ENVIRONMENTAL REVIEW TEAM REPORT

MERRITT PROPERTY
WESLEYAN UNIVERSITY

KING'S MARK
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT

on the

MERRITT PROPERTY
WESLEYAN UNIVERSITY
MARCH 1976

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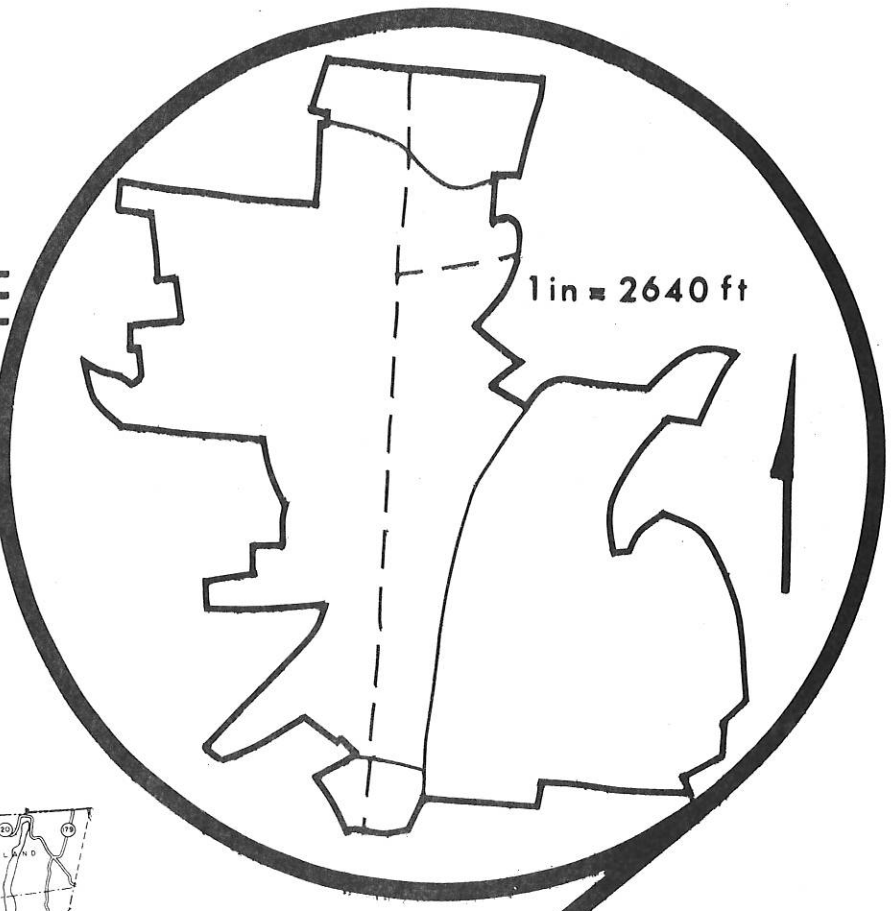
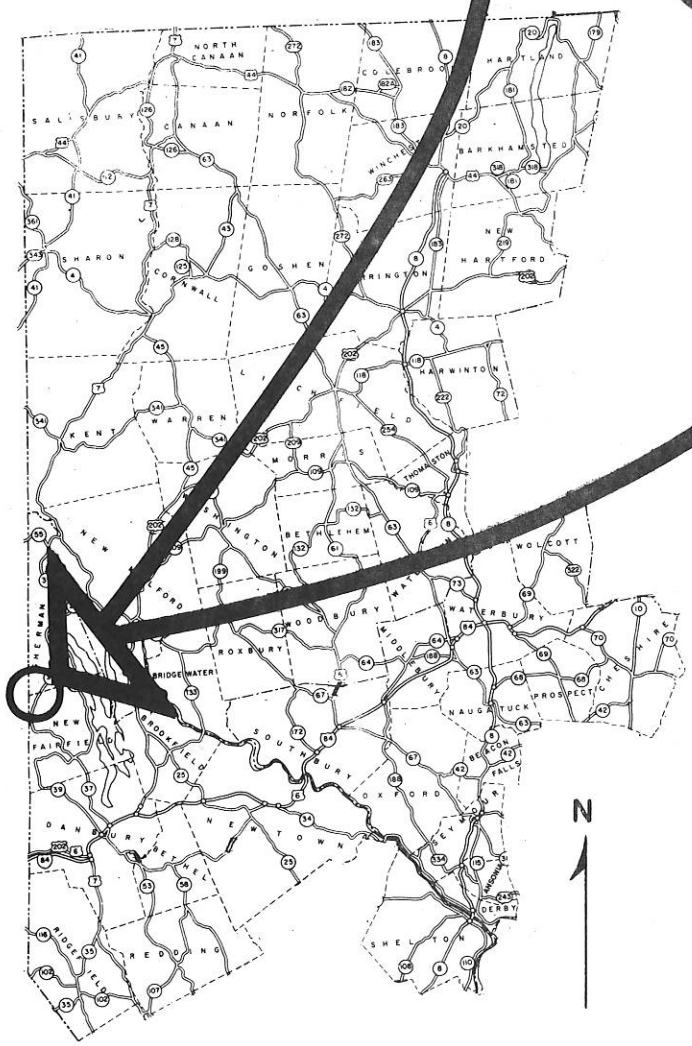
King's Mark Resource Conservation
and Development Project (RC&D)
Environmental Review Team
P. O. Box 30
Warren, Connecticut 06754

LOCATION OF STUDY SITE

MERRITT PROPERTY
WESLEYAN UNIVERSITY





ENVIRONMENTAL REVIEW TEAM REPORT
ON THE
MERRITT PROPERTY OF WESLEYAN UNIVERSITY
FAIRFIELD COUNTY, CONNECTICUT
DUTCHESS AND PUTNAM COUNTY, NEW YORK

This report is an outgrowth of a request from the Planning Office of Wesleyan University to the Fairfield County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the King's Mark Resource Conservation and Development (RC&D) Executive Committee for their consideration and approval as a project measure. The request has been approved and was subsequently reviewed by the Environmental Review Team (ERT).

The Environmental Review Team draws together a range of professionals in the fields of natural resources, engineering and planning, who, based upon existing available data and field investigation, formulate an analysis of a proposed land use activity.

The Team met and reviewed the site on November 20, 1975. Reproductions of the location map and topographic map showing the approximate property boundaries were forwarded to all members of the Team prior to their review of the site. Existing soils information, aerial photographs, and a surveyed map of the property were made available to the Team on the day of the review. The mapping of the soils of the site was completed by a soil scientist of the United States Department of Agriculture, Soil Conservation Service (SCS). Following the review, reports from each individual Team member were sent to the ERT Coordinator for review and summarization for this final report.

The members of the Environmental Review Team consisted of the following: David Thompson, District Conservationist, SCS; Barrie Wolf, Soil Scientist, SCS; Timothy Dodge, Biologist, SCS; Elliott Bronson, Geologist, Connecticut Department of Environmental Protection (DEP); Howard Gates, Forester, DEP; Edward Rizzotto, Recreation Resource Specialist, DEP; Carol Youell, Team Coordinator, King's Mark RC&D Project.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. As requested by the University, the report identifies the existing resource base, evaluates its significance to the proposed uses, and offers suggestions for its management.

The King's Mark RC&D Executive Committee hopes this report will be of value and assistance in making decisions on this particular site.

If any additional information is required, please contact: Carol Youell (868-7342), Environmental Review Team Coordinator, King's Mark Resource Conservation and Development Project, P. O. Box 30, Warren, Connecticut, 06754.

INTRODUCTION

Recently, in 1969, Wesleyan University acquired a 1500 acre tract of land known as "Great Hollow". The property sits astride the boundary of Connecticut and New York State in the towns of Pawling and Patterson in New York, and Sherman and New Fairfield in Connecticut. The land was acquired from the Merritt family with the understanding that it be conserved and maintained as a wildlife refuge for the benefit and enjoyment of the public and for scientific and educational purposes.

Wesleyan University requested the King's Mark Environmental Review Team to undertake a basic natural resource inventory and evaluation of the property in order to formulate a set of guidelines for the future use of the land. The University has proposed the following general uses for the tract: conservation, preservation, outdoor recreation, outdoor education and agriculture. The University requested information as to which of these uses might be appropriate for the various areas of "Great Hollow".

This report will present a general description of the site and its resources, and make various suggestions for management of the area. It must be emphasized that this report and attached illustrations only briefly suggest the possible land uses for the tract. Time limitations and project guidelines allow for but a brief summary. It is suggested that private consultants be contracted to further guide the University in management of those areas suggested as feasible.

Hopefully, this report will be of assistance to the University in determining the ultimate use of the Merritt property. Comments or recommendations made within the report are presented for consideration by the University in the preparation of their land use plans, and should not be construed as mandatory or regulatory in nature.

GENERAL DESCRIPTION AND SETTING

"Great Hollow" is unusual not only from the standpoint of its natural beauty, but also from the complex variety of topographical, geological, and biological situations found on the property. The 1500 acre tract of land is effectively divided into an easterly and westerly portion by Connecticut Route 37, a north south running state highway and Quaker Brook, a north south running perennial stream, located immediately west of Route 37. The entire property is characterized by high relief with elevations ranging from 1,336 feet in the northwest corner to 490 feet in the southwest corner. The slopes which rise on either side of Quaker Brook are extremely high and steep. Sloping land continues over the remainder of the property with little level land present.

The vast majority of the property is forested, with approximately 200 of the 1500 acres (13%) open land. Most of the existing open land is found adjacent to either side of Route 37. This is primarily in the form of grassland and idle land resulting from earlier agricultural activities including pasture and hayland.

TOPOGRAPHY

The property includes portions of two high ridges and their interior valley. (Refer to the "Topography Map".) The ridge lines trend generally in a northeast to southwest direction. The eastern slope of the west ridge, which has areas of rugged terrain, rises steeply to an elevation of approximately 1050 feet at the southern boundary of the property, and to approximately 1150 feet in the property's northcentral section. These elevations represent a rise of 500 feet above the valley floor in four-tenths of a mile, for an average slope of approximately 40 percent. Back of the ridge line, the land rises more gradually to the northwest to a maximum elevation of 1336 feet.

The west slope of the eastern ridge presents the opposite picture with the more gradual slope occurring at the toe and the slope steepening perceptibly at the top of the ridge to an elevation of approximately 1200 feet.

The property is drained by Quaker Brook which has its source along the northwestern line of the property from which it runs northerly and easterly to form three water bodies: Timber Lake, Valley Pond, and Deer Pond -- the last being approximately one mile north of the Merritt property's northern boundary. A tributary stream incises the western ridge line creating some spectacular and beautiful cascades as it drops the 500 feet from the top of the ridge to its juncture with Quaker Brook.

GEOLOGY

Although intensive geologic field mapping has not yet been started for the quadrangles in which the Merritt property is

located, previous work accomplished along the border of New York and Connecticut includes this area in the Hudson River Highlands of Connecticut's Western Highlands and New York State's Southeastern Highlands.

The Hudson Highlands are part of a continuous range of Precambrian metamorphic and igneous rocks which has its terminus at about the location of the Merritt property and from there runs southwesterly a distance of 140 miles to Reading, Pennsylvania. The Hudson Highlands comprise a complex of various gneisses, migmatite, calc-silicate bearing marble, granite and granodiorite.

Within the Connecticut portion the Explanatory Text for Preliminary Geologic Map of Connecticut, 1956, by Rogers, Gates and Rosenfeld describes the gneiss complex of the Highlands as including every gradation from quartz-mica schist, hornblende gneiss and small amounts of marble and quartzite.

Although the specific gneiss complexes for the two quadrangles involved have not been identified, it seems that this would not adversely effect any of the alternative uses which have been proposed for the property.

Surficial Materials. Again, no surficial geology mapping for these quadrangles has been started. The surficial materials involved in this site appear to be predominantly till.

Till is the geologist's term for surficial materials most common to Connecticut. More precisely, till is defined as a heterogeneous mixture of boulders, gravel, sand, silt, and clay-size particles, none of which are significantly sorted or non-sorted according to grain size, as is the case of windblown or waterlain deposits.

Two small areas along the stream bed of Quaker Brook have been identified in the granular materials survey as having sand deposits averaging ten feet in thickness. These sites would appear to have little potential for large scale production of water or aggregate but could be investigated as an on-site source for either if the need arises.

SOILS

A detailed soils map of the property is given in the appendix of this report. The lines shown on the soils map should not be viewed as precise boundaries, but rather as guidelines to the distribution of soils types on the property. The soils map, along with the special soil survey report, Soil Survey and Soil Interpretations for Fairfield County, Connecticut (USDA, Soil Conservation Service, 1973), can serve as an educational tool regarding the identification and interpretation of soils. The natural soil group is also given for each soil (see accompanying chart, "Soil Symbols and Series Name"). A booklet, Know Your Land, Natural Soil Groups for Connecticut, published by the Soil Conservation Service and Connecticut Cooperative Extension Service, provides

a clear explanation of the natural soil groups and their potential for various uses including: recreation, wildlife, woodland and cropland. The soils map will hopefully serve as a guide in the detailed management of the area.

With the examination of the soils map and accompanying chart, a correlation between the soils and surficial geology can be seen. Soils in Natural Soil Group A are terrace soils underlain by water deposited beds of sand and gravel (stratified drift). Groups B, C, and D are all upland soils that were formed in areas of till. Group B soils are generally found in thicker deposits of till occurring on hillsides. Group C soils occur mostly on the tops and sloping sides of hills or drumlins and have a hardpan 16 to 36 inches below the soil surface. Group D soils are found mostly on steep side slopes and narrow ridge tops and are characterized by stoniness and shallow depths to bedrock. Group E soils occur on nearly level flood plains in stream valleys, and are formed in loamy deposits overlying sand and gravel layers. These soils are subject to flooding with the lower lying, poorer drained soils being flooded most often.

AGRICULTURE

In an attempt to summarize the overall potential for an agricultural enterprise on the property, specific natural resources were inventoried and evaluated according to their agronomic capabilities. This is an inventory of areas which are defined by stone walls and/or fences and which are presently or were previously used for crops or pasture. The map, "Land Management Potential", found in the appendix, roughly outlines the area considered for potential agricultural use.

An evaluation of agricultural potential primarily concerns itself with the soil types and their characteristics. The following soils have been identified in the inventory:

17C	32XC	70B
17D	32D	70C
17MD	32XD	816
32C	32MD	855
	60C	

A detailed description of each soil type can be found in the special soil survey report for Fairfield County (as previously sited). For this report, however, the soils listed have been evaluated and categorized according to their capability of use.

Soils are often grouped into land-capability classes. The land-capability classes are useful in introducing the farmer to the more detailed information on the soil maps. This information allows him to decide how he is going to use each of his fields and what conservation practices each of them needs. The result is a conservation farm plan.

There are eight broad Capability Classes; I - VIII. As one proceeds from Class I to Class VIII, ones choices for agricultural use become fewer and risks become greater. Soils in Classes I through IV can be safely used for the common cultivated crops, which leave the soil bare part of the time. However, as one proceeds from Class I to Class IV, ones choices become fewer. Also, the conservation practices needed for these cultivated crops usually become more difficult to apply and to keep working efficiently. Actually, soils in Class IV are borderline for the common cultivated crops under present economic conditions.

Although they are not subject to erosion, soils in Class V are not suited to ordinary cultivation, usually because they are wet too much of the time, because they are too stony, or because the growing season is too short. However, they can produce good pasture or trees, where there is enough rain.

Soils in Classes VI and VII are most safely used for some kind of permanent cover, for example, grass or trees. They may be so steep, stony, wet, or shallow that they cannot be cultivated economically and safely. With very special management, including elaborate soil and water conservation practices, a few of them can be cultivated to special crops.

Class VIII land is not suited to any vegetative crop that can be sold. Usually it is very severely eroded or is extremely sandy, wet, arid, rough, steep or stony. However, it is useful for wildlife food and cover, for recreation, and for protecting the watershed.

This particular inventory contains soils in the following five Capability Classes: II, III, IV, VI, VII. (Refer to the appendix for further definition of the Capability Classes.) The map, "Agricultural Potential", found in the appendix, provides a detailed field by field evaluation of land-capability. The chart, "Safe Agricultural Land Use by Field Number", also found in the appendix, accompanies the map and provides summarized information regarding soil types, capability classes, field acreages, and categories of agricultural use. Each of the fields have been classified into the land-capability system according to the dominant soil type found in the field. In those cases where there is more than one dominant soil type within a field, the field has been divided into sections (i.e., A & B). The chart summarizes the five Capability Classes into four general categories of use: cultivated crops (II), limited cultivation (III and IV), pasture (VI) and "not suitable" for agriculture (VII).

In summary, approximately 15% of the area inventoried is suitable for cultivated crops, 25% is suitable for limited cultivation (hay, pasture), 17% is suitable as pasture land and 43% is unsuitable for agricultural use. Much of this 43%, however, is suitable for woodland and wildlife use. Agricultural activities, if desirable, should occur on soils with the least limitations. Areas already cleared (such as that portion of the property inventoried) present the best possibilities in that a minimum of vegetation would need to be disturbed.

FORESTRY

Woodland is the primary existing land use on the Merritt property with northern deciduous hardwoods (oak-hickory) being the dominant forest type. Scattered conifers including white pine, hemlock and mountain laurel (broad leaf evergreen) are found throughout the area. Hardwoods in addition to the oak and hickory include red and striped maple, poplar, birches, and beech. Shrubby growth such as shadbush, blueberry, spicebush, and lower understory plants including blackberry, ferns, greenbriar, grasses and weedy species are present.

In terms of the practice of forestry conservation, reference is made to the map "Land Management Potential" which generally suggests those areas which may be feasible for forestry management. It is suggested that a private forestry consultant be contracted to guide the University in the management of those areas. Such an individual should be able to give an unbiased judgement on the management of the tract.

The topography of the land is a key factor in the evaluation of its forestry management potential. A 15-35% slope exists on a portion of the tract which would make mechanical management difficult. Although some mature trees exist on this sloping type, severe soil erosion should be limited by allowing the area to remain in its natural state for the present time.

Those areas designated as feasible for intensive forestry management are found more in the 3-15% slope category. The brief introduction to the property indicated that there are areas which identify as mature stands where selective harvesting is needed. Most of the remaining areas need timber stand improvement measures practiced. This would include the thinning or removal of dead, dying, diseased, poorly-formed and/or inferior species which suppress or endanger the better-growing trees. Also included should be the construction of fire lanes and fire ponds to provide better protection for the forest.

WILDLIFE

The property provides habitat primarily to woodland wildlife. These include game and non-game species such as ruffed grouse, gray and red squirrel, whitetail deer, songbirds, and woodpeckers (including the pileated woodpecker), and racoon. The open land present serves to enhance the quality of the woodland habitat by creating "edge" or variations in vegetation which supply food and cover. The largely mature trees of the woodlands do limit the density of the understory plants by reducing sunlight penetration. This understory is utilized by animals for food in the form of browse material and cover. Exposure on westerly and south westerly slopes are more favorable resulting in higher quality understory plants in these areas.

In general, wildlife conditions are typical of unmanaged woodlands in Connecticut. Overall woodland wildlife habitat quality is good.

Wildlife management can be most easily accomplished on those areas suited to forestry management. (The map, "Land Management Potential", roughly outlines the areas where forestry and wildlife conservation practices seem suited.) Both forestry and wildlife management can be accomplished on the same land using similar techniques. Openings, created by cutting which stimulates young plant growth, including woody types, would have desirable effects. Openings and grass plantings along timber skid trails would create needed "edge" and offer accessibility for maintenance. In general, soils best suited to timber management would also be suited to woodland wildlife habitat management. Existing open land on the property should be maintained open to benefit wildlife.

The State of New York maintains a deer management area along the western boundary of the Merritt property, and allows hunting. In view of this, it is recommended that the boundaries of the Merritt property be clearly identified so that hunters are aware of the existence of the wildlife refuge.

FISHERIES

Quaker Brook, as it flows through the Merritt property, is a perennial unmodified stream. Visual observations indicate high quality water capable of supporting a native population of brook trout. The stream is not stocked annually with trout by the State of Connecticut, nor is it listed in the hunting and fishing bulletin as providing trout fishing to the public. None the less, its value as an aquatic resource is high.

CRITICAL AREAS

Where soils are shallow to bedrock and slopes are steep, the danger of erosion is great. Forestry practices such as tree cutting should be discouraged in these areas, as should any other activities which remove significant vegetative cover. If preservation is to be a partial use of the land, these steep areas would be best suited to that use. However, hiking trails and outdoor education should be compatible with steep areas if use is not excessive. Refer to the map, "Land Management Potential", for the general location of critical areas.

OUTDOOR RECREATION AND EDUCATION

The high esthetic appeal of the area coupled with the topographical variations and diversity of vegetation make the area attractive for outdoor recreation and education. The use of the assortment of physical conditions found on the property suggest a multitude of compatible extensive uses. (Few areas seem to suggest for intensive activity and the ability of the property

to handle the demands associated with intensive use, such as high waste disposal, parking access (etc.), seem limited.) Some suggested uses include hiking, cross country skiing, snowshoeing, photography, individual and small group camping, as well as environmental education, field research and management training, and survival experience (as already exists). The work begun on the trail system by the trails consultant, Mr. Richard C. Elliot, if continued, could provide a base for these activities as well as a framework for zoning various areas for inventory purposes and future management (see below).

Use by classes and other responsible individuals and groups could be controlled by an application-permission basis via some central office at the University coordinated with on-site control by a resident caretaker. Access, due to the physical character of the land, is somewhat restricted and this will be helpful from a control standpoint.

Groups or individuals visiting the property could be encouraged and even required to incorporate various work projects into their activities. Lists of such tasks could be maintained at the University and at the barn on the property and can be supplemented by outgoing groups, the caretaker, and other University personnel. One work project could be an intense inventory of the property, quadrant by quadrant, of such items as: plant groups, animal habitats, geological, soils, hydrological information, scenic points, etc. A visit to West Rock Nature Center in New Haven will provide some idea of the potential of organized volunteer effort. Some of the information gathered in such an inventory could be incorporated into a handout map of the property. Handout maps and other materials would be helpful to the visitor and should indicate boundaries, trails, points of interest and also concerns, and areas of limited intrusion.

Liability is often a question of landowners when allowing others on their property. It would certainly not be difficult for the University to study this question and formulate some simple waiver if necessary. In any case, that portion of the property in Connecticut would be covered by State Statutes (Sections 52-557g - 52-557j), which practically eliminate liability in the case of a landowner allowing recreational use on his property without charging for it.

Outdoor recreation and education activities, such as those outlined, are usually compatible with the other proposed uses of the property and in virtually all areas. The inclusion of recreation which would open the area to more intensive use should be reviewed to insure that the integrity of the property is not deteriorated by heavy use and that the safety of users is maintained. Several areas in which use has been concentrated are beginning to deteriorate slightly and other areas which are potentially dangerous to the unsupervised or undirected user exist.

GENERAL COMMENTS

The Merritt property seems to be generally well suited to the types of uses which have been proposed, those being conservation, preservation, recreation, education and agriculture. The property has great potential, and will continue to have, if used and managed to its best advantage. The general information offered in this report should serve as the basis for future land use planning and good land management. A committee might be formed composed of members of the University (including the staff and student body) and various land management professionals to further discuss, suggest, and implement programs for the use of the property which would incorporate all of the proposed uses.

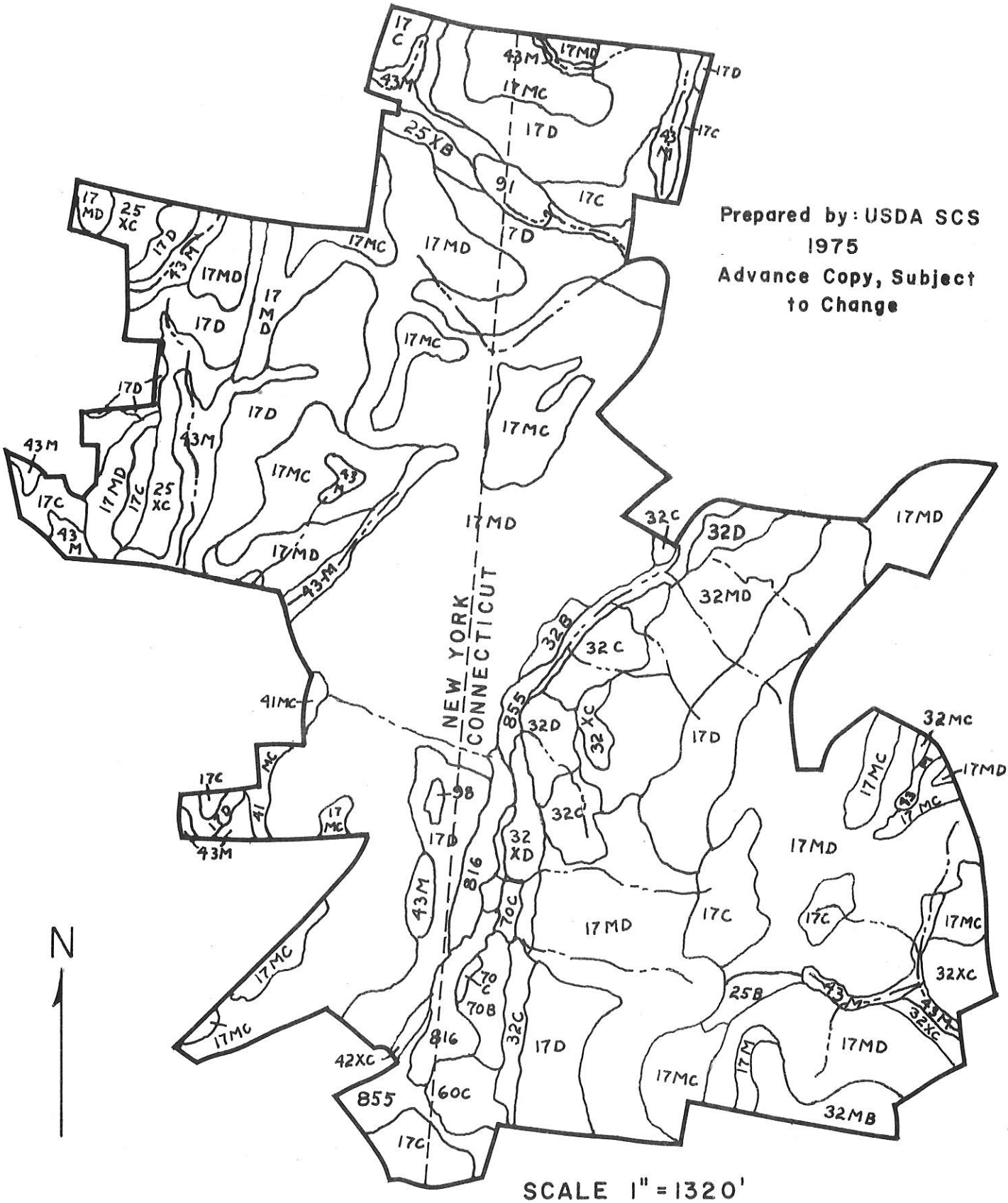
It is important to stress that those uses which have been proposed are, for the most part, compatible on the tract of land as a whole. For example, many of the conservation practices suggested, especially forestry and wildlife management, can serve a valuable educational function too. There has been some discussion that a major portion of the property be relegated to preservation rather than conservation purposes. This would at once seem impractical, unfeasible, and possibly at cross-purposes to the former owner's intentions. Absolute preservation would mean, for instance, the absence of fire control effort should it be necessary. This would be a difficult viewpoint to sustain, not only from a public safety aspect but also with regards to the moral issue of finite natural resources. If perhaps, a program of fire control was instituted and little else was done, a situation characterized by a dominant overaged forest overstory may exist which may provide little in the way of viable animal populations, animal species diversity, or plant species diversity. This condition may make for an artificial and unproductive situation. A coordinated management program is necessary to maintain a reasonably natural, diverse and productive situation in the limited sites of the lower New England area. This would seem to be in keeping with the former owner's purpose of providing the land for wildlife and educational purposes to an educational and scientific institution. The land should be used as a tool to free people of their environmental ignorances and insensitivities. The land and the people have a mutual opportunity and responsiblity; each can benefit from the other.

APPENDIX

SOIL MAP

MERRITT PROPERTY

WESLEYAN UNIVERSITY



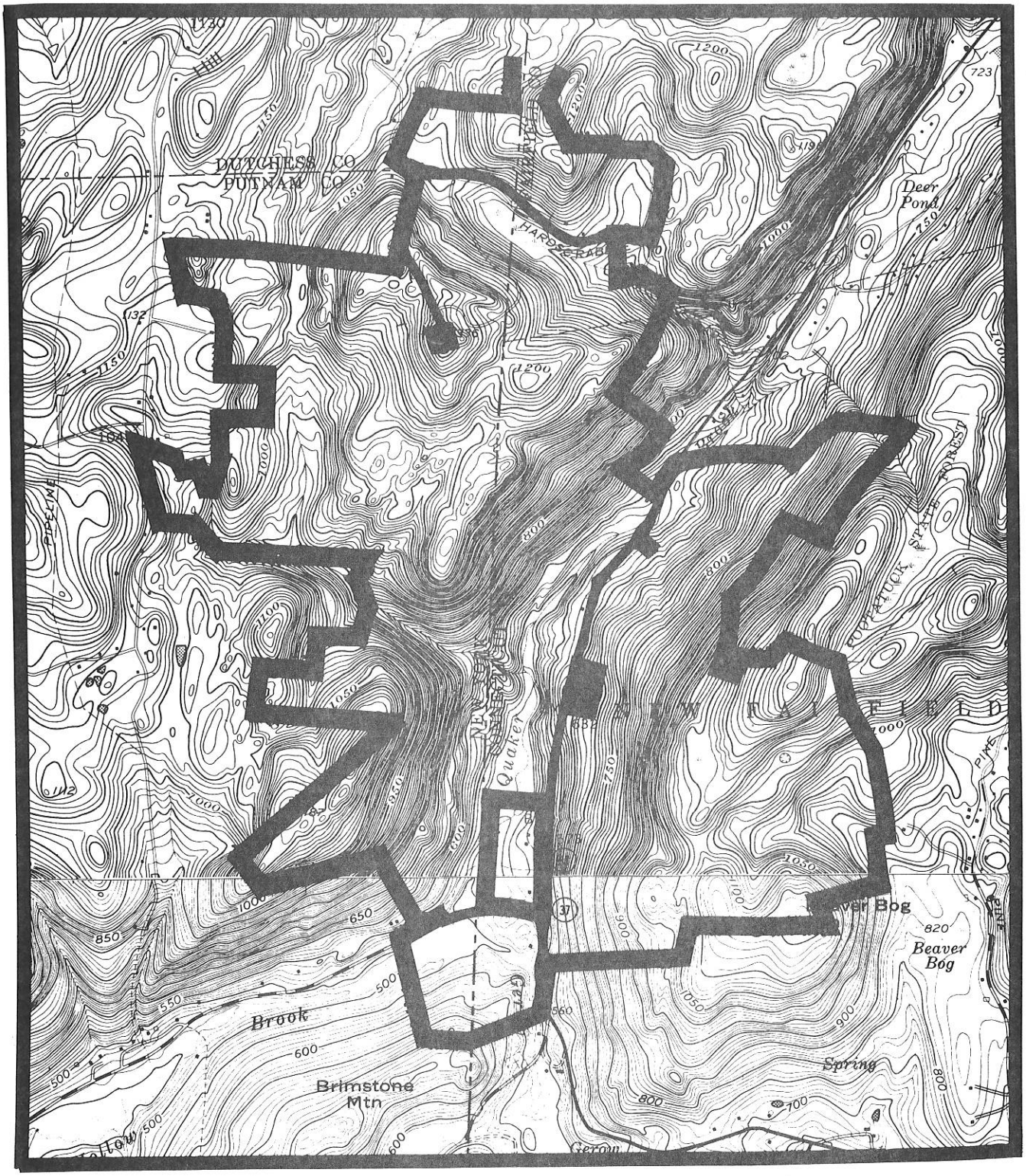
SOIL SYMBOLS AND SERIES NAMES

Natural Soil Group	Map Symbol	Soil Series Name
A-1b	60C	Hinckley
A-1d	70B	Merrimac
A-1e	70C	Merrimac
A-3b	91	Muck
B-1a	32B	Charlton
B-1b	32C	Charlton
	32XC	Charlton
B-1c	32MB	Charlton
	32MC	Charlton
B-1d	32D	Charlton
	32XD	Charlton
B-1e	32MD	Charlton
B-2b	41MC	Sutton
B-3b	43M	Leicester-Ridgebury-Whitman
C-1b	42XC	Stockbridge
C-2a	25B	Amenia
	25XC	Amenia
C-2b	25XB	Amenia
C-3a	98	Ridgebury
D-1	17C	Hollis-Charlton
	17MC	Hollis
D-2	17D	Hollis-Charlton
	17MD	Hollis
E-2	816	Podunk
E-3a	855	Rumney

TOPOGRAPHY MAP

MERRITT PROPERTY

WESLEYAN UNIVERSITY



N

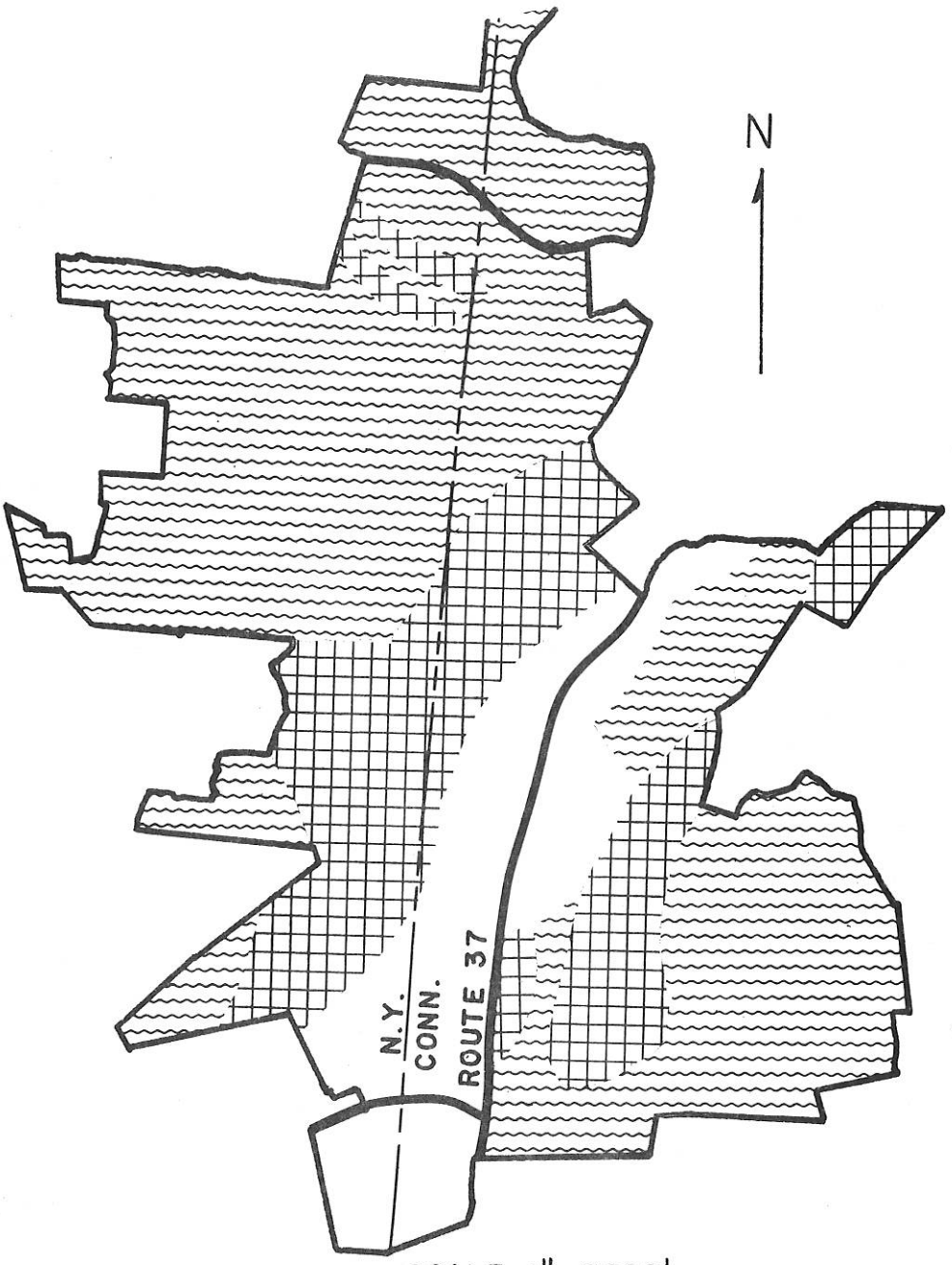
0 1/4 1/2 3/4 1 MILE

0 1000 2000 3000 4000 5000 FEET

SCALE 1" = 2000'

LAND MANAGEMENT POTENTIAL

MERRITT PROPERTY WESLEYAN UNIVERSITY



SCALE 1" = 2000'

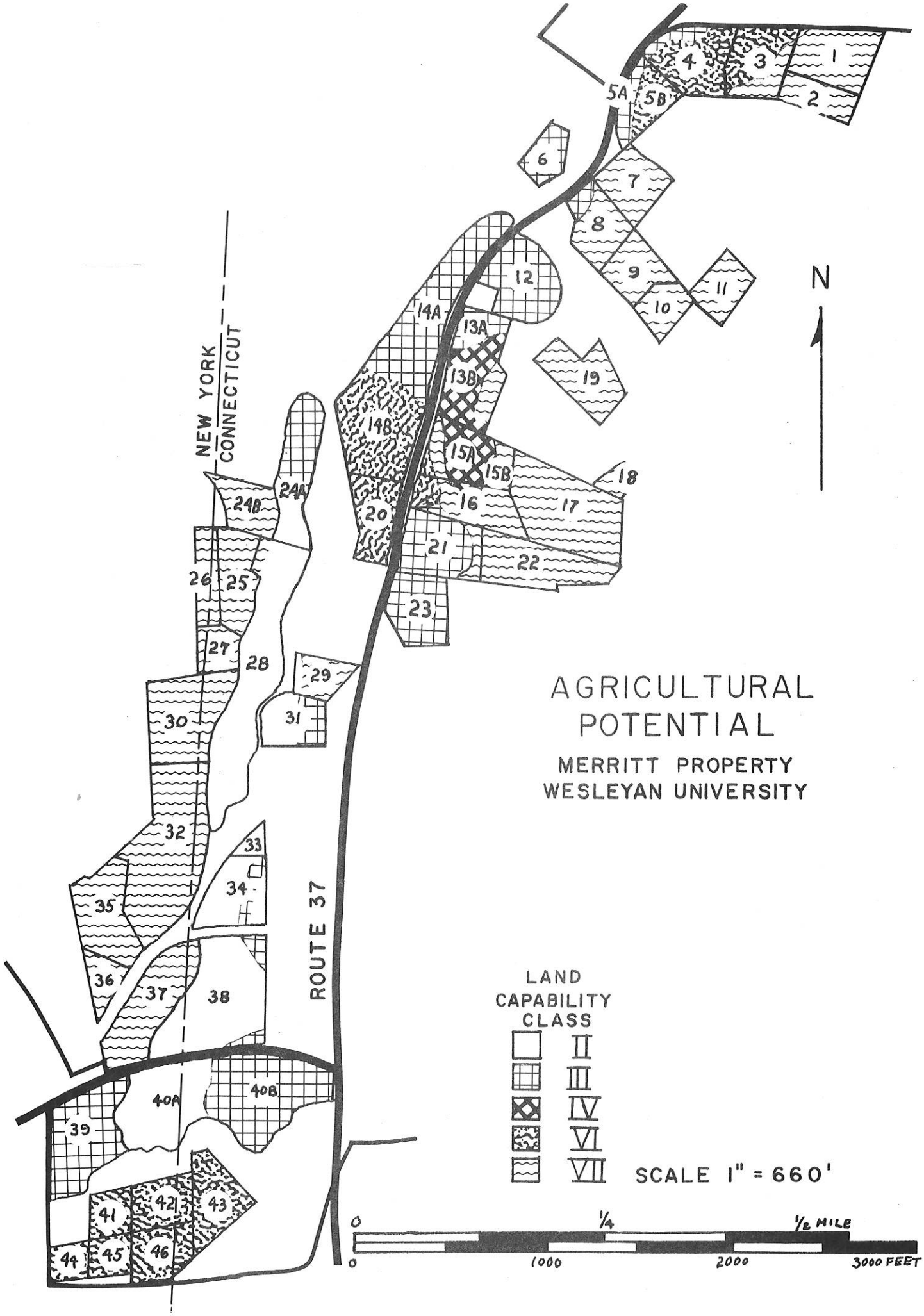
0 1/4 1/2 3/4 1 MILE

0 1000 2000 3000 4000 5000 FEET

LAND SUITABILITY

- Critical Area - Preserve
- Forestry and Wildlife
- Agriculture - See Agricultural Potential Map for greater detail

Portions of all areas suitable for recreation and education


NEW YORK
CONNECTICUT
ROUTE 37
N
AGRICULTURAL
POTENTIAL
MERRITT PROPERTY
WESLEYAN UNIVERSITY
LAND
CAPABILITY
CLASS
II
III
IV
VI
VII
SCALE 1" = 660'
0
1/4
1/2 MILE
0
1000
2000
3000 FEET

SAFE AGRICULTURAL LAND USE BY FIELD NUMBER

Field Number	Primary Soil Type(s) per field	Capability Class	Total Acres per field	Category of Use
1	32MD	VII	3.0	not suitable
2	32MD	VII	2.0	not suitable
3	32D	VI	3.0	pasture
4	32D	VI	3.0	pasture
5a	855	III	1.5	limited cultivation (hay, pasture)
5b	32D	VI	1.5	pasture
6	855	III	2.0	limited cultivation (hay, pasture)
7	32MD	VII	3.0	not suitable
8	32MD	VII	3.0	not suitable
9	32MD	VII	3.0	not suitable
10	32MD	VII	2.5	not suitable
11	32MD	VII	2.5	not suitable
12	32C	III	4.0	limited cultivation (hay, pasture)
13a	32C	III	3.0	limited cultivation (hay, pasture)
13b	32XC	IV	2.0	limited cultivation (hay, pasture)
14a	32C	III	4.0	limited cultivation (hay, pasture)
14b	32D	VI	5.0	pasture
15a	32XC	IV	1.5	limited cultivation (hay, pasture)
15b	32MD	VII	1.5	not suitable
16	32MD	VII	3.0	not suitable
17	32MD & 17D	VII	6.0	not suitable
18	32MD & 17D	VII	1.0	not suitable
19	32MD	VII	3.0	not suitable
20	32D	VI	3.0	pasture
21	32C	III	3.0	limited cultivation (hay, pasture)
22	32MD, 17MD & 17D	VII	3.0	not suitable
23	32C	III	3.0	limited cultivation (hay, pasture)
24a	855	III	3.0	limited cultivation (hay, pasture)
24b	17MD & 17D	VII	3.0	not suitable
25	17D	VII	2.0	not suitable
26	17D	VII	1.5	not suitable
27	17D	VII	1.0	not suitable
28	816	II	7.0	cultivated crops
29	32XD	VII	2.0	not suitable
30	17MD	VII	5.0	not suitable
31	816	II	2.5	cultivated crops
32	17D	VII	5.0	not suitable
33	816	II	1.0	cultivated crops
34	816	II	3.0	cultivated crops
35	17D	VII	3.0	not suitable
36	17D	VII	1.5	not suitable
37	17D	VII	2.5	not suitable
38	816	II	6.0	cultivated crops
39	855	III	4.0	limited cultivation (hay, pasture)
40a	816	II	3.0	cultivated crops
40b	60C	III	5.0	limited cultivation (hay, pasture)
41	17C	VI	1.0	pasture
42	17C	VI	1.0	pasture
43	17C	VI	3.0	pasture
44	17C	VI	1.0	pasture
45	17C	VI	1.0	pasture
46	17C	VI	3.0	pasture
			Total 147.0 acres	

CLASS II

Soils in Class II have some limitations that reduce the choice of plants or require moderate conservation practices.

Soils in this class require careful soil management, including conservation practices, to prevent deterioration or to improve air and water relations when the soils are cultivated. The limitations are few and the practices are easy to apply. The soils may be used for cultivated crops, pasture, woodland, or for wildlife food and cover.

Limitations of soils in Class II may include singly or in combination the effects of (1) gentle slopes; (2) moderate susceptibility to wind or water erosion, or moderate adverse effects of past erosion; (3) less than ideal soil depth; (4) somewhat unfavorable soil structure and workability; (5) occasional damaging overflow; and (6) wetness correctible by drainage but existing permanently as a moderate limitation.

The soils in this class provide the farm operator less latitude in the choice of either crops or management practices than soils in Class I. They may also require special soil-conserving cropping systems, soil conservation practices, water-control devices, or tillage methods when used for cultivated crops. For example, deep soils of this class with gentle slopes that are subject to moderate erosion when cultivated may need one of the following practices or some combination of two or more: Terracing, stripcropping, contour tillage, crop rotations that include grasses and legumes, vegetated water-disposal areas, cover on green-manure crops, stubble mulching, fertilizers, manure, and lime. The exact combinations of practices vary from place to place, depending on the characteristics of the soil, the local climate, and the farming system.

CLASS III

Soils in Class III have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Soils in Class III have more restrictions than those in Class II, and when used for cultivated crops, the conservation practices are usually more difficult to apply and to maintain. They may be used for cultivated crops, pasture, woodland, or for wildlife food and cover.

Limitations of soils in Class III restrict the amount of clean cultivation; timing of planting, tillage, and harvesting; choice of crops; or a combination of these items. The limitations may result from the effects of one or more of the following: (1) Moderately steep slopes; (2) high susceptibility to water or wind erosion or severe adverse effects of past erosion; (3) frequent overflow accompanied by some crop damage; (4) wetness or some continuing waterlogging after drainage; (5) low moisture-holding capacity; and (6) low fertility not easily corrected.

When cultivated, many of the wet, slowly permeable but nearly level soils in Class III require a drainage system and a cropping system that maintains or improves the structure and tilth of the soil. To prevent puddling

and to improve permeability it is commonly necessary to supply organic material to such soils and to avoid working them when they are wet. Each distinctive kind of soil in Class III has one or more alternative combinations of use and practices required for safe use, but the number of practical alternatives for average farmers is less than for soils in Class II.

CLASS IV

Soils in Class IV have very severe limitations that restrict the choice of plants, require very careful management, or both.

The restrictions in use for these soils are greater than those in Class III, and the choice of plants is more limited. When these soils are cultivated, more careful management is required and conservation practices are more difficult to apply and maintain. Soils in Class IV may be used for crops, pasture, woodland, or for wildlife food and cover.

Soil in Class IV may be well suited to only two or three of the common crops or the amount of harvest produced may be low in relation to inputs over a long period. Use for cultivated crops is limited as a result of the effects of one or more permanent features such as (1) steep slopes, (2) severe susceptibility to water or wind erosion, (3) severe effects of past erosion, (4) shallow soils, (5) low moisture-holding capacity, (6) frequent overflows accompanied by severe crop damage.

Many sloping soils in Class IV are suited for occasional but not regular cultivation. Some of the poorly drained, nearly level soils placed in Class IV are not subject to erosion but are poorly suited to intertilled crops because of the time required for soil to dry out in the spring and because of low productivity for cultivated crops. Some soils in Class IV are well suited to one or more of the special crops, such as fruits and ornamental trees and shrubs, but this suitability itself is not sufficient to place a soil in Class IV.

CLASS VI

Soils in Class VI have severe limitations that make them generally unsuited for cultivation and limit their use largely to pasture, woodland, or wildlife food and cover.

Physical conditions of soils placed in Class VI are such that it is practical to apply pasture improvements, if needed, such as seeding, liming, fertilizing, and water control with contour furrows, drainage, ditches, diversions, or water spreaders. Soils in Class VI have continuing limitations that cannot be corrected, such as (1) steep slopes, (2) severe erosion hazard, (3) effects of past erosion, (4) stoniness, (5) shallow rooting zone, (6) excessive wetness or overflow, or (7) low moisture capacity. Due to one or more of these limitations these soils are not generally suited for cultivated crops. But they may be used for pasture, woodland, or wildlife cover or some combination of these.

Some soils in Class VI can be safely used for the common crops provided unusually intensive management is used. Some of the soils in this class are also adapted to special crops such as sodded orchards, blue-

berries, etc., requiring soil conditions unlike those demanded by the common crops. Depending upon soil features and local climate the soils may be well or poorly suited to woodlands.

CLASS VII

Soils in Class VII have very severe limitations that make them unsuited for cultivation, restrict their use largely to woodland, or wildlife, with very limited usefulness for grazing.

Physical conditions of soils in Class VII are such that it is impractical to apply such pasture improvements as seeding, liming, fertilizing, and water-control measures such as contour furrows, ditches, diversions, or water spreaders. Soil restrictions are more severe than those in Class VI because of one or more continuing limitations that cannot be corrected, such as very steep slopes, erosion, shallow soil, stones, wet soil, or other limitations that make them unsuited for common cultivated crops. They can be used safely for grazing or woodland or wildlife food and cover, or some combination of these under proper management.

Depending upon the soil characteristics and local climate, soils in this class may be well or poorly suited to woodland. They are not suited to any of the common cultivated crops. In unusual instances, some soils in this class may be used for special crops under unusual management practices. Some areas of Class VII may need seeding or planting to protect the soil and to prevent damage to adjoining areas.