAKE

FISH

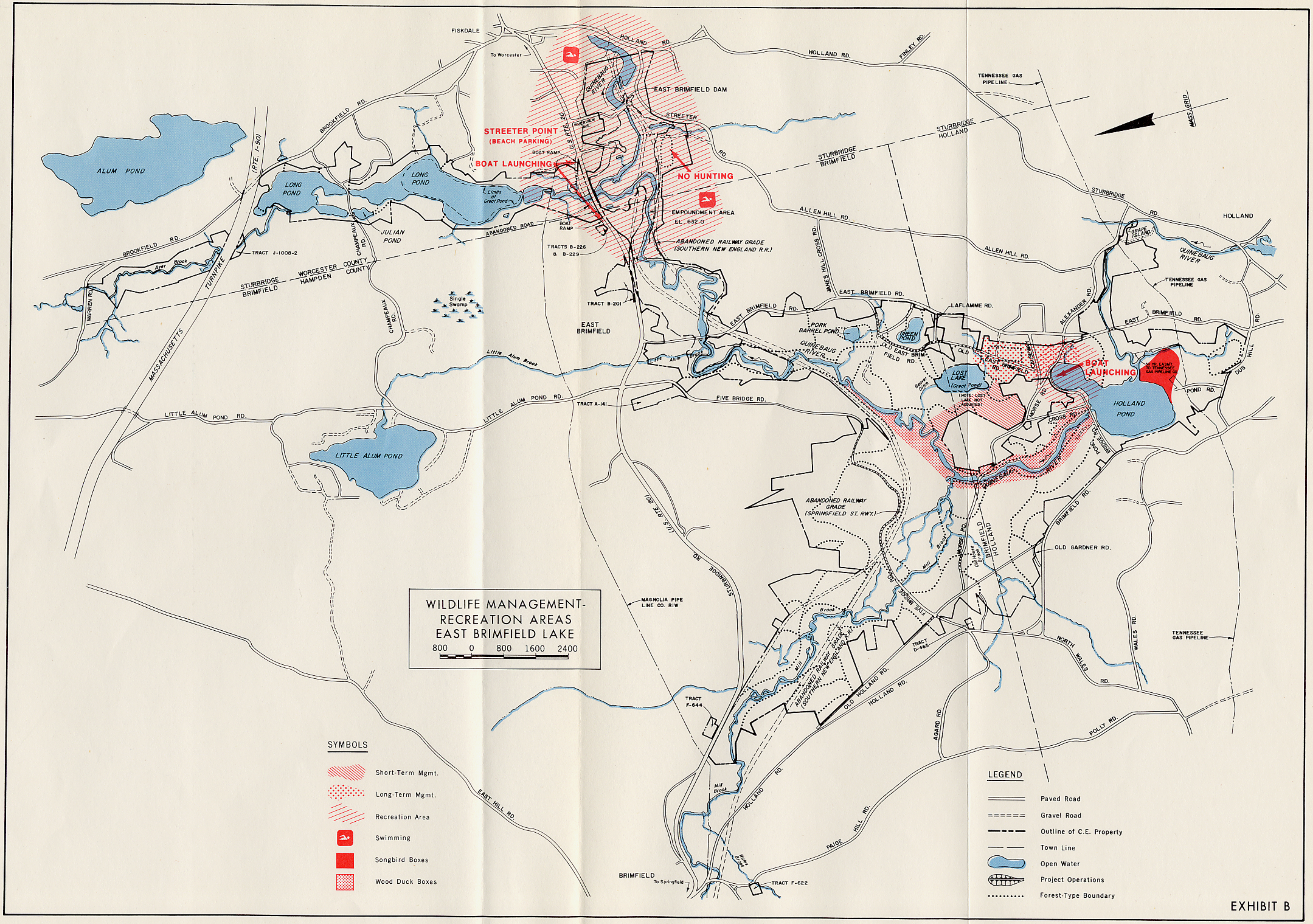
Bass, largemouth	Micropterus salmoides
Bluegill	Lepomis macrochirus
Bullhead, brown	Ictalurus nebulosus
Bullhead, yellow	I. natalis
Muskie, tiger	Esozlucius x E. masquinongy
Perch white	Morone amerianca
Perch yellow	Perca flavescens
Pickeral chain	Esox niger
Pumpkinseed	Lepomis gibbosus
Sucker, white	Catostomus commersoni
Trout, brown	Salmo trutta
Trout, eastern brook	Salvelinus fontinalis

MAJOR MAMMAL SPECTES

Beaver	Castor canadensis
Deer, whitetailed	Odocoileus virginianus
Fox, red	Vulpes fulva
Hare, snowshoe	Lepus americanus
Muskrat	Ondatra zibethica
Porcupine	Erethizon dorsatum
Rabbit, cottontail	Sylvilagus floridanus
Raccoon	Procyon loter
Skunk	Mephitis mephitis
Squirrel, gray	Sciurus cardinensis pennsylvanicus
Woodchuck	Marmota monax

WATERFOWL AND UPLAND BIRDS

Duck, black	Anas rubripes
Duck, mallard	A. platyrhynchos platyrhynochos
Duck, wood	Aix sponsa
Geese, canada	Branta canadensis
Grouse, ruffed	Bonasa umbellus
Heron, great blue	Ardia heiodias
Woodcock	Philohela minor


WILDLIFE MANAGEMENT-RECREATION AREAS EAST BRIMFIELD LAKE
800 0 800 1600 2400
SYMBOLS
Short-Term Mgmt.
Long-Term Mgmt.
Recreation Area
Swimming
Songbird Boxes
Wood Duck Boxes
LEGEND
Paved Road
Gravel Road
Outline of C.E. Property
Town Line
Open Water
Project Operations
Forest-Type Boundary
STREETER POINT
(BEACH PARKING)
BOAT LAUNCHING
NO HUNTING
EAST BRIMFIELD DAM
EMPOUNDMENT AREA
EL. 632.0
ABANDONED RAILWAY GRADE
(SOUTHERN NEW ENGLAND R.R.)
FISKDALE
To Worcester
HOLLAND RD.
FINLEY RD.
TENNESSEE GAS PIPELINE
STURBRIDGE
HOLLAND
STURBRIDGE
BRIMFIELD
ALLEN HILL RD.
HOLLAND
QUINEBAUG RIVER
ALUM POND
LONG POND
LONG POND
JULIAN POND
BROOKFIELD RD.
TRACT J-1008-2
WORCESTER COUNTY
HAMPDEN COUNTY
MASSACHUSETTS TURNPIKE
(RTE. I-90)
CHAMPEAUX RD.
Single Swamp
EAST BRIMFIELD
TRACT B-201
TRACTS B-226
B B-229
EAST BRIMFIELD RD.
LAFLAMME RD.
PORK BARREL POND
GREEN POND
LOST LAKE
(Great Pond)
BOAT LAUNCHING
HOLLAND POND
POND RD.
DUG HILL
LITTLE ALUM POND
LITTLE ALUM POND RD.
TRACT A-141
FIVE BRIDGE RD.
ABANDONED RAILWAY GRADE
(SPRINGFIELD ST. RWY.)
(U.S. RTE. 20)
STURBRIDGE RD.
MAGNOLIA PIPE LINE CO. R/W
OLD GARDNER RD.
BRIMFIELD RD.
NORTH WALES RD.
WALES RD.
TENNESSEE GAS PIPELINE
TRACT D-465
TRACT F-644
OLD HOLLAND RD.
HOLLAND RD.
AGARD RD.
POLLY RD.
PAIGE HILL RD.
EAST HILL RD.
BRIMFIELD
To Springfield
TRACT F-622
Mill Brook
EXHIBIT B

FOREST COMPARTMENTS AND COVER TYPES OF EAST BRIMFIELD LAKE

800 0 800 1600 2400

S.A.F. COVER TYPES AND LAND CLASSIFICATION

- SAF 54 - Northern Red Oak/ Basswood/White Ash
- Marsh
- Open
- SAF 22 - White Pine/Hemlock
- SAF 20 - White Pine/Red Oak/White Ash
- Hardwood Swamp
- SAF 16 - Aspen
- SAF 55 - Northern Red Oak
- Project Operations/Recreation
- SAF 21 - White Pine

LEGEND

- Paved Road
- Gravel Road
- Outline of C.E. Property
- Town Line
- Open Water
- Project Operations
- Forest-Type Boundary

EXHIBIT B