

MANAGEMENT PLAN
for the
WILDERNESS CONSERVATION AREA
(THE MANCHESTER-ESSEX WOODS)

"The practice of conservation must spring from a conviction of what is ethically and esthetically right, as well as what is economically expedient. A thing is right only when it tends to preserve the integrity, stability, and beauty of the community, and the community includes the soil, waters, fauna, and flora, as well as people."

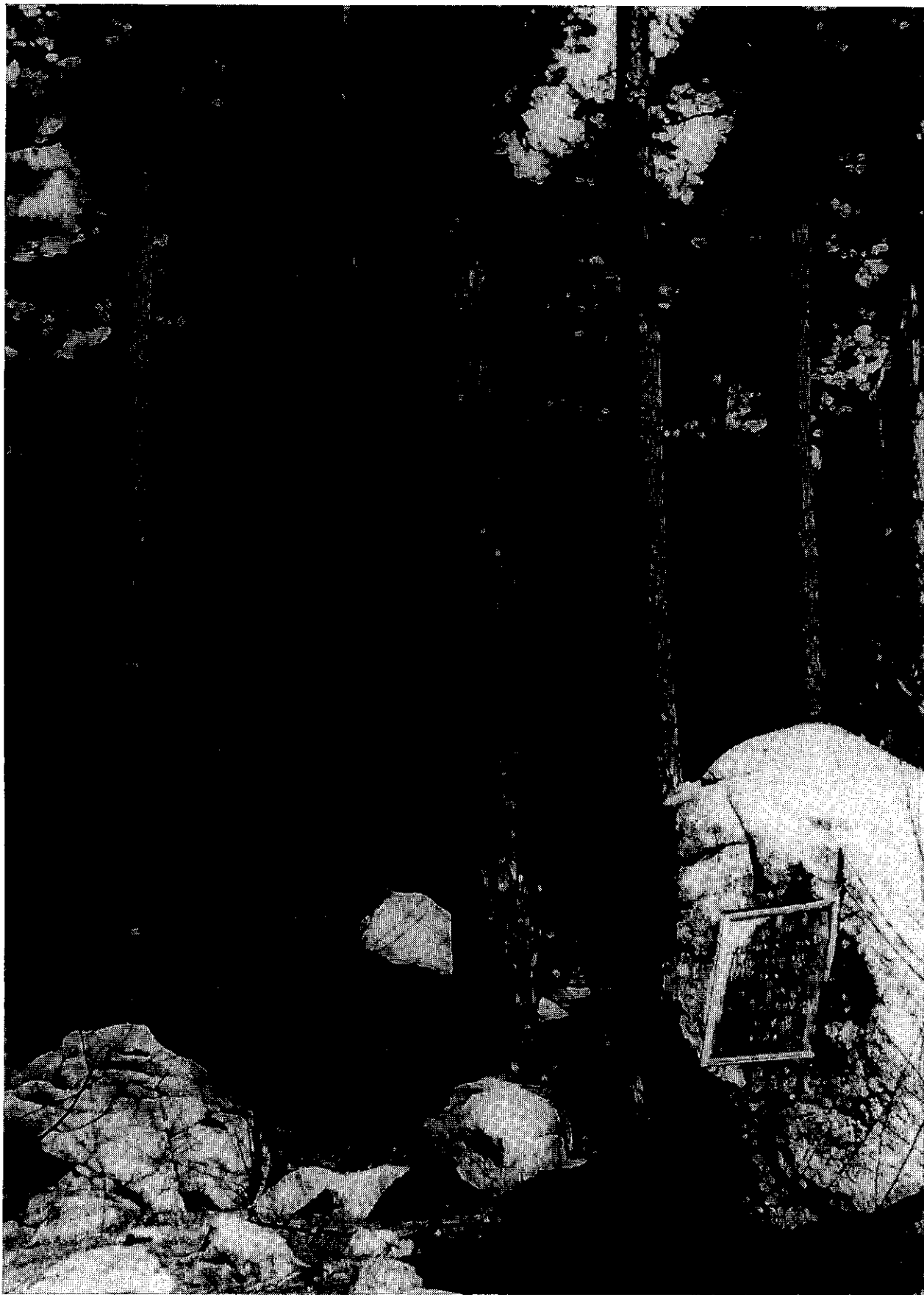
Aldo Leopold, 1947

Prepared for the Manchester Conservation Trust
by William B. Cross, Professional Forester

under the direction of
Helen D. Bethell, Executive Director, MCT

with the assistance of
Frances L. Burnett, Dorothy L. Ryan,
David A. Ryan, and Herman Weissberg

1984-1985



This brass plaque off Old School Street in the area popularly known as "Cathedral Pines" marks the first gift of conservation land to the citizens of Manchester over a century ago.

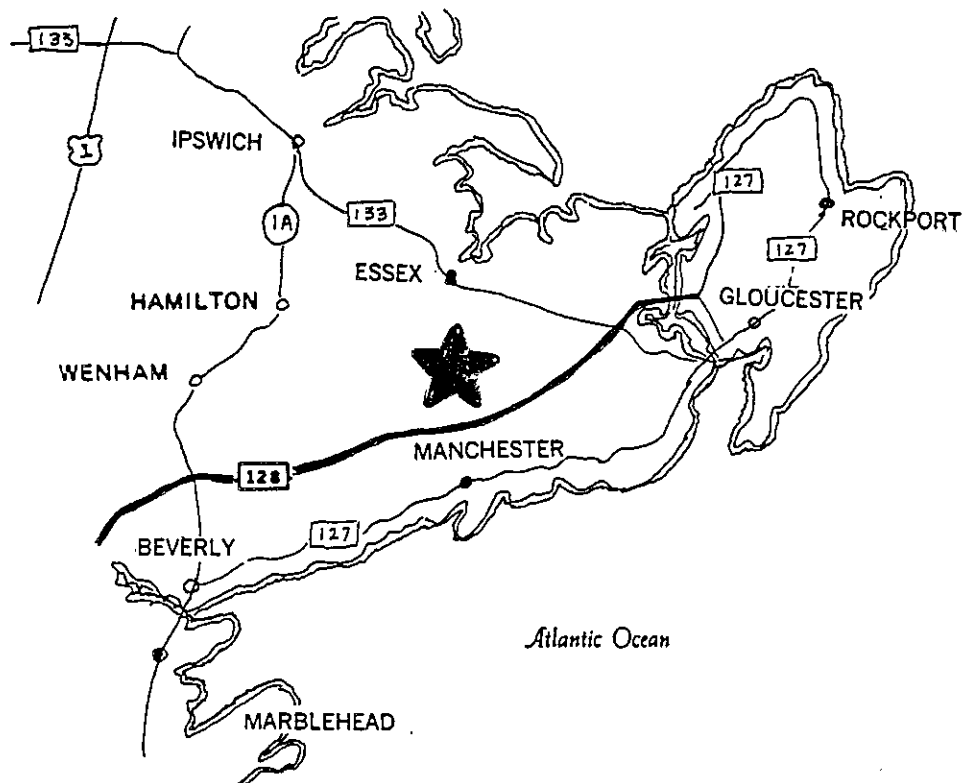
TABLE OF CONTENTS

SUMMARY	1
FOREWORD	3
NATURAL CHARACTERISTICS	
Location	4
Geology and topography	4
Hydrology	4
Soils and soil suitability	6
Wildlife	10
CULTURAL CHARACTERISTICS	
Land use history	15
Ownership and current use	20
Zoning	23
COMMUNITY AND REGIONAL NEEDS	
Commerce and industry	25
Residential construction	26
Water supplies	27
Open space	28
"BEST USE": OPEN SPACE	32
MAJOR CONCERNS	
Inappropriate development	33
Powerline intrusion	33
Area misuse	35
IMMEDIATE MANAGEMENT TASKS	
Trail maintenance	37
Trail protection	38
User awareness	38
Boundary survey	39
NEAR-TERM MANAGEMENT TASKS	
Cooperation among conservation organizations	41
Prohibition of vehicular traffic	42
Community land use planning	42
Scenic vista improvement	43
LONG-TERM MANAGEMENT TASKS	
Internal zoning	44
Access controls	45
Greater public involvement	46
APPENDICES	
Wildlife survey	47
Trail inventory	51
Forest survey -- Cathedral Pines	54
Sources of technical assistance	56

LIST OF MAPS, TABLES, AND PICTURES

Brass plaque in Cathedral Pines	frontispiece
Topographical map of study area	2
Map of soil types	7
Soil suitability guide	8
Roads in the area at the turn of the century	17
Map of area foot trails and key features	19
People in the woods -- a multi-seasonal portrait	21
Population growth, Essex and Manchester, 1950-1982, and forecast 1985-2000	26
Land use, Essex and Manchester, 1951 and 1980	29

LOCUS OF STUDY AREA



SUMMARY

At present the Manchester-Essex woods constitute a de facto Wilderness Conservation Area, one-quarter of which is protected. No development has yet penetrated the heart of this area. Uplands and swamps remain untouched save for hiking trails and dirt roads suitable for horseback riding.

The area's long history of "benign neglect" is due to poor soils, rough topography, sizable wetlands, and distance from town centers, as well as an active conservation program focused on recreational, watershed and wildlife resources.

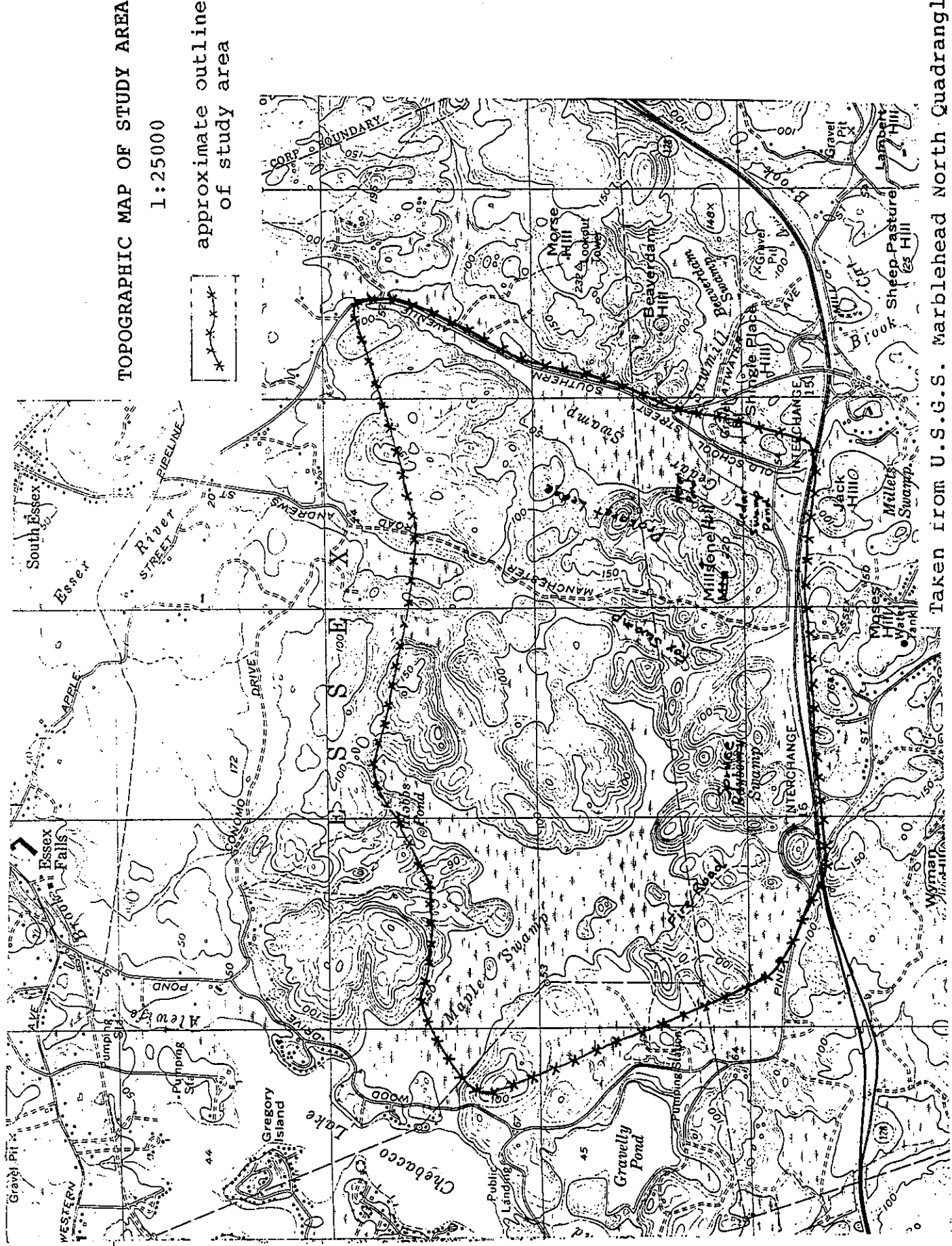
Commercial/industrial or residential development would have to overcome difficult physical and financial constraints. Regional planners favor sites with existing infrastructures and "affordable" housing. Yet regional land scarcity encourages development pressures.

The area contributes directly to Essex's water supply (Maple Swamp is part of the Chebacco Lake watershed, the recharge area for Essex wells) and possibly to Manchester's (Cedar Swamp may be linked to the aquifer for the town well). Direct pumping from Cedar Swamp has occurred in severe droughts. The swamps provide important flood protection and water pollution control for Essex, Manchester, and Hamilton.

Additionally, the area's uplands and swamps support a unique-to-this-region northern-forest wilderness environment hospitable to significant wildlife populations and easily accessible for passive recreation. Studies document a growing need for such sites statewide and regionally.

On balance, perpetuation of the area's current status as open space is its overwhelmingly best use. To help achieve this the Manchester Conservation Trust (MCT) should lead the way in dealing with major threats to the area's integrity. These include the potential for inappropriate development both within the area and on its fringes, a possible renewal of an earlier attempt to bisect the woods with a high-tension powerline, and problems of area misuse.

MCT's agenda for the area has three main elements: (1) a continuing program of land acquisition as the prime means of area preservation; (2) consistent attention to management tasks and planning so as to protect, preserve, and enhance the environmental values of existing holdings; and (3) a sustained effort at promoting greater educational use of the area and public awareness of the overriding preeminence of its environmental values in conjunction with other private and public conservation-minded organizations.



TOPOGRAPHIC MAP OF STUDY AREA

1:25000

approximate outline
of study area



Taken from U.S.G.S. Marblehead North Quadrangle

FOREWORD

This project was initiated in the spring of 1984 by the Manchester Conservation Trust (MCT), a privately funded local organization created in 1963 to preserve the natural beauty, wildlife, and resources of Manchester and its environs.

Over the past two decades, MCT has acquired by gift and purchase from numerous woodlot owners considerable acreage in the remote and undeveloped Manchester-Essex woods. As the major landowner in these woods, committed under trust to protecting natural resources and promoting recreational enjoyment, MCT has over the years created and maintained a foot trail system for public enjoyment and led the defense of the area's integrity against outside threats.

With development pressures building regionally, MCT recognized a need for a comprehensive study and management plan for the area. This would provide the basis for immediate and longer-term actions to safeguard existing conservation holdings and enhance their ecological values, as and where possible.

MCT sought the assistance of EIP (Environmental Intern Program), a nationwide service linking newly trained environmental professionals with organizations in need of their skills. EIP provided William B. Cross, a professional forester and environmental intern. Mr. Cross spent the summer and fall of 1984 researching the natural and cultural resources of the area, the community and regional needs that may touch it, and the perspectives of government agencies and other planning groups. These data were then analyzed and the area's best use and major problems identified. Finally, a management program to address MCT's responsibilities over the next five to ten years was elaborated.

This report summarizes what was learned and what should be done. The emphasis is on achievable goals. It is directed mainly to MCT, for whom it was prepared. However as many of the actions it suggests have public policy ramifications, MCT is eager to share this report with all interested citizens and government officials.

Countless individuals -- government officials, conservation specialists, MCT officers and members, and private citizens -- contributed to this report. We would like to thank them all for their generous assistance.

NATURAL CHARACTERISTICS

Location

For purposes of this study, the Wilderness Conservation Area is defined as the undeveloped, wooded area in Essex, Manchester, and Hamilton in Essex County, Massachusetts, bounded roughly by the upper reaches of Maple and Cedar Swamp on the north, Cedar Swamp on the east, Route 128 on the south, and Maple Swamp on the west.

As the definition of this area is somewhat imprecise, its size is roughly estimated at about 1,300 acres, of which about 800 lie in Essex, 400 or a bit more in Manchester, and perhaps 70 in Hamilton.

Geology and topography

Three-quarters to four-fifths of the study area consists of uplands, with numerous small hills and ridges rising at times gently, at times abruptly, from the swamps below. Two large swamps and a few other wet pockets account for the remaining two-fifths to one-quarter of the area.

The present topography, drainage patterns, water resources, and soils of the study area are a direct result of the ancient glacial history of Cape Ann. The rocky hills and outcroppings common to the area originated when expanding pressure in the earth raised and cracked the granite bedrock generally in a northeasterly direction. Wind, water, and frost eroded the fractures to create valleys; these were subsequently widened by the scraping of the glaciers, which moved in a northwest to southeast direction in this area. The resistant bedrock formed the hills and ridges of the area. Much of the soil was carried off by the glaciers.

As the glaciers receded, boulders, rocks, sand, and gravel were left behind. Rivers of meltwater often carried lighter-weight materials for some distance, eventually depositing stratified patterns of gravel and sand in the ancient valleys. Glacial debris clogged the original drainages of the area with the exception of a small opening that is now Sawmill Brook. This opening allowed salt water to enter the ancient valleys and deposit a layer of clay over the sand and gravel at the southern end of the swamps. Over time these low-lying areas became filled with peat and muck and developed into the wooded swamps of today.

Hydrology

Besides changing the course of the streams that drain the study area, glacial action also created aquifers in

these ancient valleys which had been filled up with glacial deposits, ocean-borne clay, and now peat and muck to become swamps. At present, precipitation drains from the nearby hills and percolates through the soil as underground water into the swamps where it fills the pores between sand and gravel deposits and, where clay is absent, saturates the area down to bedrock. In areas with large amounts of coarse sand and gravel the volume of water held can be great.

Both the two main swamps in the study area -- Maple Swamp and Cedar Swamp -- are recognized as significant water resources. Maple Swamp is part of the Chebacco Lake watershed, which in turn is the recharge area for Essex's water supply. Its potential as a direct source of water appears less promising. Test wells drilled in the southern end of the swamp in 1965 in hopes of finding an emergency water supply for Gloucester showed ten feet of peat over five to ten feet of clay and fine sand with some glacial till over the bedrock. There was not enough coarse sand and gravel to provide clear water and the testing was discontinued. The northern end of Maple Swamp was not tested, however.

Cedar Swamp, more fully tested, was found to have variable geological deposits. Generally, the swamp contains three to four feet of peat over fifteen to thirty-five feet of fine sand, which is over twenty to sixty-three feet of clay. Below the clay a water-bearing artesian aquifer is present. This aquifer, composed from outwash deposits from the meltwater stream delta created by the melting glaciers, is fifteen to thirty feet thick. It is deepest in areas where the clay layer is missing.

In 1965 two eight-inch wells were driven for the City of Gloucester in Cedar Swamp and continuous pumping undertaken for several months. The water was piped directly to Haskell Reservoir in West Gloucester. Temporary damming of Sawmill Brook and increased precipitation actually caused the water level in Cedar Swamp to rise during the pumping. Additional water was taken from Cedar Swamp by the City of Gloucester in 1982.

Despite a high concentration of iron, water drawn from Cedar Swamp was rated as of excellent quality. It was estimated that the two existing wells together could provide a dependable yield of one half to one million gallons of water per day.

Besides its potential as a direct source of water for Manchester or Gloucester, Cedar Swamp may be a major recharge area for the aquifer that underlies Manchester's Lincoln Street well. According to the Department of

Environmental Quality Engineering, basic aquifer mapping suggests there may well be subsurface flow linking the two via Sawmill Brook and Beaverdam Swamp to the east. Without extensive testing, however, it is difficult to quantify this relationship.

Cedar Swamp also provides a very valuable degree of floodwater storage and control and water pollution control for Manchester. The swamp receives surface water from as far away as Pleasant Street in Manchester via Millett's Brook and upper Pine Street in Manchester via drainage conduits that pass back and forth under Route 128. It also handles all the run-off from the highway between Pine Street and School Street.

Once in Cedar Swamp, this influx of surface water slows abruptly as the spongy character of the swamp takes over. Toxic chemicals from the roadways have a chance to dissipate. And excess water is released slowly, rather than rapidly, into Sawmill Brook.

Soils and soil suitability

Soil types and characteristics -- the aftermath of the area's natural history -- are a vital concern for any land use planning. Along with hydrologic factors, soils determine the vegetation that will grow on a site, thus restricting management to compatible uses. They can also present costly obstacles to development and make many proposals impracticable.

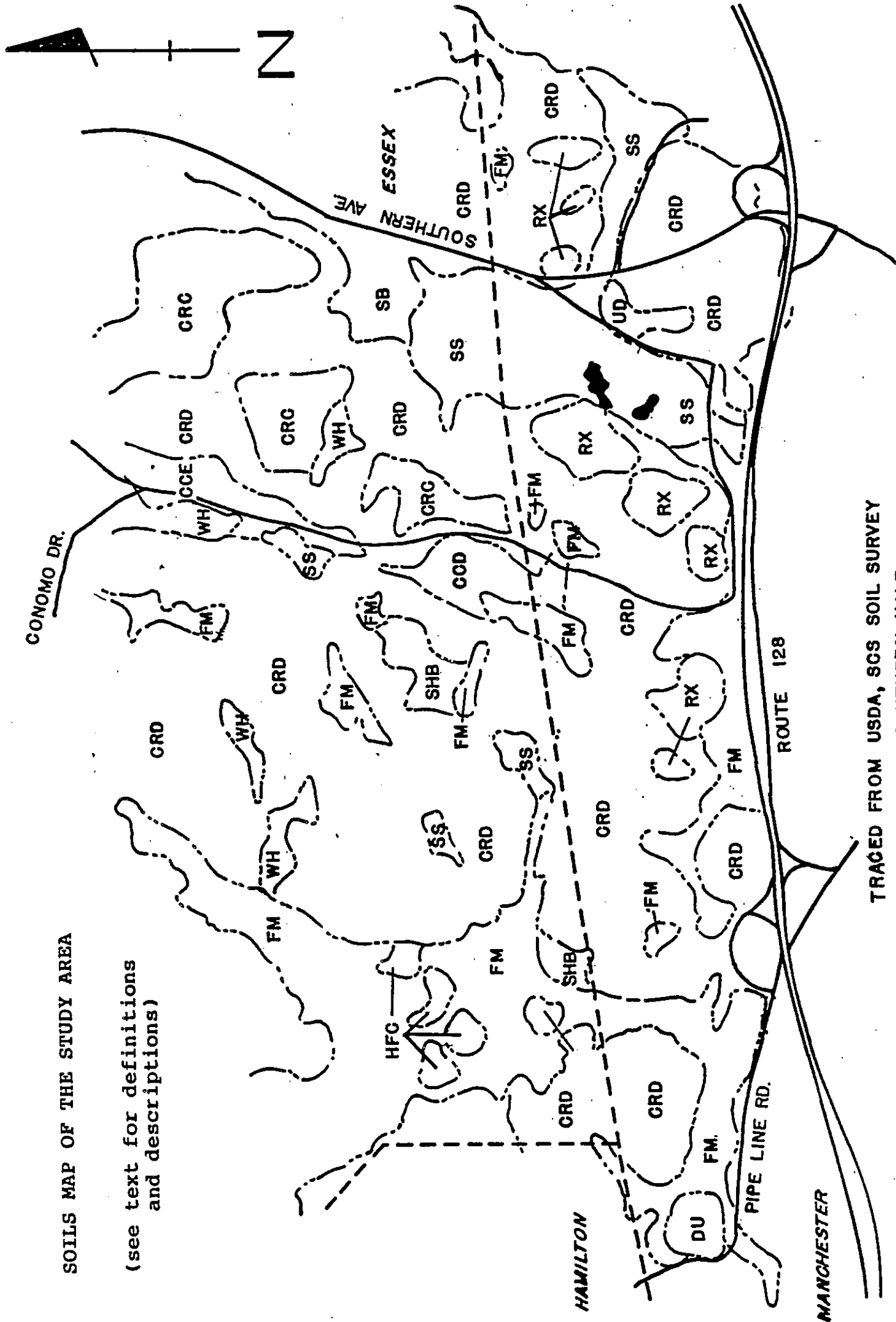
The Soil Conservation Service of the U.S. Department of Agriculture recently published a Soil Survey of Essex County--Southern Part that includes soil mapping and evaluation of the suitability of soils in the study area for various uses.

According to this report, almost two-thirds of the entire study area is composed of Chatfield-Hollis-Rock outcrop complex (CRC, CRD) and Rock outcrop (Rx) soils. These soils are found primarily on the tops and sides of higher elevations. Chatfield-Hollis-Rock outcrop soils can be moderately deep or shallow, well drained or somewhat excessively drained. Slopes range from 8% to 35%.

Uplands in the area also include small patches of Scituate very stony fine sandy loam (ShB), Canton extremely stony sandy loam (CcD, CcE), and Whitman extremely stony loam (Wh). These are deep, moderately well to poorly drained soils formed in glacial till. Slopes range from nearly level to 35%.

SOILS MAP OF THE STUDY AREA

(see text for definitions and descriptions)



TRACED FROM USDA, SCS SOIL SURVEY
ESSEX COUNTY, SOUTHERN HALF

SCALE 1:15840

WM. B. CROSS
JULY 1984

**SOIL SUITABILITY GUIDE
for the
STUDY AREA**

	UPLAND						WETLANDS			
	Chatfield-Hollis-Rock			Scituate	Canton	Whitman	Freetown-Fluv.	Hinckley	Swansea	Scarboro
	CrC	CrD	Rx	ShB	CcD, CcE	Wh	FM	HfC	Ss	Sb
Percent of study area	2%	55%	7%	1%	3%	3%	18%	1%	7%	3%
Limitations for:										
Building site development										
Shallow excavation	S	S		S	S	S	S	S	S	S
Dwellings w/o basements	M	S		M	S	S	S	M	S	S
Dwellings with basements	S	S		S	S	S	S	M	S	S
Small commercial buildings	S	S		M	S	S	S	S	S	S
Local roads and streets	M	S		M	S	S	S	M	S	S
Lawns and landscaping	M	S		M	S	S	S	S	S	S
Sanitary facilities										
Septic leaching fields	S	S		S	S	S	S	S	S	S
Landfills	S	S		S	S	S	S	S	S	S
Recreational development										
Camping areas	S	S		M	M,S	S	S	S	S	S
Picnic areas	S	S		M	S	S	S	S	S	S
Playground	S	S		S	S	S	S	S	S	S
Paths and trails	Sl	S		M	M,S	S	S	Sl	S	S
Potential for:										
Wildlife habitat										
Grain and seed crops	VP			VP	VP	VP	VP	P	VP	VP
Grasses and legumes	VP			VP	VP	VP	P	P	P	P
Wild herbaceous plants	F-G			G	G	P	P	P	P	P
Hardwood trees	F-P			F	G	P	P	P	P	P
Coniferous plants	F-P			F	G	P	P	P	P	P
Wetland plants	VP			VP	VP	VP	G	VP	G	G
Shallow water areas	VP			VP	VP	F	G	VP	G	F
Openland wildlife										
Openland wildlife	VP			P	P	VP	P	P	P	P
Woodland wildlife	F-P			F	F	P	P	P	P	P
Wetland wildlife	VP			VP	VP	F	G	VP	G	F
Woodland management										
Woodland management	F-VP			P	VP	VP	VP	VP	P	VP

Limitations: S=severe; M=moderate; Sl=slight.

Potential: G=good; F=fair; P=poor; VP=very poor.

Source: U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Essex County, Massachusetts, Southern Part, May 1984.

In Maple Swamp, Spruce Swamp, and Fox Swamp, the predominant soil complex is the Freetown-Fluvaquents association (FM), with a few tiny pockets of Hinckley (HfC) soils in Maple Swamp. Freetown-Fluvaquents are deep, poorly drained soils in depressions, on flood plains along rivers and streams, and on areas of uplands and outwash plains. These soils formed in loam deposited by streams or in highly decomposed organic material; slopes are less than 3%. Hinckley soils are deep and excessively drained, having been formed in water-sorted glacial material.

Cedar Swamp has quite different wetland soils: Swansea mucky peat (Ss) and Scarborough mucky loamy fine sand (Sb) predominate. Both are deep and poorly drained with slopes of less than 3%.

Developmental limitations

The Soil Survey rates soils for the difficulties they present for various development purposes -- shallow excavations; dwellings, with or without basements; small commercial buildings; local roads and streets; lawns and landscaping; and sanitary facilities; as well as recreational uses such as for camping and picnic areas, playgrounds, and foot paths. Limitations are considered "severe" if

...soil properties or site features are so unfavorable or difficult to overcome that special design, significant increases in construction cost and possibly increased maintenance are required. Special feasibility studies may be required where limitations are severe.

By and large the upland soils in the study area are judged to be severely limited for all activities associated with building site development, with only minor exceptions (see table, page 8). The main reason is rock outcrop and shallowness to bedrock. Steepness of slope is at times an additional drawback. Recreational development also faces moderate to severe difficulties, the sole exception being foot paths in gently sloping areas.

Wetland soils in the study area are also rated as inherently unsuitable for building site development, the sole exception being the small, inaccessible pockets of Hinckley soils in Maple Swamp. Wetness, excess humus, and ponding are cited as the chief drawbacks.

Favorable suitability ratings are few, and these are limited to the area's potential as a wildlife habitat. Most upland soils are rated as fair to good for wild herbaceous plants, hardwood trees, coniferous plants, and woodland wildlife; swamps for wetland plants, wetland wildlife, and shallow water areas (ponds).

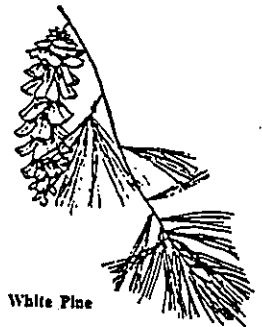
A rating of good indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management and satisfactory results can be expected.

A rating of fair indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results.

The potential productivity of commercial tree species ranges from very poor to fair, with stoniness the chief limiting factor. Eastern White Pine is the species best able to utilize upland soils and the most desirable species to manage for, if management is desired.

Wildlife

The study area contains three major ecological environments: open water (Heron and Cedar Swamp ponds), wooded swamps (Cedar, Maple, Fox, and Spruce swamps), and the largely deciduous forest that makes up the bulk of the area. Additionally, there are some rocky open summits (Millstone Hill, Prospect Ledge) and open dry areas (along the old Manchester-Essex road) that support somewhat specialized communities of wildlife. A survey may be found in the appendices.



White Pine

Open water

Heron Pond and Cedar Swamp Pond are both small and relatively shallow, having been created by gravel-pit operations in the swamp. Heron Pond is about one and a half acres, with a depth of 2' to 11'; Cedar Swamp Pond is about a half acre, with less than a 2' depth. Heron Pond is believed to contain an underground spring. Both ponds tend to freeze in winter and become quite warm in summer.

The two ponds support a number of sun-loving aquatic plant species, such as cattail, purple loosestrife (a non-native plant threatening to crowd out the native cattail), reed, arrowhead,



Purple Loosestrife

pickerelweed, sedge, and water featherfoil. Alder, a moisture-tolerant shrub grows near the ponds.

Several plants more typical of a northern bog habitat are found around the ponds. These include sphagnum moss, leatherleaf, and two insectivorous plants: round-leaved sundew, and pitcher plant, as well as a native orchid, ladies'-tresses.

Wooded swamps

Cedar Swamp and Maple Swamp support two main tree species: moisture-tolerant red maple and Canadian hemlock. White cedar and red spruce are also found in the swamps.

Where adequate light penetrates, shrubs such as shadbush, high-bush blueberry, Clethra (sweet pepperbush), steplebush, winterberry, alder, buttonbush, and black-berried elder grow. Spicebush is found near running water. Bayberry is found in swampy as well as fairly dry areas.

Skunk cabbage appears in the shadiest and wettest areas. Blue flag (wild iris) and Indian cucumber are also found in damp areas. Where light penetration is especially good, jewelweed is often present. Marsh marigold and, occasionally, cardinal flower are found near running water. Cinnamon fern and royal fern are the two most frequently encountered ferns in the swamps.

These wooded wetlands are extremely productive areas for a variety of bird populations, as different bird species use different layers of vegetation. Over the past twenty years, close to one hundred different species of birds have been sighted in or over Cedar Swamp. These include more than fifty species that nest in the area, almost forty that migrate regularly over the area, and a few more that have been spotted overhead.

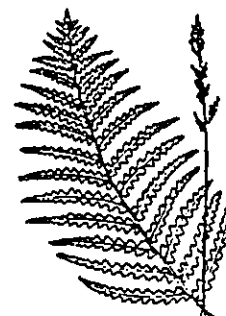
Among the nesting birds are heron, mallard, hawk, woodcock, mourning dove, owl, kingfisher, woodpecker, flicker, wood-pewee, phoebe, flycatcher, kingbird, swallow, blue jay, crow, chickadee, tufted titmouse, nuthatch, wren, veery, thrush, robin, catbird, mockingbird, thrasher, cedar waxwing, starling, vireo, warblers, redstart, ovenbird, yellowthroat, scarlet tanager, cardinal, grosbeak, indigo bunting, towhee,



Blue Flag (Wild Iris)



Clethra (Sweet Pepperbush)



Cinnamon Fern



White-Breasted Nuthatch

sparrow, blackbird, grackle, cowbird, oriole, finch, and goldfinch. The swallows, in particular, are very noticeable residents of the Heron Pond area, where they swoop and glide from mid-spring to fall, often nesting in boxes placed strategically around the pond. Some of the nesting thrushes and warblers are species more typically found in more northerly locations.

Migratory birds include loon, cormorant, heron, egret, ibis, goose, duck, sapsucker, flycatcher, nuthatch, creeper, wren, kinglet, gnatcatcher, thrush, vireo, warbler, waterthrush, sparrow, and junco.

Overhead sightings include vulture, hawk, gull, rock dove, nighthawk, and chimney swift.

Upland forest

Immature oak and oak-hardwood associations are dominant here. More than 90% of the canopy is composed of deciduous species such as oak (red, white and a few scarlet), maple, beech, yellow birch, and ash. The most common tree species is Northern red oak, with white oak and red maple as chief associates. American beech is also plentiful.

Until the hemlock looper epidemic in 1972, the oak-hemlock forest type was also represented. Pockets of black birch and mixed hardwood regeneration can be found where the loss of the hemlocks created openings in the canopy. The remaining Eastern hemlock is wide-ranging, though found mainly on damp, cool slopes. Red cedar favors dry, poor soils, while white pine is almost everywhere.

The high shade, thin acid soil, and abundant layer of slow-to-decompose oak leaves limit the variety and number of plants found throughout much of the understory and the forest floor. Some of the shrubs occurring here are mapleleaf viburnum, witch hazel, sheep laurel, mountain laurel, and a few dogwood.

Many of the herbaceous plants found near the oaks are perennials that spread by underground stems, as the thick layer of oak leaves makes seed germination difficult. Some of the most commonly found plants are members of the ericad or heath family, which have evergreen leaves, such as



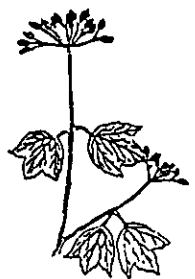
Downy Woodpecker



White Oak



Red Cedar



Mapleleaf Viburnum



Witch Hazel

wintergreen, pipsissewa, and shinleaf. Several members of the lily family occur here. Canada mayflower carpets the forest floor in many areas. Bellwort may be found, as well as two members of the orchid family, the pink lady's-slipper and the less common rattlesnake plantain. Other herbaceous plants are partridgeberry, wild sarsparilla, wood anemone, wood aster, and purple clematis.



Pipsissewa

Several different kinds of ferns grow where oaks predominate, for the most part varieties that prefer acid soil. The most commonly encountered are bracken fern, marginal woodfern, hayscented fern, and interrupted fern. A few colonies of Christmas fern are found throughout the woodlands and may indicate areas where the soil is less acid. Common polypody, another evergreen variety, is found growing on rocky outcrops.



Pink Lady's-Slipper

Colonies of various kinds of clubmosses carpet the forest floor in some of these areas. The three varieties most often encountered are ground cedar clubmoss, tree clubmoss (more commonly known as princess pine), and shining clubmoss. Pixie cup lichen is found on old stumps and in poor soils, where competition is often lacking.



Bracken

Where moist soil and cool air drainage promote their growth and the hemlock looper was less active, beech and hemlock may be found. Shagbark hickory is also present. Few shrubs are able to survive in the shade of these trees. Three that manage to grow here -- Canadian yew, hobblebush viburnum, and striped maple -- are more commonly found in woodlands further north.



Goldthread

Herbaceous plants found in these cool moist areas include bead lily, wood sorrel, gold thread, beechdrops, star flower, bunchberry, and twinflower. In more open woods rue anemone favors rocky slopes; wood betony wet meadows.

As a result of the hemlock looper epidemic that peaked in 1972 and the gypsy moth infestation in the early 1980's, the uplands offer a better wildlife habitat than might be expected.



Bunchberry

Where clumps of hemlock were killed, dense stands of black birch saplings have sprung up and numerous snags have been created. Complete defoliation of the overstory by the gypsy moth

caterpillar allowed the understory plants to flourish. The result is a good supply of food and cover for wildlife.

The limiting factors for many types of wildlife are probably the lack of winter cover and food. This is due primarily to the poor soil over much of the area.

Species sighted in the area include white-tail deer, red fox, mink, skunk, woodchuck, racoon, gray and red squirrel, cottontail rabbit, white-footed mouse, Eastern milk snake, Eastern garter snake, spring peeper, American toad, and red-backed salamander.



Eastern Cottontail



White-Footed Mouse

Rocky open summits

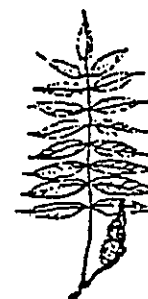
On Millstone Hill, Prospect Ledge, and other rocky summit areas, plants must tolerate poor thin soil and exposure to drying wind and sun. Trees typically found here are stunted oak and pitch pine. Low-bush blueberry, sheep laurel, huckleberry, and bearberry (a groundcover with tiny evergreen leaves) may be found. Ground pine clubmoss, rock polypody, and rock tripe lichen also like these areas.



Pitch Pine

Open dry areas

Along the old Manchester-Essex Road the natural environment is more open and well drained. Here one finds a typical population of shrubs and plants that thrive in a dry, sunny environment. Staghorn sumac, rose bushes, raspberry, blackberry, and sweet fern are plentiful. Some smaller sun-loving plants here are common mullein, goldenrod, milkweed, wild aster, yarrow, tansy, Queen Ann's lace, chicory, ragweed, and rabbit's foot clover.



Staghorn Sumac

British soldier lichen favors open, poor soils, such as abandoned gravel pits and fire roads.



Bearberry



Lowbush Blueberry



Ground Pine Clubmoss



Sheep Laurel

CULTURAL CHARACTERISTICS

Land use history

Although Manchester and Essex are both coastal towns traditionally oriented seaward, early residents made significant use of the natural resources of the inland regions. Firewood was a major need, as was timber for building and open fields for animal pastures. Boundaries between properties were commonly set off by stone walls, the stones of necessity being cleared from the land itself.

In the 17th century land in the study area belonged either to the Commoners of Manchester or the Commoners of Ipswich. (Until 1819 Essex was the Chebacco Parish of Ipswich.) The first division of common land in Manchester's portion came in 1699 -- the so-called West Division -- but only a small part of the West Division lies in the study area. In 1718 the Manchester land in the study area roughly east of the old Manchester-Essex road was divided; in 1763 the balance.

The boundary between Manchester and Ipswich originally ran more southwesterly than at present. This "Ancient Line" is still indicated in part by a stone wall built in the early 1700's to try to keep Ipswich people from stealing Manchester's wood. All the land in the study area north of this line was divided by the Commoners of Ipswich in 1710/11.

In 1767 the Manchester-Ipswich line was redrawn. The westerly end of the boundary was moved northerly about a quarter of a mile to the present Dug Hill Bound, with the easterly end remaining at the Cedar Swamp Bound (a/k/a Ship Rock) on the westerly side of Cedar Swamp. Manchester got some land formerly part of Wenham as well as part of what had been Ipswich. The elongated piece is known as the "Manchester Gore."

As industry developed in the two towns the woods were put to further use. Local oak and pine were used in the shipyards of Essex, while cherry, birch, and oak helped supply the furniture and cabinet industry in Manchester. A small sawmill was built sometime after 1723 close to the fire road that is now a continuation of the Dug Hill Trail; some traces of the Old Mill Dam may still be seen just southerly of the fire road.

Granite was also quarried from the area, though not in great quantities. Evidence of rock-cutting can be seen along the old Manchester-Essex Road and the Prospect Ledge Trail, where a few stones are said to have been quarried for the Essex Town Hall in the 1890's.

With Manchester's new popularity as a summer home for wealthy Bostonians beginning in the mid-nineteenth century, the woods became popular for summer afternoon carriage rides. One could travel north via School Street, turning left at Baker's Farm (the old road is just before the off ramp from Route 128) to follow the narrow, curving woods road along the edge of Cedar Swamp to South Essex (Old School Street, upper School Street, Southern Avenue). Or one could take the narrow woods road to Essex proper which was reached via Pleasant Street. The latter road was more difficult for the horses, however, as it had a number of "steep pitches" that proved difficult for the "Boston teams."

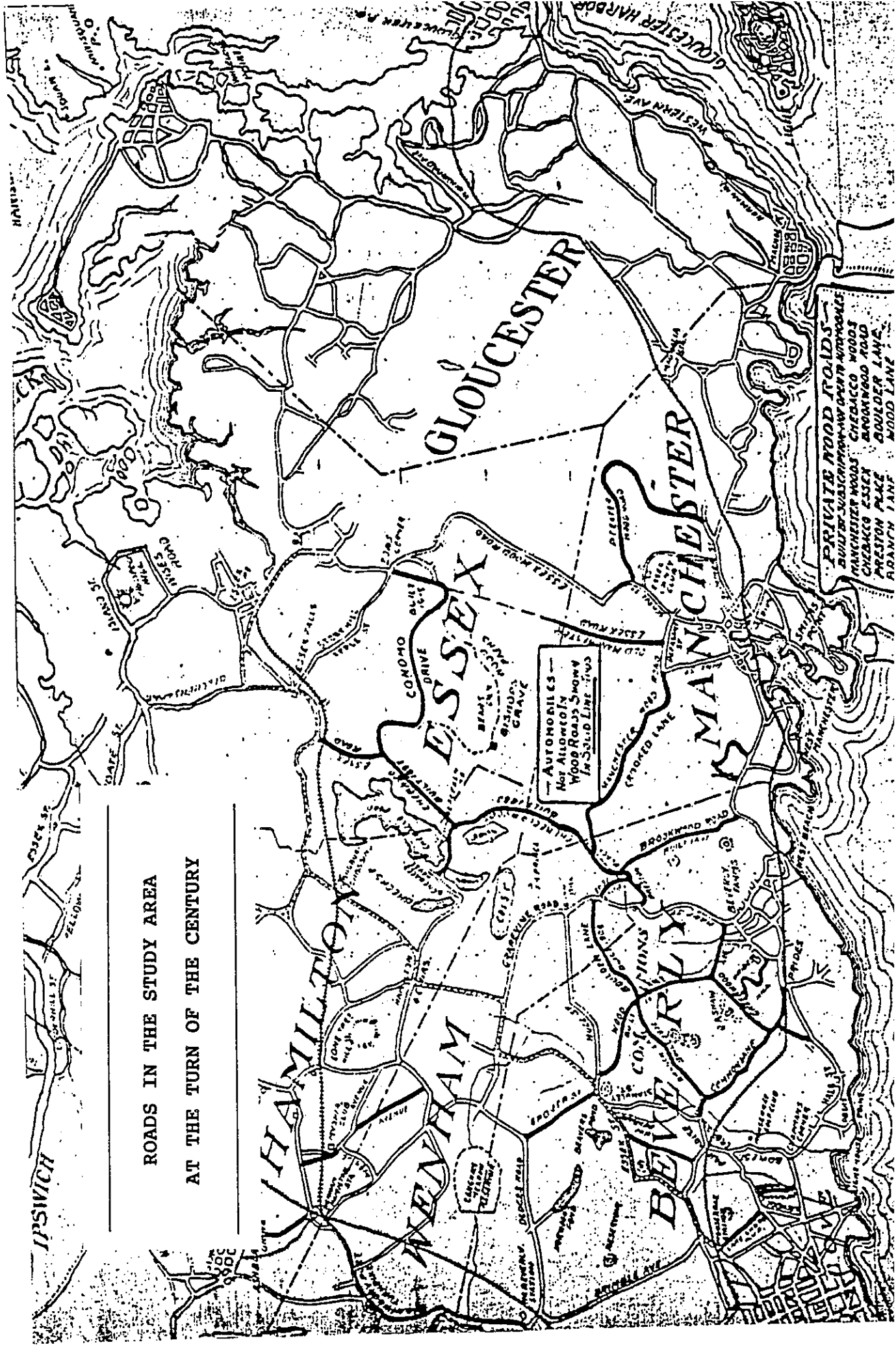
Love of the woods by Sunday afternoon carriage riders led to the first conservation efforts in the area. Though there was little, if any, thought in those days to building in the woods, residents did use their woodlots for fuel supply. Perhaps some of the large trees along the road were being cut; perhaps there was just the fear they might be.

→ Alice North Towne, a 24-year-old summer resident, was concerned enough to act. In 1878 she persuaded T. Jefferson Coolidge, of Boston and Manchester, and Henry Lee, of Boston and Beverly Farms, to act as trustees in purchasing narrow parcels of land along the main road to Essex to preserve the trees that made the carriage rides so enjoyable. Alice herself negotiated directly with several landowners.

As the Cape Ann Advertiser reported on September 6, 1878, under the heading, "A Move in the Right Direction": preservation "forever from the axe" of this woodland some "two rods in width" would "preserve the beautiful shade which makes this one of the most cool and attractive drives in Essex county."

Thus Manchester's Woodland Park Trust and Essex's Coolidge Trust were born. Manchester's Town Meeting accepted the first gifts in 1880; additional parcels were accepted in 1883, 1885, 1891, and 1905. A brass plaque inscribed "To the Glory of God and for the Benefit of Man -- These Woods are Preserved Forever -- 1879" was placed on one of the dedicated parcels on the west side of Shingle Place Hill in an area popularly known as Cathedral Pines (see frontispiece). More parcels were added in 1885, 1891, and 1905. Essex accepted its share of this protected land in 1921. ←

The advent of the automobile around the turn of the century led to friction with the "Boston teams." Colonel William D. Sohier of Beverly and a few others raised private subscriptions to create, maintain, and preserve woods roads suitable for carriages and off-limits to motorized vehicles.



ROADS IN THE STUDY AREA
AT THE TURN OF THE CENTURY

Their efforts to protect the scenic qualities of the study area, as well as other woods in the region, for quiet enjoyment are detailed on the map on page 17.

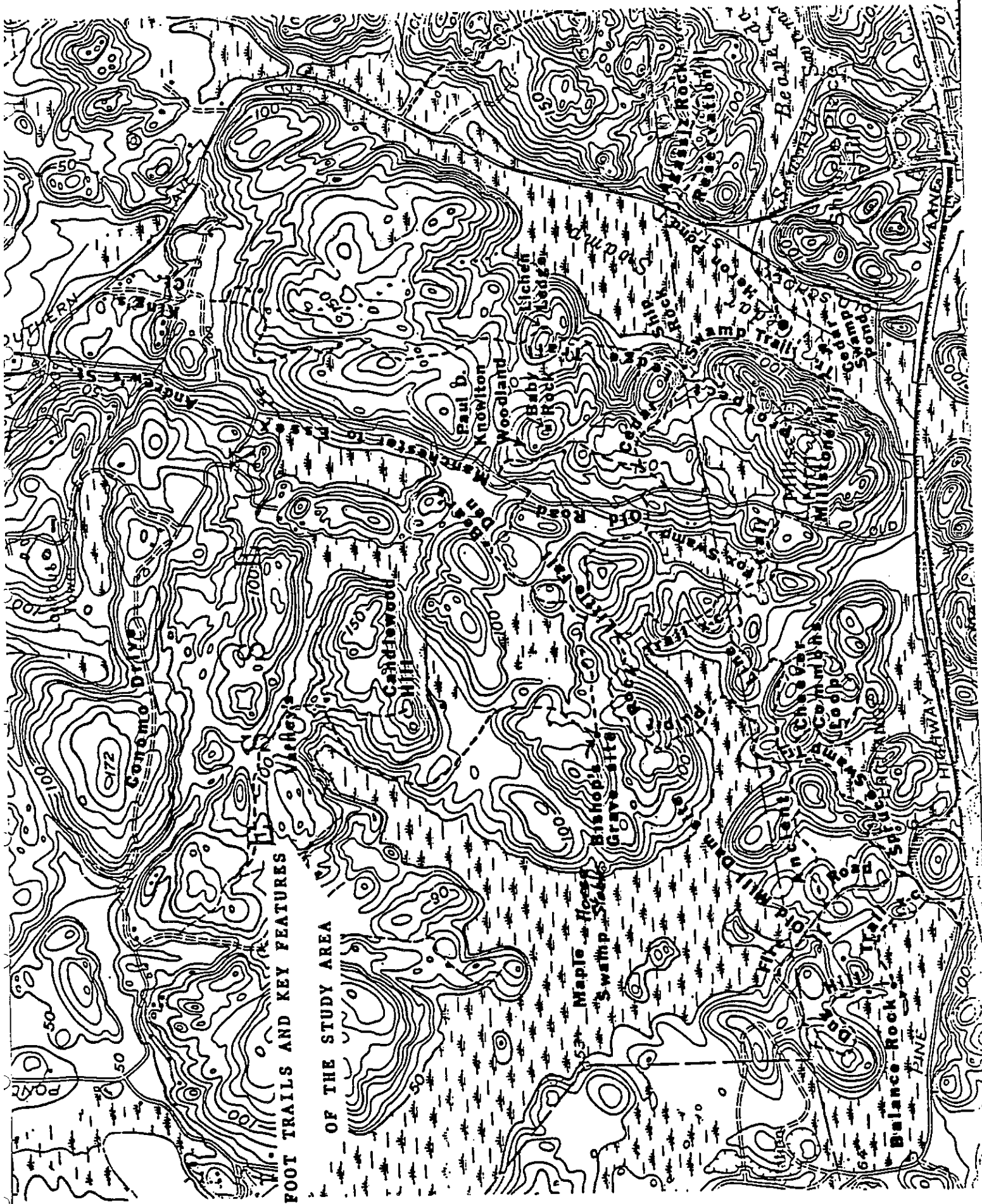
With the wider popularity of the automobile and the oil burner in the early twentieth century, however, the woods passed into a stage of quiet appreciation but general neglect. Forest fires, though never uncommon, became more newsworthy. In recent years several have been significant regional events. Those in the 1930's were believed to have been set deliberately to provide employment for volunteers as firefighters. In early fall 1968 a pyromaniac set at least a half dozen fires along the edges of the old road in Essex, as well as a big fire near Agassiz Rock in Manchester. All these fires destroyed wildlife habitat, depleted the soil of nutrients, and resulted in permanent damage to surviving trees.

Construction of Route 128 in 1954 along the southerly edge of the study area reawakened interest in the woods. Numerous citizens voiced concerns about the vulnerability of the area and the need to protect its special natural resources. This led to a resumption of conservation activity.

In 1957-58 the Trustees of Reservations, a statewide conservation organization founded in 1891, acquired land on the east side of School Street distinguished by the presence of two immense glacial boulders. Agassiz Rock Reservation was named for the famous 19th-century naturalist, Louis Agassiz. Funds for the acquisition were provided by Arthur W. Stevens, of Boston, formerly a summer resident of Manchester. Subsequent gifts and purchases have brought Agassiz Rock Reservation to 104 acres; this includes all of Beaverdam Hill and most of Beaverdam Swamp, and borders Sawmill Brook just downstream from Cedar Swamp.

MCT itself was created in early 1963 and immediately accepted its first gifts of woodlots in the study area. That same year Manchester's Town Meeting voted to set aside large tracts of land on Millstone Hill and Cheever Commons for conservation. MCT has continued to acquire parcels regularly since that time, and the Town of Manchester put additional tax-title lands in the area under conservation protection in 1968, 1979, and 1985.

Local residents formed an Essex Conservation Trust in 1970; however, land acquisition was minor and ECT is now inactive. In 1984 the Essex County Greenbelt, a privately funded regional group, received its first gift in the Essex woods, the Warren Memorial Reservation west of Andrews Street just north of Conomo Drive.



FOOT TRAILS AND KEY FEATURES

OF THE STUDY AREA

Ownership and current use

Conservation parcels

At present roughly 28 per cent of the study area (some 380 acres, more or less) is under conservation protection. Manchester accounts for some 250 acres; Essex for the balance.

Of the roughly 250 acres of conservation land located in Manchester, MCT holds title to more than 150 acres. The Town, under Town Meeting votes that set aside tax-title land or accepted private gifts for conservation, owns the other one hundred acres, more or less. In some areas Town and MCT parcels interlock: Cedar Swamp Conservation Area contains some 27 acres owned by the Town and 19 acres owned by MCT; Millstone Hill Conservation Area contains almost 16 acres owned by the Town and almost 43 acres owned by MCT; and Cheever Commons Conservation Area contains some 39 acres owned by the Town and almost 19 acres owned by MCT.

Additionally, the Town owns some 19 acres under the Woodland Park Trust, and MCT holds some 54 acres in the Dug Hill-Fox Swamp area.

In Essex, where conservation acreages are less certain, it appears that about 130 of the roughly 800 acres in the study area are under conservation protection. These parcels tend to be clustered around the old Manchester-Essex road, though some parcels are randomly scattered throughout the area. MCT owns about one hundred acres; the Essex County Greenbelt 12.6 acres; and the Town a few parcels. Additionally the North Shore Council of Boy Scouts owns 10 acres with conservation restrictions.

An eight-mile network of foot trails crisscrosses these protected parcels, offering easy access to all the major natural habitats. These trails range from the short path in from Old School Street leading to beautiful Heron Pond set within the red maples of Cedar Swamp to the mile-long Ancient Line Trail linking Pine Street with the old Manchester-Essex road via the open ledges, old stone walls, dramatic cliff faces, and swamps that characterize the old boundary between Manchester and Ipswich.

The Millstone Hill Trail leads to the highest point in Manchester, some 220 feet above sea level. The Cedar Swamp Trail skirts the western edge of Heron Pond, then the wooded edge of Cedar Swamp at the foot of Prospect Ledge, then upland through the woods to the old Manchester-Essex Road. The Prospect Ledge Trail offers a far-ranging view and a mile-and-a-half stroll to the northern edge of the area at King's Court in Essex.



Enjoying the woods in all seasons . . .

Clockwise from the top: cross-country skiers take the view from atop Millstone Hill; Heron Pond offers quiet beauty and solitude in summer; MCT officers pick sites along Old Manchester-Essex Road for conservation signs; volunteers team up in autumn to clear blowdowns and brush from footpaths; a child checks the snow's depth.

Further west the Dug Hill Trail provides a relatively gentle terrain for cross-country skiing; the Spruce Swamp explores old stone walls and damp places; the Pulpit Rock Trail reveals a unique rock formation caused by the splitting of a glacial boulder; and the Cheever Commons Loop provides a special opportunity to explore both the bottom and top of Great Ledge.

Offshoots from the main trails and woods roads lead to scenic and historic sites such as Bishop's Grave and Bear's Den (off the old Essex-Manchester road), Baby Rock and the Paul D. Knowlton Woodland (off an abandoned section of the old Essex-Manchester road), and Lichen Ledge (off the Prospect Ledge Trail), as well as the Boy Scout campsite on Candlewood Hill.

Manchester schoolchildren regularly use Heron Pond and the surrounding conservation land as outdoor classrooms. Grades three through seven have natural science workbooks keyed to this area that are part of their regular science curriculum. The workbooks were prepared by staff of Mass. Audubon, with support from MCT.

Scout groups and casual hikers also visit the study area frequently. Heaviest use is from late spring through early fall, although winter brings hardy snowshoers and cross-country skiers even to steep areas.

Additionally, the old roads and woods lanes are explored by horseback riders and a few motorized vehicles, two-wheeled and four-wheeled. Occasionally, horses and vehicles wander onto the foot paths with a serious destructive impact, especially in damp and wet places.

Unprotected parcels

The unprotected three-quarters of the study area lies mainly in Essex. Numerous individual owners, including many unknown inheritors of partial title, predominate. A few parcels are held in tax possession by the Town.

Some consolidation of woodland parcels under single ownership has occurred along the westerly end of Conomo Drive. Residential subdivision and construction there is under way. And one or two houses are also being built on land at the junction of Conomo Drive and the old Essex-Manchester Road. This land was given to the Mass. Farm and Conservation Land Trust for resale to benefit The Trustees of Reservations. Another parcel included in the gift is now the Greenbelt's Warren Memorial Reservation.

In Manchester, unprotected acreage is located in two

general areas. North of the Pine Street interchange lie some about 25 or 30 acres; however, this area is inaccessible and ownership rights appear divided and uncertain.

Further east, however, a contiguous area of some 54 acres lies on both sides of the old Manchester-Essex road and the adjoining access road to Old School Street put in by the Commonwealth when Route 128 was built. One private owner here has several lots totaling 42.5 acres that are being offered for sale for industrial purposes. The latter area is not posted and receives heavy recreational use; it is dominated by steep, rocky slopes and wetlands, and it more suitable for conservation than for development. Moreover, as the largest single parcel outstanding in this part of Manchester, it is crucial to the integrity of adjacent conservation holdings.

Zoning

Land use constraints in the study area vary widely. The Town of Essex, in whose territory most of the land not under conservation protection lies, does not have any use zoning by-law. The type of development that might occur in the area is thus governed almost entirely by economic considerations. Decisions are made by the Planning Board on a case-by-case basis. This makes it very difficult for the Town to take a comprehensive look at the area and to assess with any accuracy the cumulative impact of individual decisions.

Essex has recently explored land use planning, using the services of a professional planner. It is possible that some use restraints may emerge relative to the study area, because of its site development constraints. Most likely, the area might be considered most suitable to residential development, with large lot requirements.

In Manchester, by contrast, use zoning in the study area has been in place since the 1950's. All land in Manchester north of Route 128 is in a Limited Commercial District. Stated uses include

business and professional offices and office buildings, scientific research and development, experimental and testing laboratories, light non-nuisance manufacturing,... recreational club or facilities operated for profit, and municipal use....

Dimensional regulations state:

Each business, defined as a single use under one ownership, shall be located on a lot of not less than 5 acres and of a minimum width at all points of not less

than 500 feet. The structures on the lot shall cover not more than 20% of the area of the lot, and at least 25% of the area of the lot shall be of natural or landscaped area. Not more than 25% of the area of the lot shall be used for parking. All structures shall be set back from any street at least 150 feet and from any other lot line at least 100 feet.

The Limited Commercial District By-Law does not exclude wetlands or steep slopes from the 5-acre minimum lot. Yet the portion of the study area that remains open to development contains sizable wetlands and rough terrain. The lack of such safeguards makes more difficult any efforts to preserve the area's environmental integrity.

COMMUNITY AND REGIONAL NEEDS

Beyond their own needs as small communities, Essex and Manchester share in the larger needs of the metropolitan Boston region. Recent state and regional studies have focused on area demand for industry, housing, water supplies, and open space. These needs are here examined as they relate to the study area.

Commerce and industry

In 1984 the Metropolitan Area Planning Council (MAPC), of which Essex and Manchester are members, issued an update on its Overall Economic Development Program for the region. Its recommendations included:

Development Location: Support, instead of new development in outlying areas, more intensive development in existing downtown areas with infrastructure in place, and reuse buildings as appropriate to support continued health of cities in the region.

Under this policy, opening up the study area for industrial development would not be viewed as a wise use of regional resources. Typically, new industrial areas require massive investment in roads and utilities. The study area would be no exception.

Municipal sewerage would be required because the soils cannot handle any concentrated usage. Essex lacks any town sewerage. Manchester's sewer-treatment plant is already at or beyond capacity. Even if adequate sewer capacity were available in Manchester, laying sewer and other utility lines to the one section that is available for development would prove highly expensive and disruptive of conservation land en route.

Road improvements would also be costly, if possible. In Essex access to the study area is via narrow, privately owned, dirt road (Conomo Drive, Andrews Avenue, King's Court). In Manchester the only land available for development in the study area is a half-mile to a mile in from School Street. And Old School Street is pinched by town-owned conservation land for much of its length.

On a local level, commercial development initiatives have been limited to the area east of School Street, which has better access. Even there development has been constrained by rugged topography. There is no demonstrated need for extension of high-cost commercial development into the study area.

One likely regional need that could involve the study area remains unresolved. That is the long-term electrical power requirements of the Gloucester-Rockport area. In 1964 New England Power Company proposed an overhead high-voltage power transmission line through the study area. Strong public opposition eventually led the company to table its proposal. However, the idea has not been abandoned and may resurface as electrical needs grow.

In sum, the study area is not a significant asset to either the local communities or the region in terms of potential commercial or industrial development. Its appropriateness as a passageway for electrical power lines has not been conclusively demonstrated.

Residential construction

Between 1950 and 1982 the population of Essex grew by 69% and Manchester by 86%. Nonetheless, regional planning authorities expect both towns to maintain relatively stable population levels over the next 15 years.

	<u>Population</u>		<u>Change</u>	<u>Forecast</u>
	<u>1950</u>	<u>1982</u>	<u>1950-1982</u>	<u>1985-2000</u>
Essex	1,794	3,032	+69%	3,000
Manchester	2,868	5,400	+86%	5,400
Total	4,662	8,400	+79%	8,400

Source: Metropolitan Area Planning Council.

The projection of a stable population appears surprising in view of the all too apparent demand for new residential construction. MAPC explains the difference in terms of the trend toward a smaller number of people per household. And though housing demand is strong, the lack of easily developable land is expected to restrain new housing starts.

Housing needs throughout the Commonwealth have been addressed by the Executive Office of Communities and Development (EOCD). The key need is for housing for the elderly, the handicapped, and families of low to moderate income. According to EOCD, "the acute housing shortage which faces Massachusetts has had the most severe impact on families of low income. High selling prices and high rents have limited the housing market for families -- especially for large families who need three or more bedrooms at affordable costs."

Essex and Manchester share this statewide need for affordable housing. However, EOCD has told Manchester that it is not interested in sites that are remote from town centers. EOCD also prefers sites that have fully developed town services, i.e., roads, sewers, town water supply. Given that the study area lacks such services as well as any sense of neighborhood, it is highly unlikely EOCD would accept any site there.

Additionally, there are serious questions as to whether the development of poor quality, remote land for housing would pay for itself. Town services, such as police, fire, and public works coverage would have to be stretched significantly. There is a serious question as to whether added tax revenues would cover these increased costs.

For these reasons, the study area cannot be rated as attractive or significant in meeting community and regional housing needs.

Water supplies

Water supply for the Town of Essex comes exclusively from two wells located very close to Chebacco Lake, which is directly linked with Maple Swamp. The lake represents the top of the ground water table, although the deep gravel-packed wells reach down into natural aquifers where glacially deposited sands and gravels naturally filter and purify the water taken up by the wells.

Chebacco Lake is surrounded with seasonal homes, all with septic systems of various ages. Presently, the pond is experiencing rapid eutrophication deemed due in large part to septic system failure. Concern for potential impact of septic system failure on Essex's town water supply is not new. In his Open Space Planning Program for the Town of Essex, prepared in 1972-1973, H. Calvin Cook noted: "...there is always a potentially hazardous situation where septic tank systems are located around a seasonally populated lake, especially on top of bedrock, which is the case on Gregory Island."

Maple Swamp, which is part of the study area, drains directly into Chebacco Lake. Its importance to Essex's water supply was also noted by Cook:

It should be apparent by now that the inland wetlands located within the watershed of Chebacco Lake are especially important from the point of view of the protection of natural resources. Pure fresh water is the most important of natural resources to human beings. Because all of the precipitation that falls

within the watershed boundaries of Chebacco Lake eventually finds its way into the lake, the wetlands within the watershed contribute significantly to the natural drainage and ground water systems of the whole southwestern quadrant of Essex.... The fact that the Town's only public water supply is located where it is must not be lost sight of in the context of any and all future land development within Chebacco's watershed, a great part of which extends into the neighboring communities of Hamilton, Manchester, and Wenham.

As Manchester's water supply ponds located just over the boundary in Hamilton are also intimately connected with Chebacco Lake and Maple Swamp, Cook's comments bear careful attention there as well.

The rest of Manchester's water comes from a well downstream of Cedar Swamp. While extensive testing would be needed to establish a direct connection between the swamp or the brook that drains it and the Manchester Town well, a hydrologist with the Department of Environmental Engineering has stated that the possibility cannot be ruled out. Additionally, Cedar Swamp itself has yielded water to the City of Gloucester on past occasions (see page 5) and must remain a possible long-term source for Manchester and the larger region.

For these reasons, the study area must be considered highly significant in an assessment of the region's present and future needs for its most vital natural resource -- a safe and dependable water supply.

Open space

The Essex County Greenbelt estimates that one-fifth of the open space in Essex County has been lost over the past 25 years. The results of photointerpretation show that between 1951 and 1971 there was a 170% increase in non-agricultural land development across the county. During the same period farming acreage decreased 53%, woodland acreage decreased 9%, and urban land increased 50%.

Similar, but much more dramatic, changes have occurred in Essex and Manchester. A study by the Department of Forestry and Wildlife Management, University of Massachusetts, Amherst, suggests that between 1951 and 1980 urban land more than doubled, agricultural land -- of which there was already very little -- was nearly halved, and one-quarter of open land and one-twelfth of forests were lost. Meanwhile, as noted above, population for the two towns combined was up nearly 80%.

Land use in Essex and Manchester

(in acres*)

	<u>1951</u>	<u>1980</u>	<u>Change</u>
Urban	1,092	2,311	+112%
Agriculture	1,764	1,011	- 43%
Open	282	209	- 26%
Forest	7,677	7,178	- 7%
Wetlands**	3,505	3,327	- 5%
Recreation	--	213	--
Mining	--	56	--
Waste disposal	--	15	--
Total	14,320	14,320	

*Photointerpretation was done by the Remote Sensing Project, Department of Forestry and Wildlife Management, University of Massachusetts, Amherst. 1980 acreages are based on an interpretation of 1980 aerial photos. 1951 acreages have been revised to be consistent with the 1980 analysis

**Includes 2,250 acres of salt marsh in Essex.

The growth of population and the loss of open space usually walk hand-in-hand. Often, however, there is a time lag before concern becomes widespread. In Massachusetts the issue is now a popular one, in part because citizens throughout the Commonwealth are exhibiting a growing interest in outdoor exercise and enjoyment of nature, and awareness of the vital importance of natural resources to healthful life.

The Massachusetts Department of Environmental Management started work on a statewide comprehensive outdoor recreation plan (SCORP) in 1965. In 1978 it published Massachusetts Outdoors, a report on its findings. Its survey showed that nature walking is the second most popular recreational activity in the state. (Bicycling, pool swimming, and non-pool swimming are first, third and fourth, respectively.)

The study also found that "...participation rates are relatively constant across age, sex, income, and regions, indicating a high degree of interest in landscape and nature

study." Nature walking was shown to have the greatest need for increased facilities through the year 2000, with picnicking a close second.

The 1978 SCORP provided for development of a Natural Heritage Program in coordination with The Nature Conservancy. This program compiles data on the location and status of rare plant and animal species, plant communities, aquatic habitats, and other unique natural features in the Commonwealth. This information is stored in a set of cross-referenced map, computer and manual files that are continually updated. The inventory is used to develop priorities for site protection. It is noteworthy that part of the study area has been identified and is being actively monitored under the Natural Heritage Program.

In 1985 the Department of Environmental Affairs issued a new report, The Outdoor Heritage of Massachusetts. Its purpose:

...to lay the framework for a new Open Space Master Plan that will continue the work begun in these earlier plans. The underlying assumption is that some of the Commonwealth's greatest assets are its natural resources and the recreational opportunities they present and that the quality of life in Massachusetts can be improved through the wise use of its outdoor heritage.

The study area fits this description, offering both significant natural resources and diverse recreational opportunities. Its wetland and wildlife values have been detailed. These values are increasingly appreciated as more is learned of nature's interrelationships and the interdependence of species. Among the policies articulated by the Department of Environmental Management are: "The Commonwealth shall practice and promote the protection of wildlife and wild plants to preserve the diversity and health of natural community ecosystems. Special emphasis shall be given to the preservation and recovery of rare and endangered species and threatened ecosystems." Also, "The Commonwealth shall promote the protection, restoration and preservation of wetlands, watersheds, and aquifers."

Although the study area is not vast or remote, it is sizable enough to qualify as a quasi-wilderness. Size is significant in that it allows ecological values impossible in smaller settings. Certain species, for example, cannot exist except in remote, isolated areas.

Speaking at a conference on "Open Space -- Our Commonwealth" in March 1985, Gerard Bertrand, President of the Mass. Audubon Society, stressed the critical need of

conservation areas to be "ecologically viable." There is, he said, a minimum size for conservation areas without which they cannot remain healthy. Wildlife must be free to move about without pressing up against manmade constraints.

The study area's recreational values focus on hiking, cross-country skiing, picnicking, horseback riding, and nature study. Well accessed by trails, it is largely free from motorized traffic and offers opportunities for privacy and peaceful exploration. Seasonal highlights -- fall foliage, winter white, spring rebirth, and summer lushness -- provide quiet recreation and enjoyment difficult, if not impossible, to quantify.

For some people within the local communities enjoyment of the woodlands may be limited to a glance from the highway and a vague awareness that "those trees are protected". Yet that is enough to gain their support. It is as if the mere presence of an attractive natural vista and a diversity of wildlife within the community is regarded as an index to the quality of life.

Ecological values often underlie these primarily aesthetic considerations -- what we find attractive may be highly beneficial in the natural order. Yet it would be difficult, if not impossible, to quantify how much of the area's value comes from its attractive woodlands, wildlife, ponds, paths, and ledges, its sense of privacy and peacefulness, its vistas and its caves, and how much from its water filtering and storage capacities and flood-control, air-purifying, insect-controlling, chain-of-life mechanisms. All combine to make it a prized asset.

For all these reasons, the study area rates very highly in terms of community and regional needs for open space.

BEST USE: OPEN SPACE

Weighing the study area's natural characteristics -- geology, topography, hydrology, soils and soils suitability, and wildlife -- and its cultural characteristics -- land use history, ownership, and zoning, together with recognized local and regional needs for industrial and residential development, water supplies, and open space, the balance is striking.

The best use of the study area is as a protected natural environment, open to the public for passive recreation compatible with maintenance of its wildlife and other natural resources.

This "best use" would allow the land to continue to do what it has done so well for so long:

Make a significant and irreplaceable contribution to public and private water supply in Essex, provide a possibly substantial contribution to public water supply in Manchester, and a potentially important direct contribution to regional water needs in times of drought.

Provide a significant measure of flood-control and water and air pollution-control to both towns.

Provide a unique natural habitat readily accessible and enjoyable for public passive recreation.

Alternative, competing uses are less attractive because of natural constraints and excessive costs to private developers and taxpayers alike. More importantly, such development would be incompatible with the full benefits the area now offers. Land use changes within the area or intensive development on its edges would effect a significant alteration in the character of the resource. The special environmental values provided by its size and relative isolation would be destroyed.

The significant benefits the area generates as a wilderness confirms the far-sightedness of MCT, the Trustees of Reservations, the Essex County Greenbelt, and the two towns in setting aside large blocks of land within the study area for conservation. The major objective for MCT -- and indeed for all conservation groups interested in the area -- is to identify and take steps to deal with any and all inappropriate and incompatible uses that are now or may in future be attracted to the area. Only by such action can the study area hope to continue to provide the highly significant benefits it now affords.

MAJOR CONCERNS

Strategies and priorities for management actions must be based on the most pressing threats to the integrity of the wilderness conservation area as a whole. Those most apparent at present include the potential for inappropriate development both within and adjacent to protected areas, the threat of a high-tension powerline through the heart of the area, and improper use of roads and trails.

Inappropriate development

In the past the natural limitations of the land in the study area -- bedrock outcroppings, steep slopes, thin soils, wetlands, and poor drainage -- as well as its location distant from the main residential and business districts of Essex and Manchester have effectively constrained potential developers. Now, however, real estate values and the demand for residential, office, and industrial space are rapidly altering the economics of building. Physical constraints and soaring costs no longer can be counted on to deter development.

The lack of land use goals (Essex) and inappropriate zoning (Manchester) are major problems. If the Wilderness Conservation Area is to yield its best value to Essex and Manchester, as well as to the larger region of which it is a part, public policy must change. Both the towns have the authority to consider such steps independently, although a cooperative effort could focus more clearly on the area's needs.

Essex's current land use study offers MCT an opportunity to share its knowledge of the study area's special ecological values. Similarly, MCT might share with Manchester's growth management study group and its Planning Board its awareness of the special ecological qualities and building site development constraints of the study area, with an eye to reconsideration of Town zoning requirements or other regulations in the area.

Ownership provides the surest means to control land use. MCT must continue its efforts to acquire abutting parcels within the study area. It should also work with and encourage other conservation groups to do likewise. Solicitation of gifts and purchases in as large a measure as is financially feasible should be actively pursued in a cooperative spirit.

Powerline intrusion

The New England Power Company's still-extant threat to run an overhead high-voltage power transmission line through the study area is a major concern. The 1964 proposal was

tabled only after substantial public opposition. No long-term solution was offered -- only short-term improvements in existing energy transmission capabilities. So the long-term problem remains.

Since the early 1970's, population levels and demand for electrical power on Cape Ann have tended to stabilize. Work to upgrade the existing system is said to have been completed. In the long-range forecast filed with the Energy Facilities Siting Council in 1984, New England Power Company identified 1995 as the earliest year that an electrical transmission problem can be expected under present circumstances.

New England Power's problem is in meeting reliability standards. The forecast states:

Using the existing supply system, future test load levels were selected for computer simulation. The adequacy of the system at these higher load levels was checked assuming single-facility failures during heavy load periods. The point at which the system no longer could supply the area load was identified as the critical load level. At this point, the addition of major reinforcement would be indicated.

Presently, diesel generators in Gloucester are the contingency supply for this situation. The company's ability to comply with new noise abatement ordinances could drastically affect the 1995 date. If it is unable to equip the generators with adequate noise controls and they are abandoned, the date a new power source is needed will move up significantly.

The company forecast notes that Essex and the holdings of the Manchester Conservation Trust are areas of potential sensitivity and environmental concern. It also lists several alternatives to construction of a new transmission line, but these are not necessarily viable options to the power company.

In any event, it is obvious that construction of a power line through the study area is neither appropriate nor in any way acceptable. If a line must be built, it should be routed around the area through less sensitive property. A power line in the woods would cut the area in half, destroying its wilderness quality and much of its ecological value. Use of herbicides to maintain the line's right-of-way would adversely impact on the wetlands and could contaminate local water supplies. The open swath created for the line would encourage inappropriate uses of the area, particularly by motorized vehicles.

If and when New England Power decides it needs a new power line, it must first file with the Energy Facilities Siting Council. After public notice is given, there is a time for intervenors to file with the Council and for public hearings. The Council has the authority to mediate disputes. Once the Council grants a permit, the proposal must be approved by the Massachusetts Department of Public Utilities and the Executive Office of Environmental Affairs. If the company does file for a permit to construct this power line, early involvement in the process is the key to seeing that the end result is acceptable.

Keeping a watchful eye out for any suggestions that New England Power is resurrecting plans to use the study area for a powerline is MCT's key responsibility here. Additionally, MCT should cooperate with other conservation-minded groups in promoting a greater awareness within the two towns of the overriding preeminence of environmental values in the Manchester-Essex woods. An informed, committed citizenry is critical to convince state officials of the importance of maintaining the area's integrity.

Area misuse

The old Manchester-Essex road, which bisects the study area from north to south, is an important recreational and management asset. It is an excellent trail for horseback riding, and provides valuable access for fire protection and maintenance. However, it is also commonly used by recreational two-wheel and four-wheel-drive vehicles. This is detrimental to the wilderness character of the area and the quality of the experience for those engaged in passive recreational pursuits.

The road has a hard gravel surface. Lacking maintenance some stretches are eroded from water run-off. Motorized vehicles add little to this damage. However, there is also little challenge to motorized vehicles. As a result, numerous turnouts (and some trails) are explored. The more use these turnouts and trail heads receive, the larger they get. And the larger they get, the more use they receive. Damage to vegetation, soil compaction, and serious erosion problems result.

There is also a litter problem along the road, more so than anywhere else in the study area.

Trail abuse is another serious problem, though mainly limited to the most easily accessible sections. Trails that pass through wetlands or over the thin soils on the numerous steep slopes are quite fragile. Foot travel alone is often enough to cause damage in these areas. Use by horses and motor bikes causes severe problems. Damage to vegetation,

soil compaction, and erosion are cumulative, and in time can turn a trail into an impassable mudhole.

Disruptions from loud off-road motorcycles destroy the tranquility of the area as well. Unfortunately, these abuses are very difficult to control.

Any attempt to protect fragile areas from misuse requires a strong management commitment by all interested parties, with a large measure of community support. Boundaries and rules and regulations must be clearly posted. Entrances to sensitive areas must be restricted wherever possible. Regular patrolling of these areas in season is essential. And vandalism to signs must be countered promptly. Additionally, consideration should be given to shutting off the area from usage by four-wheeled vehicles.

IMMEDIATE MANAGEMENT TASKS (1986-1987)

Coping with major threats and critical tasks as well as routine management requires priorities. The simplest and most pressing needs are to maintain and enhance the existing facilities (trails), halt the debilitating uses occurring on the property, intensify efforts to secure wider public awareness and support, and initiate a survey of property lines.

Trail maintenance

Throughout the extensive MCT trail system evidence of past maintenance activity can be observed, but this work must be done on a regular basis to prevent deterioration and upgrade the system. Over-all, the trails are in good condition, but some areas are in need of attention.

Generally, trails should be clearly defined to prevent wandering from the trail bed that would result in soil compaction and damage to vegetation. A corridor four to six feet wide and eight feet in height is adequate. This can be varied to allow alternate areas of shade and sunlight that will result in a corresponding diversity of groundcover.

Trails for ski touring should have smooth surfaces and more headroom to allow for the expected depth of snow; they should also be wider -- up to twelve feet. Also, it is best if these trails are in a loop. The slope and length of ski trails should be restricted to the following standards:

	<u>Slope</u>	<u>Length</u>
Novice trails	7%-8%	3-5 miles
Intermediate trails	12-15%	5-8 miles

For all trails, where erodable slopes are present, water bars should be installed at the following frequencies:

<u>Slope</u>	<u>Spacing</u>
2%-5%	500'-300'
6%-10%	300'-200'
11%-15%	200'-100'
16%-20%	100'

Ditches may be built on the uphill side of the trail to divert water flows to the water bars.

Where a trail crosses a wet area, the surface of the trail should be hardened. Rock cribs, stepping stones, flagstones, or flat-topped logs can be used.

Permanent marking standards should be developed to define the color, frequency, placement, and form of trail markings along with a master sign list to record the location, text, and size of each sign. Early each spring, every trail should be patrolled and a short standardized written report prepared to locate the areas in need of the most attention and to help plan the season's work.

An excellent source for information and instructions for completing this work is the Appalachian Mountain Club's Field Guide to Trail Building and Maintenance.

Blowdowns are a problem common to the entire system. Numerous dead hemlock trees killed by the hemlock looper epidemic of the early 1970's are standing in scattered sites throughout the woods. These snags have begun to topple and crisscross the trails in many places. A concerted effort is needed to clear these blowdowns. A two-man crew equipped with proper chain saws and peavys could probably accomplish this within three working days.

Two trail sections are in need of major improvements. The footbridge in Fox Swamp on the Ancient Line Trail needs to be repaired or replaced, and the section of the Prospect Ledge Trail on the hairpin turn at the north end of the trail needs extensive work or relocation. Also, the Bear's Den Trail needs to be remarked, but otherwise is in good condition.

Trail protection

Several trail entrances off the old Manchester-Essex road, as well as off old School Street and the access road, also need work to inhibit their use by horses and vehicles. Chief among these are the entrance to Varney's Trail off the old Manchester-Essex road, the entrance to the Cedar Swamp Trail off old School Street, and the unofficial path to the Millstone Hill Trail from the access road. The latter two sites involve wet areas, and the continual churning up of the trail bed is leading to erosion.

Placement of large stone boulders, such as those at the entrance to the trail to Heron Pond, or barrier fences would help thwart entry by horses and motor bikes. As several of these points are on land managed by the Manchester Conservation Commission, their cooperation should be sought.

User awareness

One of the simplest and best ways to educate people who use and enjoy the area to the special environmental values and needs of the wilderness conservation area and to

encourage their voluntary compliance with regulations is to place bulletin boards at the most commonly used entrance points. Presently, the best location might be near the green at the junction of School and Old School Streets in Manchester.

The information presented could include notes on the values of conservation land, the role of the protecting organizations, and highlights of excursions in the area. Trail maps, rules and regulations, a calendar of upcoming events, and any other pertinent information could be posted.

Providing rewarding opportunities for quiet recreation is a well-established goal for MCT within the wilderness conservation area. However, as a resource-based area where the primary emphasis is on natural beauty rather than activity, use must be limited and channeled so that the area will not be altered and the quality of the resource damaged. Facilities, such as trails, have been created as much to protect the environment as for the convenience of the user.

Yet there is more MCT could do to enhance proper recreational use and appreciation of the area. Informative trail signs and self-guiding nature trails can increase educational values for hikers and those interested in nature study. Nature trails may consist of a series of signs along a trail or leaflets distributed from a container at the beginning of the trail, or both. Leaflets could be sold on the honor system with a coinbox attached to the container.

The greater the educational use of a conservation area, the more valuable it becomes in the public consciousness. This substantially lessens the danger of casual misuse and bolsters resources with which to fight off unsuitable encroachments and intrusions, such as that posed by the power line proposal.

MCT should also take steps to educate horseback riders on proper use of the area and make them aware that violations of Trust property will not be tolerated. A leaflet should be prepared for distribution to the various stables in Essex and Manchester. More sign-posting is also needed. Policing can be of help though it is difficult in all but the most accessible areas.

Boundary survey

A thorough professional survey of all MCT properties is essential. Until recently, woodlots in the study area had little monetary value. They were bought, sold, and inherited with little concern for exact boundary locations or property descriptions. Assessors' records, deeds, and plans within

the area are often old, vague, incomplete, or inaccurate, making location of current bounds and property lines extremely difficult. This problem is most acute in Essex, although work is also needed in Manchester.

For MCT, an accurate metes and bounds description of each individual parcel, location of permanent bounds at important corners, and proper blazing and painting of external boundaries will be increasingly desirable as a basis for proper posting and enforcement of rules and regulations.



NEAR-TERM MANAGEMENT TASKS (1986-1989)

Management planning for the next few years should focus on policy innovations to deal with the rapidly evolving events that threaten the integrity of the study area as a whole and on less critical but highly recommended ways of increasing recreational enjoyment. Near-term needs include increased cooperation among conservation organizations active in the area, steps to prohibit vehicular traffic within the area, greater involvement in community land use planning, and scenic vista improvement along trails, as appropriate.

Cooperation among conservation organizations

The Essex County Greenbelt and The Trustees of Reservations share with MCT a strong interest in the future of the study area. They are similar organizations with similar goals. Both own land abutting the area -- the Greenbelt at its northern end where the old Manchester-Essex road, Conomo Drive, and Andrews Avenue intersect in Essex; The Trustees of Reservations in the triangle between old School Street and School Street, across from Agassiz Rock Reservation in Manchester. Both are concerned with everyday problems of access, usage, and maintenance. Other landowners, such as the North Shore Council of Boy Scouts and some individuals, also share conservation goals.

As the largest conservation landowner in the area, MCT should take the lead in encouraging formation of an Overseers' Committee for the Wilderness Conservation Area -- a committee of conservation organizations and other conservation-minded landowners to review specific land use proposals and make comprehensive recommendations to decision-making authorities. This would bring a regional context to the issues confronting landowners in the area.

At present, MCT shares with The Trustees of Reservations the services of a part-time summer policeman who keeps an eye on the entrances to the Agassiz Rock Reservation and the Cedar Swamp and Cathedral Pines areas. MCT also serves as a resource for TTOR's local committee for Agassiz Rock Reservation. Putting cooperation on a systematic basis would help coordinate efforts at providing routine maintenance, proper usage, and small improvements and share insights relative to long-term planning.

The participation of town conservation commissions might also be encouraged. MCT has, on paper, a responsibility to act as a visiting committee to two Town of Manchester conservation areas outside the study area. Within the study area, MCT has assumed this role de facto, largely

because Town and MCT conservation parcels interlock extensively and the local conservation commissions have not assumed an active management role. MCT might encourage the Manchester and Essex Conservation Commissions to appoint representatives to the Overseers' Committee.

Prohibition of vehicular traffic

Before too long steps should be taken to deal with the problem of unrestricted and unnecessary motor vehicle use of the area, as well as appropriate land use there. Both these needs will involve MCT in considerable interaction with Town boards and with Town Meetings.

The best solution to the problem of four-wheel vehicles would be to restrict access at or near the major entry points. Full access should remain available to those with legitimate interests -- police, fire department, and land owners within the area. Single-file horseback riders, hikers, and cross-country skiers should also be allowed to enter freely. This would mean that two-wheeled motor bikes could still get through. But four-wheeled vehicles could not.

With use restricted, the roads could be seeded with a mixture of grasses beneficial to wildlife. This would create a new habitat type and wildlife corridor through the area.

Community land-use planning

Essex -- As noted above, the bulk of the unprotected acreage in the study area lies in Essex. Just where the protected area's northern boundary and access point should be -- how much development is to take place off Conomo Drive and the old Manchester-Essex road -- as well as much of the difficult surveying and marking of boundaries are all issues that must be addressed largely in Essex. What happens in Essex will have a profound impact on the future of the area as a whole.

With the report prepared by Philip Hare Associates in hand, Essex is attempting to come to grips with local planning issues. As a major landowner in the Essex portion of the study area, MCT should participate in any community discussions that result. It should also seek the support and cooperation of Essex officials and a favorable local public opinion concerning its protection efforts.

Manchester -- As noted above, unprotected parcels within the study area in Manchester are few but those along the old Manchester-Essex road and the connector road are critical to the integrity of the area as a whole.

Manchester's Planning Board is currently sponsoring a growth management study to assess potential development within the town and its likely impact on town services and amenities. In this context, MCT should offer the study group its information on the natural constraints and conservation significance of the unprotected parcels. It should encourage the Planning Board to study the implications of development on those parcels in view of the uncertain relationship of surface waters in the area to the aquifer for the Lincoln Street well, the risk of increased flooding along Sawmill Brook, as well as the degradation of valuable open space through the intrusion of a highly engineered development in the midst of a sensitive environment.

Determining the relationship between the surface waters of Cedar Swamp, Beaverdam Swamp, and Sawmill Brook and the aquifer for the Lincoln Street well is perhaps the most essential task to proper long-term land use planning for the area north of Route 128. This determination should precede any development that might have an adverse impact on these surface water resources. The first step would be to have a professional geologist perform a complete literature review and study of all reports and well logs (both public and private) from the area and attempt to develop a coherent data base. Conclusions from this work would help define hydrologic relationships within the drainage basin and point to whatever field work might be needed to determine proper protective measures.

MCT should also make a greater effort to acquaint Town officials with its work alongside the Town's Conservation Commission in preserving open space for public enjoyment and resource protection.

Scenic vista improvement

As the highest point in the wilderness conservation area, the peak of Millstone Hill offers the potential for a scenic vista with a magnificent panoramic view. To allow this, it will be necessary to remove a block of trees from the crest of the hill down the slope to a point where desired sight lines are clear. The improved view will undoubtedly attract visitors to the area and give more people an appreciation of the intangible values of open space.



LONG-TERM MANAGEMENT TASKS (1989-1993)

Long-range management planning should be designed to protect and preserve the quality and character of the study area as a Wilderness Conservation Area in perpetuity. As such, these plans must be flexible enough to accommodate an increasing land base and changing needs, uses, and threats; but firm enough to be effective. Internal land use, access controls, and greater public involvement all merit consideration.

Internal zoning

MCT and other cooperating conservation organizations can adopt appropriate internal zoning regulations as a management tool. Conflicting uses and users can be separated, sensitive areas protected, and locations for future facilities carefully located.

Generally, areas can be assigned to different use categories based on the natural ability of the land to withstand the expected uses and the compatibility of those uses. Clearly defined boundaries between different zones are important in order to facilitate regulation and management. These can be roads or topographical features, such as ridges and streams. The purpose and regulations for use of each zone should also be well defined.

Management guidelines and criteria have been elaborated by the Massachusetts Department of Environmental Management's Office of Planning under its GOALS program (Guidelines for Operations and Land Stewardship). Four categories are addressed:

Unique resource zone: areas requiring a high degree of protection, such as natural areas, rare species habitats, and historical and archaeological sites.

Environmental protection zone: sensitive areas such as wetlands, steep slopes, scenic landscapes, and other areas in need of protection from inappropriate or excessive use.

Natural resources management zone: areas in which there is a continuous yield of forest, wildlife, water, or agricultural resources as well as dispersed recreation, such as hiking and hunting.

Developed lands zone: active recreation areas, visitors' centers, administration and maintenance areas, and lands suitable for future development.

GOALS Management guidelines address allowed/prohibited uses

and appropriate levels of use. Considerations include recreation, visual resources, wildlife management, transportation, silviculture, facilities, resource protection, vegetation, and fire suppression. Once protected parcels within the Wilderness Conservation Area have been zoned and mapped, these guidelines can be used as a framework for management decisions.

Access controls

Vehicular access, parking, and pedestrian entrances into the Wilderness Conservation Area have a direct impact on usage of the area and on-site circulation. Controlling this access can be an important tool in managing the area.

Presently, most users park near the green triangle at the junction of Old School Street and upper School Street, on the connector road, or anywhere along the old Essex-Manchester road. Some cars park along Pine Street just north of Route 128. Pedestrian entrance is from these main parking areas and from King's Court in Essex. There is no parking on King's Court and only limited on-street parking at Pine Street. These two trailheads are hard to find and receive relatively little use.

Trash cans are maintained at the School Street triangle and the facilities appear adequate for current use. Should a gate be installed to prevent cars from parking within the property, the number of cars parking at the triangle and the use of trails leading from this area is apt to increase slightly, but probably not enough to overtax the capacity of the area.

Significantly increased popularity of the Wilderness Conservation Area would put more pressure on all entrance points. A parking facility in the Pine Street area would alleviate this problem should it occur. It might be easier to create a new entrance and parking area through the Town's former dump. King's Court is a residential neighborhood and not suited for development of a parking area.

At present there is no clearcut entrance point in the northwestern corner of the area. With the western end of Conomo Drive upgraded for residential development and the possible construction of a turnaround at its end, provision of a parking site for conservation area users might be desirable. MCT should discuss this with the Essex Planning Board and the Essex County Greenbelt, which holds conservation land along Conomo Drive. Signs, boundary markings, gates, or boulders are all methods that can be used to control access from this entrance. If the amount of use warrants it, a bulletin board might be advisable.

Greater public involvement

Grassroots community awareness and support could become the Wilderness Conservation Area's greatest asset. Public understanding and appreciation of the sensitive nature of its natural resources will increase voluntary compliance with regulations and influence town decisions that affect the area. If an eminent domain battle should arise, the unqualified support of local residents could be essential.

MCT has a strong base of support within Manchester, with over 200 families and individuals as regular dues-paying members and numerous others as honorary members on the basis of land or conservation restriction gifts. Twice-yearly newsletters, along with press releases, keep members and town officials informed of MCT activities. Few Essex residents belong to MCT, quite possibly because few know much if anything about the organization. Encouraging Essex residents to join MCT, as well as regular solicitations of new members in both towns, should be an important long-term goal.

Essex residents should be included on the Overseers' Committee for the Wilderness Conservation Area. MCT might also consider adding an Essex resident to its Executive Committee. Essex participants could help represent MCT's interests in Essex and help dispel any resentment that may exist in Essex against a Manchester-based group owning land and taking part in policy discussions.

MCT would also benefit from establishing subcommittees to help gather data, elaborate policy choices, and get directly involved, as appropriate, in land management (e.g., parking, access, trail maintenance), land acquisition (e.g., title and genealogical research), educational projects (e.g., slide show, on site, in schools, community groups) and social events. Members should be encouraged to join one or another of these subcommittees for specific time periods so that the commitment would not be excessive.



APPENDIX: WILDLIFE SURVEY (1984)

Open water and environs

cattail (Typha sp.)
purple loosestrife (Lythrum salicaria)
reed (Phragmites communis)
arrowhead (Sagittaria sp.)
pickerel weed (Pontederia cordata)
sedge (Carex, Cyperus, sp.)
water featherfoil (Hottonia inflata)
speckled alder (Alnus rugosa)
sphagnum moss (Sphagnum sp.)
leatherleaf (Chamaedaphne calyculata)
sundew (Drosera sp.)
pitcher plant (Sarracenia purpurea)
lady's-tresses (Spiranthes cernua)

Wooded swamps

red maple (Acer rubrum)
Canadian hemlock (Tsuga canadensis)
white cedar (Chamaecyparis thyoides)
red spruce (Picea rubens)
shadbush (Amelanchier sp.)
high-bush blueberry (Vaccinium corymbosum)
sweet pepperbush (Clethra alnifolia)
steepleshbush (Spirea tomentosa)
winterberry (Ilex verticillata)
alder (Alnus sp.)
buttonbush (Cephalanthus occidentalis)
black-berried elder (Sambucus canadensis)
spicebush (Lindera Benzoin)
bayberry (Myrica sp.)
skunk cabbage (Symplocarpus foetidus)
golden ragwort (Senecia aureus)
blue flag (Iris sp.)
Indian cucumber (Impatiens capensis)
jewelweed (Impatiens capensis)
marsh marigold (Caltha palustris)
cardinal flower (Lobelia cardinalis)
cinnamon fern (Osmunda cinnamomea)
royal fern (Osmunda regalis)

Nesting birds:*

green-back heron	eastern kingbird
mallard	tree swallow
broad-winged hawk	blue jay
American woodcock	American crow
mourning dove	black-capped chickadee

hairy woodpecker
northern flicker
eastern wood-pewee
eastern phoebe
great crested flycatcher
brown thrasher
cedar waxwing
European starling
red-eyed vireo
Nashville warbler
yellow warbler
chestnut-sided warbler
Magnolia warbler
Wilson's warbler
Canada warbler
American redstart
ovenbird
common yellowthroat

Migratory birds*

red-throated loon
common loon
great cormorant
double-crested cormorant
great blue heron
little blue heron
black-crowned night heron
snowy egret
gloss
wood duck
Canada goose
American black duck
yellow-bellied sapsucker
olive-sided flycatcher
willow flycatcher
red-breasted nuthatch
brown creeper
winter wren

Overhead sightings*

turkey vulture
red-tailed hawk
herring gull
great black-backed gull

veery
wood thrush
American robin
gray catbird
northern mockingbird
northern cardinal
rose-breasted grosbeak
indigo bunting
rufous-sided towhee
chipping sparrow
song sparrow
swamp sparrow
red-winged blackbird
common grackle
brown-headed cowbird
northern oriole
house finch
scarlet tanager

golden-crowned kinglet
ruby-crowned kinglet
blue-gray gnatcatcher
Swainson's thrush
hermit thrush
solitary vireo
black-throated blue warbler
yellow-rumped warbler
black-throated green warbler
blackburnian warbler
palm warbler
bay-breasted warbler
blackpoll warbler
black-and-white warbler
Connecticut warbler
northern waterthrush
white-throated sparrow
white-crowned sparrow
dark-eyed junco

rock dove
common nighthawk
chimney swift

Upland forest

red oak (Quercus)
white oak (Quercus)
scarlet oak (Quercus)
red maple (Acer rubrum)
American beech (Fagus)
yellow birch (Betula)
black birch (Betula)
white birch (Betula pendula)
ash (Fraxinus)
Eastern hemlock (Tsuga canadensis)
red cedar (Juniperus virginiana)
white pine (Pinus Strobus)
mapleleaf viburnum (Viburnum acerifolium)
witch hazel (Hamamelis virginiana)
sheep laurel (Kalmia angustifolia)
mountain laurel (Kalmia latifolia)
dogwood (Cornus florida)
wintergreen (Gaultheria procumbens)
pipsissewa (Chimaphila unbellata)
shinleaf (Pyrola sp.)
Canada mayflower (Maianthemum canadense)
false solomon seal (Smilacina sp.)
Bellwort (Ulvularia sp.)
pink lady's slipper (Cypripedium acaule)
rattlesnake plantain (Goodyera sp.)
partridgeberry (Mitchella repens)
wild sarsaparilla (Aralia sp.)
wood anemone (Anemone quinquefolia)
wood aster (Aster sp.)
purple clematis (Clematis verticillaris)
bracken fern (Pteridium aquifolium)
marginal woodfern (Dryopteris sp.)
hayscented fern (Dennstaedtia punctilobula)
interrupted fern (Osmundia claytonia)
Christmas fern (Polystichum acrostichoides)
common polypody (Polypodium polypodiodes)
ground cedar clubmoss (Lycopodium complanatum)
tree clubmoss (Lycopodium obscurum)
shining clubmoss (Lycopodium lucidulum)
pixie cup lichen (Cladonia pyxidata)
shagbark hickory (Carya osata)
Canadian yew (Taxus canadensis)
hobblebush viburnum (Viburnum alnifolium)
striped maple or moosewood (Acer pensylvanicum)
yew (Taxus canadensis)
bead lily (Clintonia borealis)
sorrel (Rumex acetosella)
gold thread (Coptis groenlandica)
beechdrops (Epifagus virginiana)
star flower (Trientalis borealis)

bunchberry (Cornus canadensis)
twinflower (Linnaea americana)
rue anemone (Anemonella thalictroides)
wood betony (Pedicularis canadensis)

white-tailed deer (Odocoileus virginianus)
red fox (Vulpes fulva)
mink (Mustela vison)
skunk (Mephitis mephitis)
raccoon (Procyon lotor)
gray squirrel (Sciurus carolinensis)
red squirrel (Tamiasciurus hudsonicus)
New England cottontail rabbit (Sylvilagus transitionalis)
eastern cottontail rabbit (Sylvilagus floridanus)
eastern milk snake (Lampropeltis triangulum)
eastern garter snake (thamnophis sirtalis)
spring peeper (Hyla crucifer)
American toad (Bufo americanus)
red-backed salamander (Plethodon cinereus)
deerfly (Chrysops callidas)
mosquito (Culex pipiens)

Rocky open summits

oak (Quercus sp.)
pitch pine (Pinus sp.)
low-bush blueberry (Vaccinium sp.)
sheep laurel (Kalmia angustifolia)
huckleberry (Gaylussacia baccata)
bearberry (Arctostaphylos uva-ursi)

Open dry areas

staghorn sumac (Rhus typhina)
rose (Rosa sp.)
raspberry (Rubus idaeus)
blackberry (rubus allegheniensis)
sweet fern (Comptonia peregrina)
common mullein (Verbascum thapsus)
goldenrod (Solidago sp.)
milkweed (Asclepias syriaca)
wild aster (Aster sp.)
yarrow (Achillea millefolium)
tansy (Tanacetum vulgare)
Queen Ann's lace (Daucus carota)
chicory (Cichorium intybus)
ragweed (Ambrosia artemisiifolia)
rabbit's foot clover (Trifolium arvense)

*Species observed in Cedar Swamp, 1964-1985, by Herman Weissberg, Brookline Bird Club.

APPENDIX: TRAIL INVENTORY (1984)

Ancient Line Trail

In Fox Swamp the trail is overgrown and the log bridges are in a serious state of disrepair, to the point of being dangerous. These should be completely rebuilt. Near the westerly junction of the Pulpit Rock Trail there are several blowdowns that should be cleaned up. Otherwise, the trail is in excellent condition.

Baby Rock access

Access to Baby Rock is achieved via the original road bed of the old Essex-Manchester road. It is relatively short and in excellent shape with only one significant blowdown. There are no markings or signs at the trailheads, but they are probably not needed.

Bear's Den Trail

This trail needs to be marked. When walking from Varney's toward the old Essex-Manchester road, it is easy to miss a turn and continue down a wrong trail following a gully into a residence. Otherwise, the trail is in excellent shape and one of the most pleasant among the system.

Candlewood Hill spur

This spur trail is in good condition. There is a campsite at the top of the hill that appears to be used fairly often, but there is no litter or damage.

Cedar Swamp Trail

Near where the trail veers to the west away from Cedar Swamp, one 20-yard stretch should be relocated westerly to the base of a ledge to avoid a wet spot. Otherwise, the trail is in good condition. Near Ship Rock there is some minor erosion and a blowdown, but there are not serious problems.

Cheever Commons Loop

This trail is well marked and in good condition.

Dug Hill Trail

The beginning of this trail, near Pine Street, is difficult to locate. The bridge over Mill Brook, although presently serviceable, will need to be rebuilt within a few

years' time. When travelling the loop in a counterclockwise direction, it is easy to miss the turn off the Fire Road. there is some evidence of use by dirt bikes, but no serious damage. Over-all, the trail is in good condition.

Millstone Hill Trail

Although not marked from the old School Steet entrance, the trail is open and well defined. This section of trail, as well as a short spur to the connecting road running parallel to Route 128, are commonly used as a bridle path. As a result, the trail bed has been thoroughly turned over. This is leading to erosion problems during high water in the swamp. Also, where the spur trail joins the connecting road, there is a pile of brush and trash restricting access. This is unsightly and could be better done by a few large boulders.

The old concrete bridge near Cedar Swamp Pond where the trail crosses Sawmill Brook is in good condition. Further on, where the trail rises up from the gully at the beginning of the Prospect Ledge Trail, there is the potential for erosion. Installing two water bars here would be good preventive maintenance.

By clearing a small section on the southerly side of the Hill a scenic vista overlooking the Town of Manchester and the ocean could be created. This would enhance the aesthetic quality of the trail, as this is the highest elevation in Manchester and the ideal spot for a vista.

Old Manchester-Essex Road

This dirt road is regularly used as a bridal path and occasionally by four-wheel-drive vehicles. It is barely passable with a two-wheel-drive truck. Turnouts and side woods roads, including the trail to Varney's, are repeatedly explored by the off-road vehicles, causing them to be enlarged. Litter is a serious problem along the road, more so than anywhere else in the area.

Closing the road by placing gates at both ends (perhaps even at the southeastern entrance to the area at old School Street) would be the best remedy for these abuses. This would allow continued access for maintenance, fire suppression, and bridle use, while improving the quality of the area for wildlife and recreation. Restricting bridle use traffic during the spring mud season would eliminate the minor rutting that is currently present.

Prospect Ledge Trail

From the Millstone Hill Trail to Ship Rock the trail is

in excellent condition and well marked. Erosion may become a problem in the gully near Ship Rock. From there to King's Court use of the trail is hampered by many dead hemlock blowdowns. Unfortunately, there are likely to be more in the near future. This problem is at its worst at the north end of the trail where it is compounded by a washout of the trail bed. Construction of three or four water bars or relocation of the trail is needed. There is no sign at the King's Court trailhead.

Pulpit Rock Trail

There are a few blowdowns near Pulpit Rock, but otherwise the trail is in fine condition.

Spruce Swamp Trail

Although somewhat overgrown near the swamp, this trail is in excellent condition.

Varney's woods road

This trail is an old cart path. It has been used by horses, four-wheel-drive vehicles, and dirt bikes. The damage has been confined to a few wet spots. There is an old unsightly dump a short way up the trail. There are a few blowdowns that could be removed. At this time, marking is not necessary.

APPENDIX: FOREST SURVEY -- CATHEDRAL PINES

In 1972 an epidemic infestation of the hemlock looper killed all of the hemlock overstory in this scenic and historic area. Subsequently, the dead tree trunks were removed by CETA workers, leaving an area resembling and equivalent to a clearcut.

Natural regeneration has resulted in the development of a very dense and uniform even-aged stand of black birch saplings. An on-site survey suggests the following distribution of species:

Average number of stems per acre

<u>Species</u>	<u>Diameter at breast height</u>		
	<u>1"</u>	<u>2"</u>	<u>3"</u>
Black birch	2,175	200	50
Mixed hardwood (acceptable growing stock)*	225	25	--
Mixed hardwood (unacceptable growing stock)	650	25	--
Total	3,050	250	50

Average diameter at breast height: 1.1"

Average height: 10'-12'

*trees with no visible wounds or insect or disease damage on the main stem; no major fork in the lower fourteen feet of the stem, and at least intermediate in crown class.

Black birch are intermediate to intolerant in their ability to grow in shade and most likely became established after the loss of the hemlock. There are numerous hemlock seedlings in the understory scattered individually and in clumps. Generally, the height of these hemlock is one to three feet. They have been overtopped by the hardwoods, but since hemlock is very shade tolerant, have survived. Hemlock may survive in the understory indefinitely, but after years of suppression may not be vigorous enough to respond to release.

Recently, some Douglas fir seedlings were underplanted in some sections of the stand. Although new growth is present on most of these trees, their chances of survival are problematical.

The present situation presents several silvicultural

options that would yield very different results. A few are outlined below:

Do nothing -- The status quo results from a policy of benign neglect. Since there is no immediate danger of erosion, extensive mortality, or a health hazard, there is no urgent need to do anything. This will result in a thick, slow growing stand of birch.

Pre-commercial thinning -- The present stand is well established, but the individual trees are competing for nutrients, moisture, and, most importantly, sunlight. A thinning would encourage crown expansion needed to sustain rapid growth of the most desirable trees. Without volunteer help, this would require an investment of a minimum of \$40 an acre. Residual stand density should be about 1,000 trees per acre, with an average spacing of five by eight feet between stems. Current average spacing is about three and one-half by three and one-half feet.

Release cutting -- Either independently, or in conjunction with a thinning, hardwoods overtopping hemlock regeneration could be removed to allow more rapid development of these trees and eventually an increased hemlock component in the stand.

Planting -- To establish a uniform softwood stand by planting would require extensive site preparation. The present stand would have to be removed, probably with a large bulldozer. Later, spraying with a selective herbicide or manual brush removal would be appropriate. Such activity would be expensive and unsuitable, if not harmful, to this wilderness site. Moreover, new growth would inevitably be subject to natural trauma, such as the hemlock looper or blister rust, which could wipe out the entire stand.

APPENDIX: SOURCES OF TECHNICAL ASSISTANCE

Agencies

COOPERATIVE EXTENSION SERVICE
Essex Agricultural and Technical Institute
Hathorne, MA 01937
(617) 451-2770

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Division of Forests and Parks
Jack Jackson, Service Forester
Bradley Palmer State Forest
Topsfield, MA 01983
(617) 887-5775

Andrea Lukens, Supervisor of Interpretive Services
100 Cambridge Street
Boston, MA 02202
(617) 727-3180

Office of Planning
100 Cambridge Street
Boston, MA 02202
(617) 727-4704

Division of Fisheries and Wildlife
Walter Hoyte, Game Biologist
Box 86, Harris Street
Acton, MA 01720
(617) 263-4347

Massachusetts Natural Heritage Program
Bruce Sorrie, State Botanist
100 Cambridge Street
Boston, Ma 02202
(617) 727-3160, 3151

DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING
Jack Donahue
One Winter Street
Boston, MA 02108
(617) 727-1552

ENERGY FACILITIES SITING COUNCIL
George H. Aronson, Director of Technical Analysis
100 Cambridge Street, Suite 2109
Boston, MA 02202
(617) 727-1136

ESSEX CONSERVATION DISTRICT
562 Maple Street
Hathorne, MA 01937
(617) 774-5578

ESSEX COUNTY GREENBELT ASSOCIATION
Elizabeth Bell, Executive Director
82 Eastern Avenue
Essex, MA 01929
(617) 768-7241

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
Division of Conservation Services
Joel A. Lerner, Director
100 Cambridge Street
Boston, MA 02202
(617) 727-1552

MASSACHUSETTS ASSOCIATION OF CONSERVATION COMMISSIONS
Lincoln Filene Center
Tufts University
Medford, MA 02155
(617) 381-3457

MASSACHUSETTS AUDUBON SOCIETY
South Great Road
Lincoln, MA 01773
(617) 259-9500

Resources for Cape Ann
Richard K. Quateman, Director
159 Main Street
Gloucester, MA 01930
(617) 283-0598

METROPOLITAN AREA PLANNING COUNCIL
110 Tremont Street
Boston, MA 02108
(617) 451-2770

THE NATURE CONSERVANCY
Karen Caljouw
294 Washington Street
Boston, MA 02108
(617) 542-1908

TRUSTEES OF RESERVATIONS
Wayne Mitton, Regional Director
572 Essex Street
Beverly, MA 01915
(617) 927-1391

U. S. AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE
Essex Agricultural and Technical Institute
Hathorne, MA 01937
(617) 774-1890

U. S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Robert N. Morehouse, District Conservationist
225 Great Road, Box 147
Littleton, MA 01460
(617) 486-8715, 3032

U. S. GEOLOGICAL SURVEY
Michael Frimpter, Hydrologist
150 Causeway Street
Boston, MA

Publications

Appalachian Mountain Club, Field Guide to Trail Building and Maintenance.

C. Frank Brockman and Lawrence C. Merriam, Jr., Recreational Use of Wild Lands, 1973.

Commonwealth of Massachusetts, Department of Environmental Management, Massachusetts Outdoors, Statewide Comprehensive Outdoor Recreation Plan, 1978.

Commonwealth of Massachusetts, Department of Environmental Management, Office of Planning, Guidelines for Operations and Land Stewardship, 1984.

H. Calvin Cook, Open Space Planning Program, Essex, Massachusetts, 1973-74.

Cooperative Extension Service, University of Massachusetts, Woodland as Wildlife Habitat.

David F. Delaney and Frederick B. Gay, U. S. Geological Survey, Water Resources of Coastal Drainage Basins, Northeastern Massachusetts, 1980.

Essex County Greenbelt, Passport to Essex County.

Geraghty & Miller, Investigation of Groundwater Resources in the City of Gloucester.

Richard Haussman and Emerson Pruett, U.S. Department of Agriculture, Forest Service, Permanent Logging Roads for Better Woodlot Management, 1978.

Neal Jorgenson, Sierra Club, Guide to New England Landscape, 1971.

Alan Jubenville, Outdoor Recreation Planning, 1976.

S. Joseph Larson and Richard B. Newton, Cooperative Extension Service, University of Massachusetts, The Value of Wetlands to Man and Wildlife.

Massachusetts Association of Conservation Commissions, Massachusetts Land and Water, Will There be Enough?

Massachusetts Audubon Society, Guide to Sanctuary Planning.

Massachusetts Electric Company, New England Power Company, Yankee Atomic Electric Company, Supplement 2C to Long Range Forecast for the Ten-Year Period 1984-1993, Volume 2 -- Facilities and Resources, 1984.

Metcalf & Eddy, "Letter Report to Town of Manchester, Massachusetts, on Town Wide Groundwater Investigations", 1979.

The Nature Conservancy, New England Natural Community Classification.

William A. Niering and Nancy C. Olmstead, The Audubon Society Field Guide to North American Wildflowers, 1979.

Ellie Pope, The Wilds of Cape Ann, 1981.

Robert Proudman and Reuben Rajala, Appalachian Mountain Club, Trail Building and Maintenance, 1981.

John H. Sears, The Physical Geography, Geology, Mineralogy and Paleontology of Essex County, Massachusetts, 1905.

Herrey W. Shimer, The Trustees of Reservations, The Agassiz Rock Reservation, 1958.

Society of American Foresters, Forest Cover Types of North America (exclusive of Mexico), 1954.

Soil Conservation Service, U. S. Department of Agriculture, Planning Guide Sheets, 1982; Job Sheet MA-902, Planning and Constructing Trails, 1981; Job Sheet MA-903, Access Roads, 1980.

U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Essex County -- Southern Part, 1984.

Whitman & Howard, Engineers, Water Resources Report for the Town of Manchester, 1957.