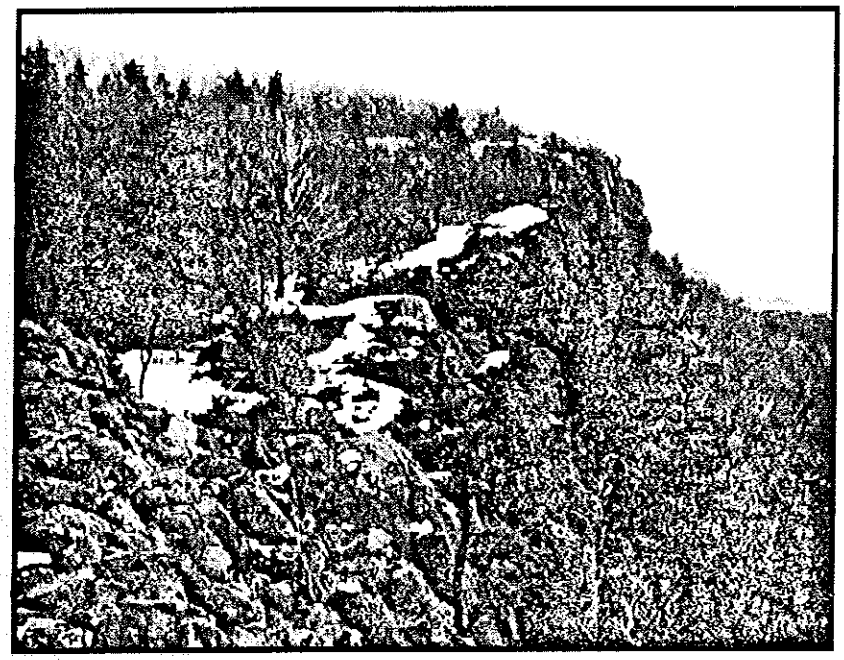
Lamentation Mountain Tri-Town Project

LAND USE PLAN



Prepared by and for

Berlin Conservation Commission

Meriden Conservation Commission

Middletown Conservation Commission

June 1994

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ACKNOWLEDGEMENTS

In 1991 the Berlin, Meriden and Middletown Conservation Commissions launched the Lamentation Mountain Tri-Town Project (the "Tri-Town Project") to work on a uniform and consistent conservation and development plan for Lamentation Mountain, which lies in the three towns. The Tri-Town Project met three times to review available historical, geological, and biological information, and existing maps and to establish study goals and planning options. At an initial project meeting on March 19, 1991 presentations were made by Jelle DeBoer of Wesleyan University (geology and water resources); Joseph Hickey, Department of Environmental Protection (trap rock ridges and recreation); Jim Gibbons, University of Connecticut Extension Service (natural resource planning); and Geoff Colegrove, Midstate Regional Planning Agency (computerized mapping).

In 1992, the Tri-Town Project received a $300 grant from the Rockfall Foundation (Middletown, CT). These funds were used for the development of the Natural Resource Inventory and final copies of this report. The Natural Resource Inventory of Lamentation Mountain was carried out by Ms. Beth Lapin of The Nature Conservancy during the summer of 1992. In 1993, the Tri-Town Project received recognition as an Outstanding Planning Program from the Connecticut Chapter of the American Planning Association. The project was also acknowledged in the recent State Plan of Conservation and Development by the Connecticut office of Planning and Development.

The planning meetings and technical information compiled by the many volunteers, officials and organizations involved in this project provided the foundation for the focus and scope of the following report.

Others, whose interest, participation, and contributions made the completion of this report possible include: W. Voelker, R. Schmidt from the town of Berlin, D. Caruso, J. Netherton, R. Gibson from the City of Meriden; W. Warner, L. Bowers, R. Klattenberg from the City of Middletown; Northeast Utilities Service Company; the Connecticut Forest and Park Association; Midstate Regional Planning Agency; and the Connecticut Department of Environmental Protection.

I. INTRODUCTION AND PURPOSE OF THE STUDY

The Lamentation Mountain/Chauncey Peak ridgeline is a section of the Central Connecticut traprock ridge system that has been called Connecticut's Central Park. It constitutes the municipal boundary between the municipalities of Berlin, Meriden and Middletown. The fact that the study area is divided among three municipalities, three state planning regions and three soil and water conservation districts makes this location highly unique within the State of Connecticut.

The traprock ridge environment offers unique plant and wildlife habitat, magnificent and panoramic views of the central Connecticut Valley, extensive hiking, and educational opportunities and a place of peace and solace. Because of the existence of these special characteristics it became apparent to local planners and conservationists that a long term strategic plan was needed to guide the conservation of this important resource and to ensure that development will proceed in an environmentally responsible manner.

Since the inception of this planning effort it has been well understood that many of the challenges which municipalities experience today transcend their boundaries and are of regional and often statewide concern. The protection of Lamentation Mountain/Chauncey Peak is one of these challenges which must be cooperatively addressed at all levels of government. Coordination is necessary not only between the three muncipalities which are located in three different counties (Hartford, Middlesex, and New Haven) but also the three different regional planning agencies for those counties. For this reason, this multi-town planning effort is particularly innovative and forward-looking. It involves not only working at the three levels of government but also with multiple players within each level of government. This cooperative planning effort will insure that all participants within the three levels of government will be working in concert to provide for the coordinated conservation and development of this precious resource.

The rights and desires of landowners are of great importance to the Tri-Town Project. This report is intended to promote meaningful discussions with landowners and town land use agencies. The Tri-Town Project invites landowners views and seeks their input and support. If necessary, amendments will be incorporated. This report will also serve as a guide for use by town and city commissions, as well as, developers and property owners. The carefully guided conservation and development of this multi-town resource will benefit those who own land on the mountain by formulating recommendations to assist them by making the development process flow more smoothly. In addition, it will benefit all residents of the State by preserving and improving accessibility to this resource of statewide significance.

STUDY GOALS

The purpose of this multi-town planning effort was to identify the study area's natural features, analyze the constraints and opportunities for development and provide innovative land conservation and development recommendations designed to guide the future growth of the study area.

With this purpose in mind the Tri-Town Project Committee established the following project goals:

1) Permanently protect unique features, such as special wildlife habitats, rare and endangered species, the talus slope and the cliff faces ;

2) Maintain an unimpeded and publicly accessible trail network which allows for access to the higher elevations;

3) Maintain the natural scenic beauty of the mountain landscape as viewed from the mountain and from surrounding locations;

4) Promote open space planning and development techniques compatible with the natural qualities of the mountain and, in particular, the traprock ridgeline.

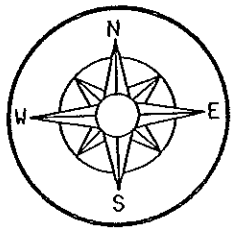
II. THE TRI-TOWN LAMENTATION MOUNTAIN STUDY AREA

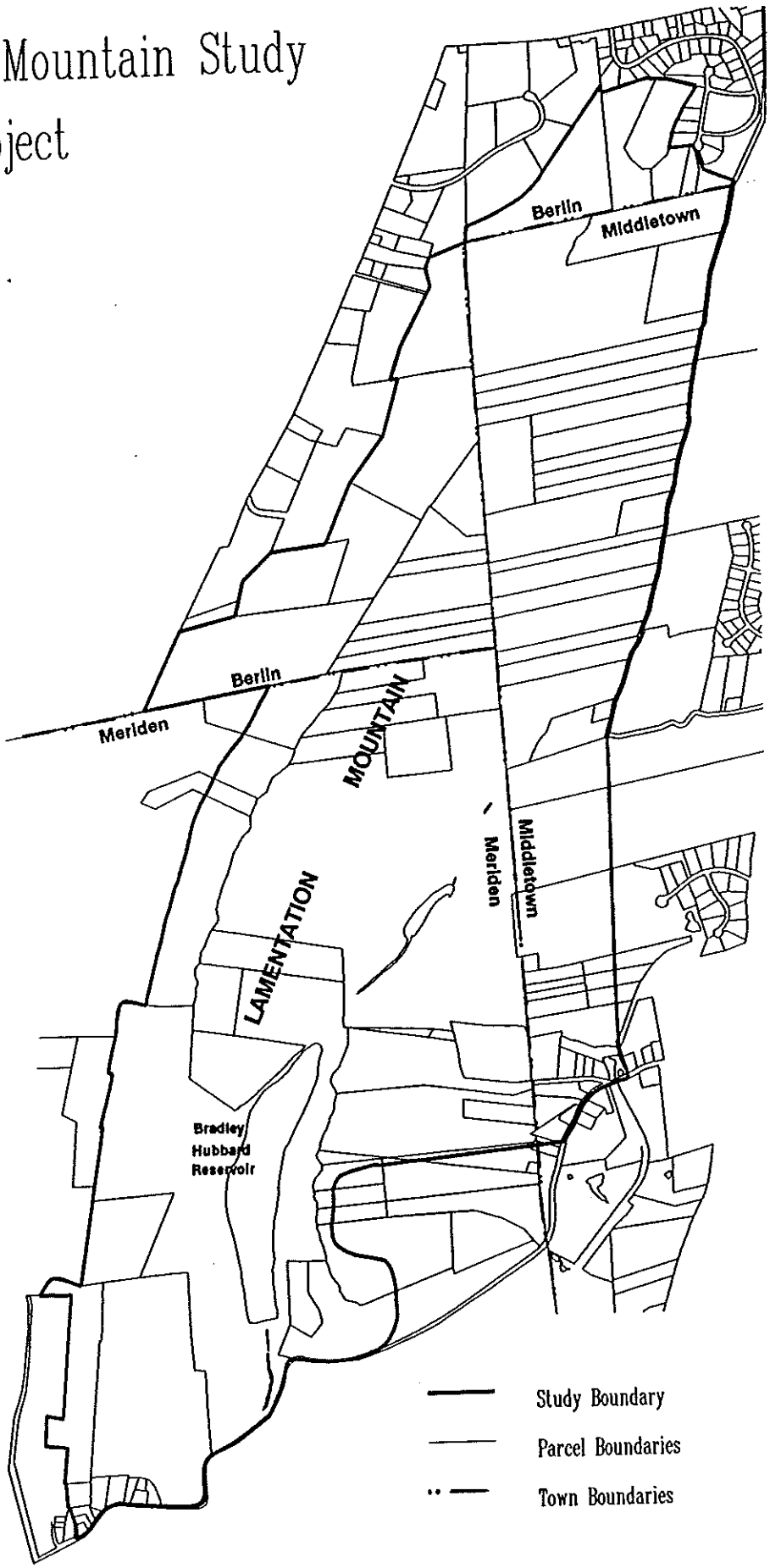
The ridge under study is located in the Connecticut River valley in central Connecticut and runs approximately 3.5 miles north to south through the town of Berlin and cities of Meriden and Middletown

The ridge, which includes Lamentation Mountain and Chauncey Peak, has a maximum elevation of 720 feet above sea level. It is typical of many ridges in Connecticut with its steep west facing cliff and much more gradual east sloping side. The ridge runs on a slight southwest to northeast direction. From its higher elevations, Mt. Tom (Massachusetts) can be seen to the north, Sleeping Giant Mountain to the south, the Western Highland to the west and the Eastern Highlands to the east.

The study area, displayed in Figure 1, is approximately 1300 acres. It is bounded on the west by the 250 foot contour line at the base of the mountain running parallel to Connecticut Route 15, also known as the Berlin Turnpike. Westfield Road in Meriden and Country Club Road in Middletown constitute the southern extreme of the study area. The eastern boundary is an unimproved road known as Stantack Road. Stantack Road runs northerly from Country Club Road in Middletown to Spruce Brook Road in Berlin. In general, Spruce Brook Road constitutes the northern boundary of the study area.

Lamentation Mountain Study
Tri-Town Project
Study Area





Scale: 1 inch equals 2000 feet.

Figure 1

III. PRESERVATION IN EXISTING PLANS OF DEVELOPMENT

a. State of Connecticut Plan of Conservation and Development

The State Plan of Conservation and Development designates the majority of the study area as a "Conservation Area". A small area at the lower elevations in Middletown is designated as "Rural Area". The State Action Strategy for Conservation Areas is as follows:

> ***"Plan and manage, for the long-term public benefit, the lands contributing to the state's need for food, fiber, water and other resources, open space, recreation, and environmental quality and ensure that changes in use are compatible with the identified conservation values."***

b. Regional Conservation and Development Plans

The Midstate Regional Planning Agency has designated the portion of the study area in Middletown as "Open Space" on its Regional Plan of Development.

The Central Connecticut Regional Planning Agency has designated the portion of the study area in Berlin as "Conservation/Preservation "on its Regional Plan of Development.

The South Central Regional Council of Governments has designated the portion of the study area in Meriden as "Limited Growth" on its Regional Plan of Development.

c. Local Plan's of Development

Meriden's Land Use Plan, adopted in 1985, identifies the bulk of the study area as Parks/Open Space. Also included in the study area is land designated as industrial, this being the present site of the traprock quarry. A smaller area on the western slope of Lamentation Mountain is designated as Residential-Low Density. The Plan also has as an objective **"to protect the integrity of environmentally sensitive areas."** In addition, the Plan recommends **"acquisition of marginal lands adjacent to Giuffrida Park....."**.

Middletown's "Guiding the Future: A Plan of Development for the Year 2000", adopted in 1990, identifies the area as Proposed Open Space. The Plan also contains a section on steep slopes and ridgelines. Quoting from the Plan:

> ***"These large parcels of wooded land have value for their plant and wildlife habitat, passive recreational use, and scenic quality. These values qualify them for consideration as protected open space."***
>
> ***"If these areas are threatened with development the Planning and Zoning Commission should consider creative development proposals which would cluster development at lower elevations and leave the higher elevations as open land."***

The plan also discourages the extension of public water and sewer into this area.

The Berlin Plan of Development adopted in 1992 focuses on the publicly owned land in the study area. The plan identifies Lamentation Mountain State Park and four parcels owned by the town within the study area. Private lands are identified as rural density. With regard to the traprock ridgelines the plan indicates that:

"The Town should seek to acquire as much of this resource as possible and to restrict development activities to well below the ridgelines and steep slopes."

IV. EXISTING LAND USE

Figure 2, the existing land use map, shows that the majority of the study area is undeveloped. As displayed on the land use map the Blue Blazed Mattabessett Trail provides pedestrian access to the ridgeline and runs the entire length of the study area. The trail can be accessed from Country Club Road in Middletown, Giuffrida Park in Meriden or from a small parking area on Spruce Brook Road in Berlin.

a. Meriden

In Meriden approximately 600 acres of land are located within Giuffrida Park, a city owned park containing a golf course and a watershed protection area for Bradley Hubbard Reservoir, a city water supply. There are also scattered single family homes, a large traprock quarry, and an automobile junk yard. A total of 32 privately owned lots exist within the project boundaries, the majority of which make up the quarry. The remaining small residential lots are located in the southwest portion of the study area.

b. Middletown

In Middletown, the current land use is primarily undeveloped privately held woodlands. The only other land use is 11 scattered single family homes on large lots. The majority of the homes (7) are located off of a private road at the southern extremity of the study area in Middletown. As stated, with the exception of these single family homes, the remainder of the land in Middletown is undeveloped. There are 49 privately owned lots. The Existing Land Use and Zoning Map indicates that the large area of undeveloped land in Middletown is fragmented into long narrow lots with the only access to the study area from Middletown via an unimproved city road (Footit Drive). City records do not indicate that Stantack Road, the study area's eastern boundary, is a city road. The land in Middletown surrounding the study area is predominately undeveloped with the exception of scattered single family homes and two large residential subdivisions. The southern most subdivision, known as the Old Farms Subdivsion, was constructed as an Environmentally Sensitive Cluster Design. This subdivision serves as an excellent example of the effectiveness of this planning design to integrate environmental protection with development.

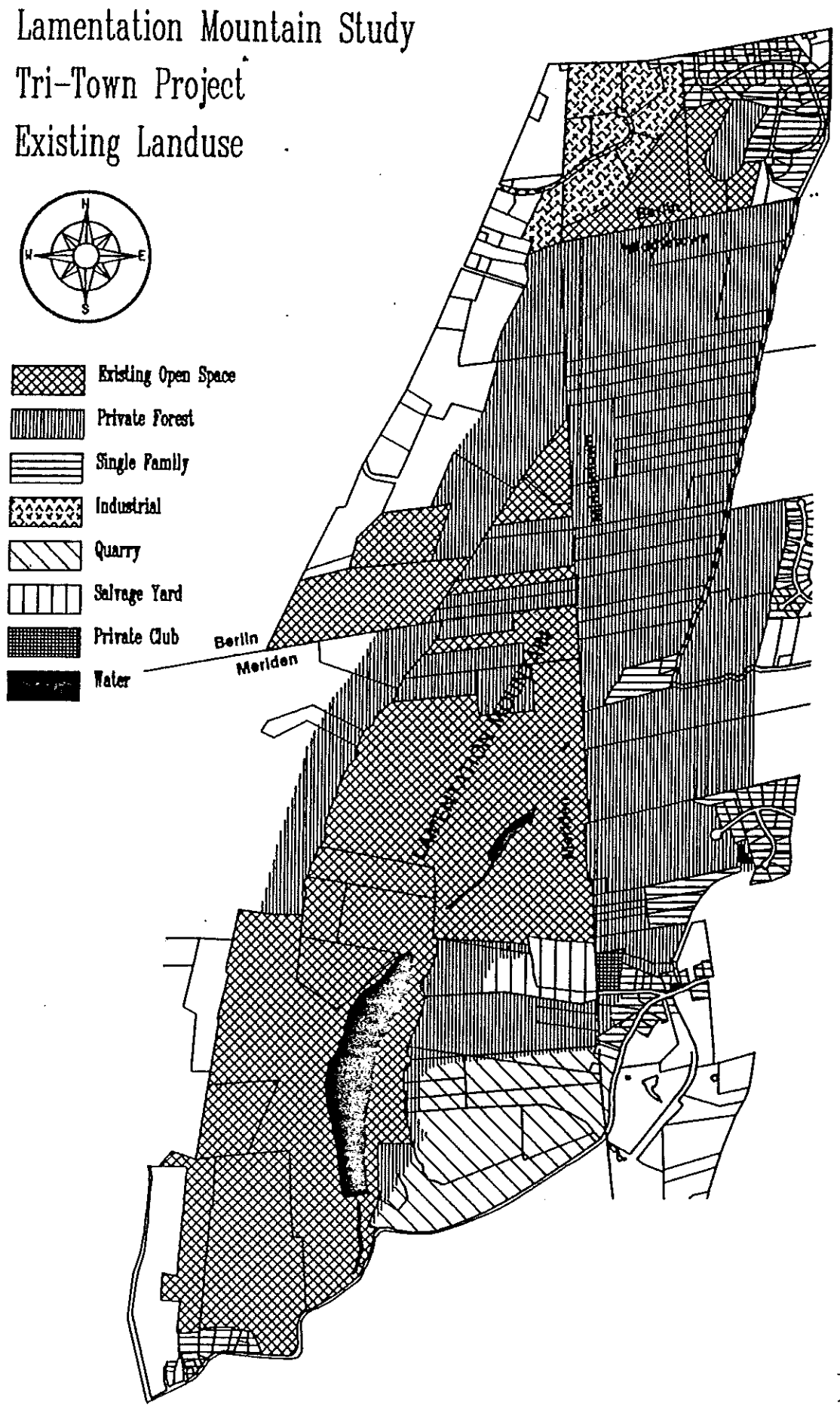

Lamentation Mountain Study
Tri-Town Project
Existing Landuse
N
W
E
S
Existing Open Space
Private Forest
Single Family
Industrial
Quarry
Salvage Yard
Private Club
Water
Berlin
Meriden
Berlin
Meriden
Lamentation Mountain
Scale 1 inch equals 2000 feet

Figure 2

c. Berlin

The Town of Berlin has the smallest portion of land within the study area. Most of this land is completely undeveloped and six parcels are held as open space by the Town of Berlin or the State of Connecticut. The land owned by the State is Lamentation Mountain State Park, an undeveloped park that is accessible from the Berlin Turnpike. The only improvement on these parcels is a water tower owned by the Town of Berlin. There are three large undeveloped parcels of land at the western extreme of the study area. These parcels are privately held and have, along with significant development potential, direct access to Route 15. The land surrounding the study area in Berlin is developed with a residential and an industrial subdivision, and limited commercial development including restaurants and motels. The residential subdivision, known as "Lamentation Mountain Estates", at the northern extreme of the study area is also an excellent example of an Environmentally Sensitive Cluster Design.

V. EXISTING PUBLIC UTILITIES

a. Meriden

Public water and sewer lines currently do not service any of the study area. However, water and sewer service is available along Route 15 and a portion of Westfield Road. Connections could be made to these systems to service at least a portion of the study area if development were to occur.

b. Middletown

City sewer is available in the Old Farms subdivision adjacent to the area and city water and sewer are available in the Westfield Hills subdivision, which is also adjacent to the study area. While City water and sewer are available, due to topographic constraints it may be difficult to extend these lines. Furthermore, the City's Plan of Development currently discourages any further extensions into the study area.

c. Berlin

Public sewer and water are available along the Berlin Turnpike and from the Spruce Brook Road area. There is also a major gas line which traverses the study area in Berlin.

VI. EXISTING ZONING AND OPPORTUNITIES FOR CREATIVE DEVELOPMENT

a. Meriden

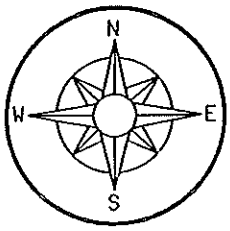
Meriden zoning is R-R (Rural-Residential) and M-3 (Industrial). The zoning of the study area is shown in Figure 3. The R-R zone requires 40,000 square feet of lot area. Permitted uses include single-family dwellings, public buildings, public and private utility substations, places of worship and public assembly, crop and tree farming, riding academies and stables, membership clubs, and child-care providers. The M-3 zone permits manufacturing, production and fabrication; offices, warehouses and distribution facilities; research and development; veterinarians; newspaper and job printing; industrial laundries; recreation centers; child care providers. Uses permitted by Special Exception include building materials and contractor's yards, feed and fuel storage, junk yards, commercial equipment, wholesale, retail, service and storage; bituminous paving plants and concrete plants; truck terminals; heliports, mobile homes and mobile home parks; factory outlets; and class II and III child care providers. Meriden also has a provision for cluster type development to allow for the maximum preservation of open space.

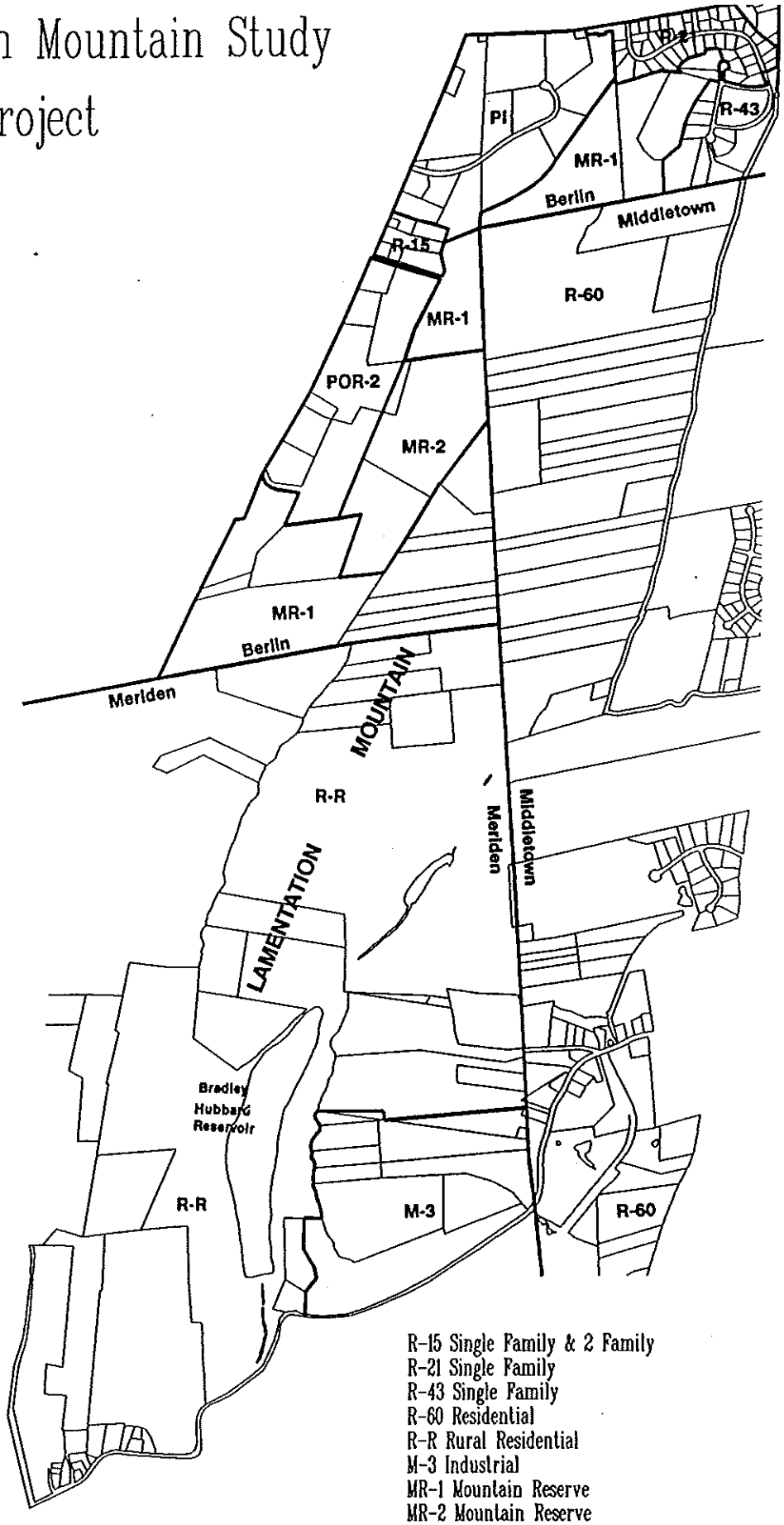
b. Middletown

Middletown zoning is R-60 Residential. This is a classic Rural Residential zone. The minimum lot area is 60,000 square feet and the permitted uses include farming, single family homes, day care centers, churches, schools, recreation areas, leaf composting areas and natural resource extraction.

In addition to standard subdivisions with large lots and thirty foot road widths, the City of Middletown Zoning Code contains both cluster regulations and Large Lot Environmentally Sensitive regulations. In exchange for a more environmentally sensitive subdivision and a greater amount of open space, the cluster regulations provide for flexibility in lot size and dimensions, road widths and sidewalk requirements. The cluster alternative also has a density bonus incentive to encourage the use of cluster design. The Large Lot Environmentally Sensitive subdivision allows for 18 foot private gravel roads.

Lamentation Mountain Study
Tri-Town Project
Zoning





R-15 Single Family & 2 Family
R-21 Single Family
R-43 Single Family
R-60 Residential
R-R Rural Residential
M-3 Industrial
MR-1 Mountain Reserve
MR-2 Mountain Reserve
PI Planned Industrial
POR-2 Planned Office / Residential

Scale: 1 inch equals 2000 feet.

Figure 3

c. Berlin

Berlin zoning is Mountain Reserve 1 and Mountain Reserve 2. Mountain Reserve 1 is a single family, three acre lot zone. It permits single family residential, farms, parks, schools, churches, nursing homes, golf courses, and other similar uses. Mountain Reserve 2 allows similar uses but also includes multi-family housing at a density of two dwelling units per acre and a maximum impervious surface coverage of twenty-five percent. While the MR-2 zoning does allow multi-family development, it is restricted to a maximum elevation of 350 feet MSL. Berlin also has a cluster type development provision to allow for the maximum preservation of open space.

VII. NATURAL FEATURES

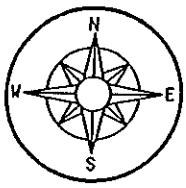
The study area's unique environmental features impose limitations on development. The following site analysis covers topography, drainage, steep slopes, soils, and vegetative communities.

a. Topography

Both the Lamentation Mountain and Chauncey Peak ridgelines are oriented north-south (see Figure 4). The Chauncey Peak ridgeline, approximately 3,000 feet in length, is located in the south central portion of the study area. At its northern most point, the ridge begins at a ravine with a stream at its base. This stream feeds into the Bradley Hubbard Reservoir. The ridge runs the length of the reservoir and at the southern terminus of the study area the ridge wraps around to the east. The summit of Chauncey Peak reaches elevation 688 mean sea level (MSL). From the top of the ridge to the west is a sheer cliff. From the top of this cliff elevation drops 377 feet to the shores of the reservoir.

East of the Chauncey peak ridgeline a significant portion of the eastern face has been altered. This alternation is due to an extensive quarrying operation. Undisturbed natural topography on the eastern slope is far more gently sloping from the summit. Elevation changes from 688 MSL at the summit down to a wetland area at approximately 400 MSL. This vertical change in elevation occurs over a horizontal distance of approximately 2,000 feet.

Lamentation Mountain Study
Tri-Town Project
Topography



Scale: 1 inch equals 2000 feet.

Figure 4

The much longer (approximately 2 miles) and much more recognizable Lamentation Mountain ridgeline is characterized by both exposed basalt cliffs with talus slopes and tree lined portions. Lamentation Mountain has a summit of 720 MSL with elevations along the ridge ranging from 550 at the southern terminus to approximately 250 feet at the northern terminus. From the top of the Lamentation Mountain ridgeline the elevation drops dramatically on the western cliffside of the mountain. The elevation changes over a horizontal distance of approximately 800 feet from approximately 600-720 MSL to approximately 350 MSL at the western edge of the study area.

As with Chauncey Peak, the eastern slope has a far more gentle decline in elevation from the summit. Moving from the northern terminus south to the Meriden/Berlin boundary the eastern slope drops fairly rapidly from approximately 600 MSL to 250 MSL over a horizontal distance of approximately 1,000 feet. From this point to the eastern edge of the study area the land is more gently sloping, with elevations ranging between 200-250 MSL. South of the Meriden/Berlin boundary line, the ridgeline drops off much more gently from the summit at 720 MSL down to 400 MSL at the stream which flows into the ravine north of the Bradley Hubbard Reservoir. This change in elevation occurs over a horizontal distance of approximately 2,200 feet. East of the stream which feeds into the reservoir the topography is much more gently sloping with elevations ranging between 250-300 MSL.

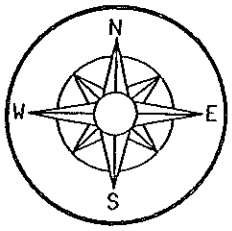
b. Drainage

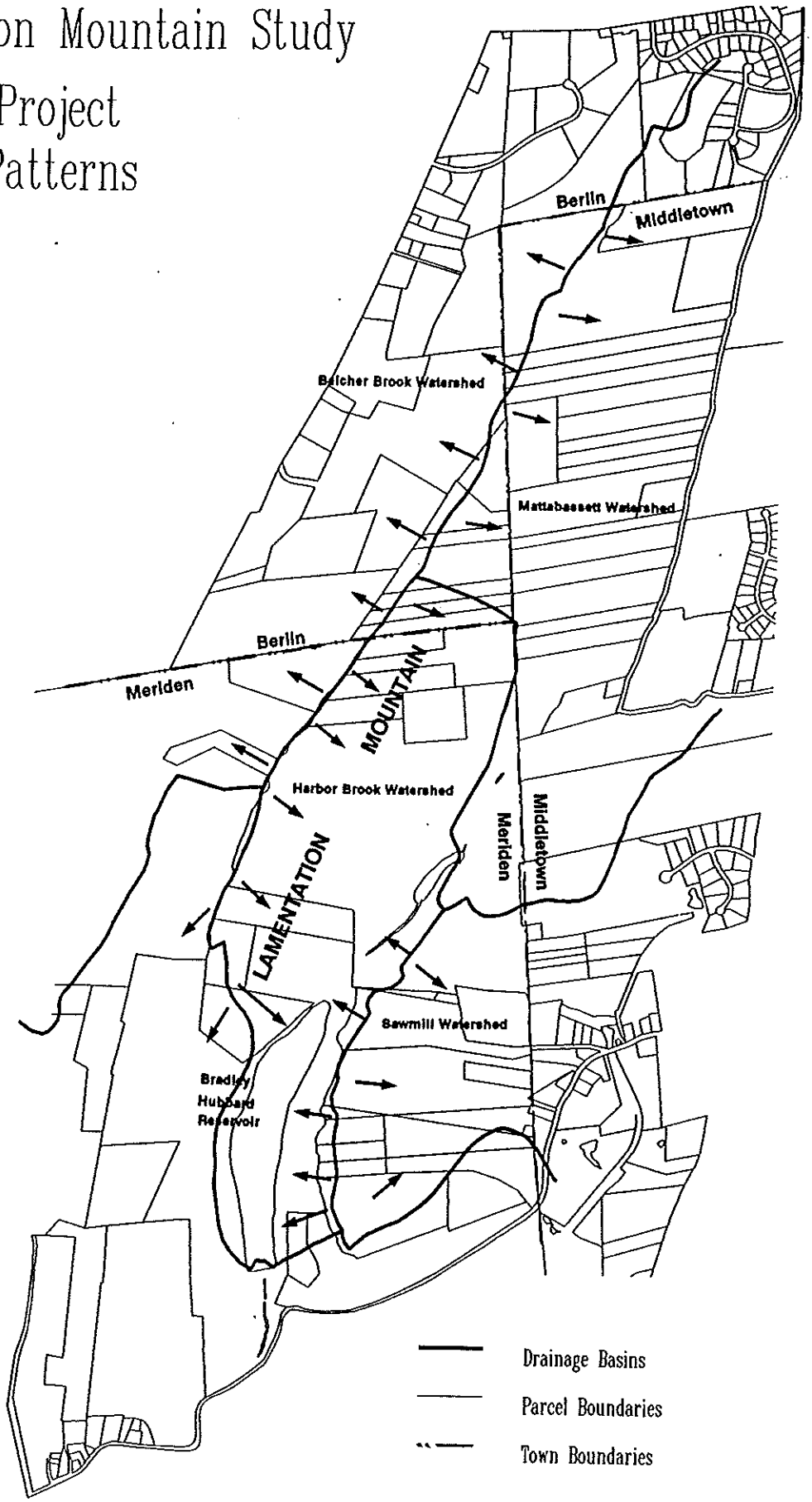
Overland flow of water off of the mountain drains into four distinct watersheds: the Harbor Brook, the Sawmill Brook, the Mattabesset, and the Belcher Brook watershed systems. The attached drainage map, Figure 5, illustrates these drainage patterns.

In the study area the Harbor Brook watershed drains overland to an unnamed stream, into the Bradley Hubbard Reservoir, Baldwins Pond, Harbor Brook, Hanover Pond, and finally into the Quinnipac River. Drainage from the western face of Chauncey Peak also drains directly into the reservoir.

The Mattabesset Watershed drains into Lamentation Brook, West Spruce Brook, Spruce Brook and their associated wetland corridors, which act as natural detention areas. At the northern end of the study area the streams converge into Spruce Brook, which flows northerly out of the study area to the Mattabesset River.

Lamentation Mountain Study
Tri-Town Project
Drainage Patterns





Scale: 1 inch equals 2000 feet.

Figure 5

Drainage from the western face of Lamentation Mountain enters the Belcher Brook Watershed. This drainage eventually crosses the Berlin Turnpike and drains into Silver Lake and a large wetland south of the lake. Silver Lake feeds into Belcher Brook and flows northerly, eventually, converging with the Mattabesset River in Berlin.

Drainage from the Sawmill Watershed first enters a large wetland area at the base of Chauncey Peak. The wetland detains the water for a period of time and gradually drains easterly to Sawmill Brook flowing through Highland Pond and then northerly to the Mattabesset River.

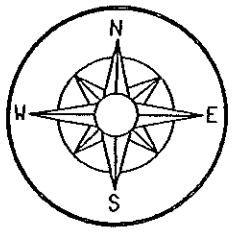
As is clear from the above discussion, a significant portion of the drainage from the study area reaches the Mattabesset River. The Mattabesset River and the sediments that it carries flow to the Connecticut River and Long Island Sound. Therefore, it can certainly be inferred that the protection of water quality in the study area contributes to preserving water quality in the Mattabessett River, the Connecticut River and , Long Island Sound.

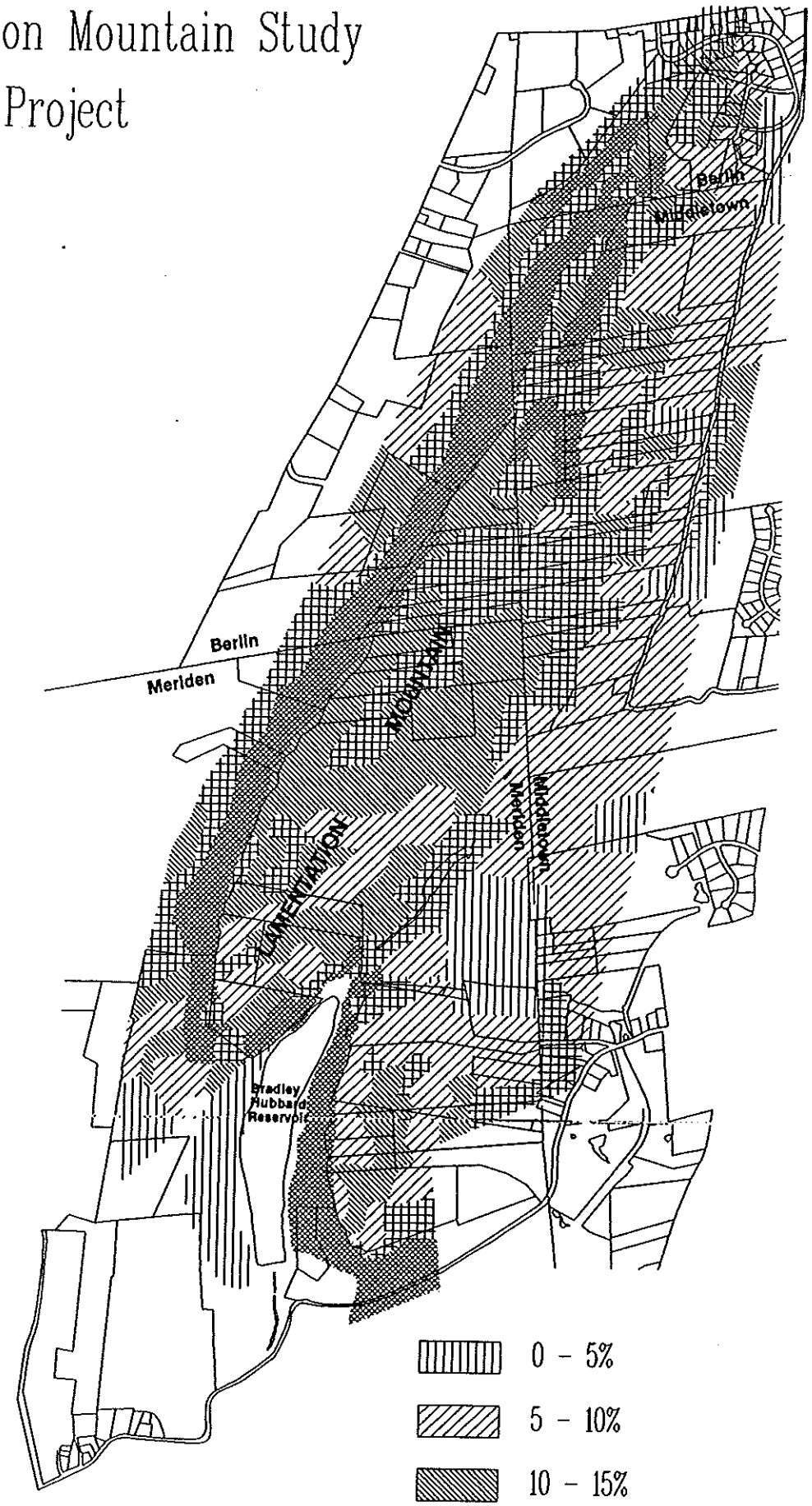
c. Slopes

The attached slope map, Figure 6, displays slopes of 0-5%, 5-10%, 10-15%, 15-25%, and greater than 25%. As the map clearly displays, there is a band of extremely steep slopes along the western face of both Lamentation Mountain and Chauncey Peak. The combination of elevation above sea level, steep slopes, and exposed cliffs creates a significant natural feature in the region. These memorable ridgelines and cliffs are in plain view to anyone traveling the highways within the Central Connecticut Corridor. Equally impressive are the panoramic views from the ridgelines which attract significant numbers of hikers and rock climbers each year. Because of these features, the undisturbed and steeply sloping traprock ridges with slopes greater than 25% are particularly significant and worthy of preservation.

There is also a significant amount of area with slopes between 15-25%. This characteristic, and to a lesser degree areas with slopes between 10-15%, clearly places restrictions on development. Due to the increasing cost of land versus development costs and the depletion of highly buildable land, steeply sloped lands have in many cases become feasible for development. In fact, they often provide dramatic and desirable home sites. However, development often requires extensive grading and deforestation. These practices on steep slopes can result in erosion and sedimentation. For these reasons, development on steep slopes, especially those in excess of 15%, should be discouraged. On slopes less than 15%, buildings should be carefully sited to insure watershed protection and preservation of the visual character of the area.

Lamentation Mountain Study
Tri-Town Project
Slopes





Scale: 1 inch equals 2000 feet.

Figure 6

Considering the single factor of slope, those areas with slopes of less than 10% can be considered most desireable for development. These areas are predominantly at the base of the mountain in Meriden and Middletown. In Berlin at the western and northern extremes of the study area there are also fairly large areas with slopes of less than 10%.

d. Soils

The following soil classifications are taken from the soil surveys of Hartford, Middlesex and New Haven counties. The surveys were complied by the USDA Soil Conservation Service. The soil complexes are displayed on the soils map, see Figure 7.

Holyoke Rock outcrop complex (HZE)

This complex is characteristic of traprock ridgelines and has slopes generally ranging from 15 to 40%. This complex has poor potential for community development. The complex is limited mainly by shallowness to bedrock, steep slopes and rock outcrops. Excavation is difficult and blasting is required in most places. On-site septic systems require special design and installation.

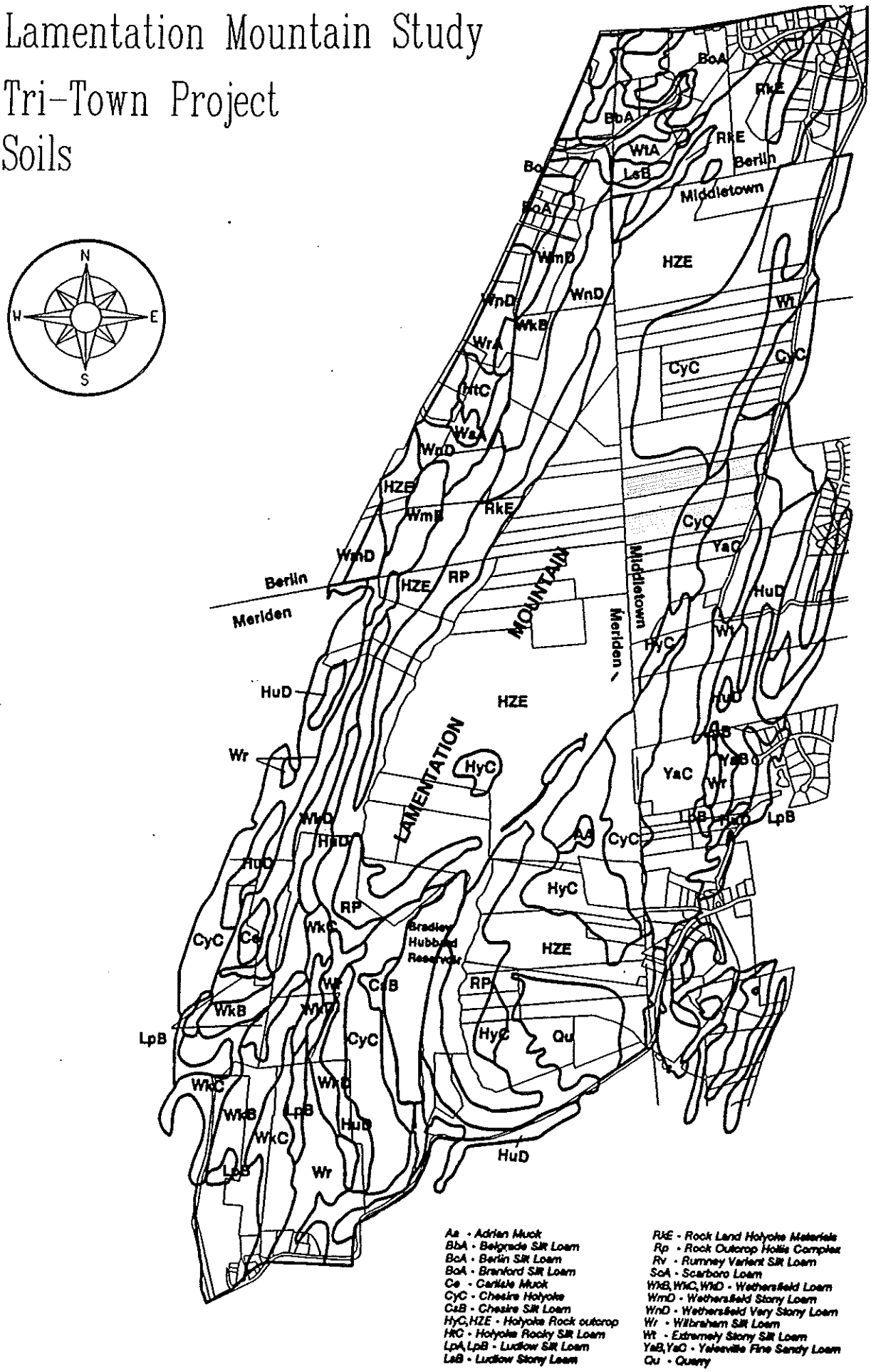
Cheshire Holyoke very stoney silt loam, slopes 3-15% (CyC)

This complex has fair potential for community development. Shallowness to bedrock in the Holyoke soils and the bedrock outcrops make excavating difficult. On-site septic systems require very careful design and installation. Larger than normal areas are sometimes needed for on-site septic systems. A few areas of bedrock outcrops provide a scenic and picturesque setting for homesites.

Yalesville fine sandy loam 8 to 15% slopes (YaC)

This soil has fair potential for community development. The soil is limited mainly by shallow depth to bedrock and the steep slopes. Bedrock makes deep excavation difficult. On-site septic systems need careful design and installation and sites require filling in places.

Lamentation Mountain Study
Tri-Town Project
Soils



Aa - Adrian Muck
BbA - Belgrade Silt Loam
BoA - Berlin Silt Loam
BoA - Branford Silt Loam
Ce - Carlisle Muck
CyC - Chesire Holyoke
CsB - Chesire Silt Loam
HyC,HZE - Holyoke Rock outcrop
HtC - Holyoke Rocky Silt Loam
LpA,LpB - Ludlow Silt Loam
LsB - Ludlow Stony Loam
RkE - Rock Land Holyoke Materials
Rp - Rock Outcrop Hollis Complex
Rv - Rumney Variant Silt Loam
ScA - Scarboro Loam
WkB,WkC,WkD - Wethersfield Loam
WmD - Wethersfield Stony Loam
WnD - Wethersfield Very Stony Loam
Wr - Wilbraham Silt Loam
Wt - Extremely Stony Silt Loam
YaB,YaC - Yalesville Fine Sandy Loam
Qu - Quarry

Scale: 1 inch equals 2000 feet.

Figure 7

Holyoke Rock outcrop complex 3 to 15% (HyC)

This complex has poor potential for community development. It is limited mainly by shallowness and by rock outcrops. Excavation is difficult and blasting is required in most places. On-site sewage disposal systems require very careful and often special design and installation. An area of five (5) acres or more is commonly needed for use as a suitable site for an on-site septic system.

Rock outcrop Hollis Complex (RP)

This complex has poor potential for community development. It is limited mainly by rock outcrops, shallow depth to bedrock and steep slopes. Excavation is very difficult and blasting is required in most places. On-site septic systems require very careful design and installation. In most places such systems are not practical because effluent seeps into cracks in the bedrock and contaminates groundwater. Also, an area of more than five (5) acres is generally needed for on-site septic systems.

Wilbraham silt loam (Wr)

This poorly drained soil is characterized in the State of Connecticut as an inland wetland soil. For this reason, the areas composed of these soils are carefully regulated by local inland wetland agencies. The soil has poor potential for community development. The soil is limited mainly by the high water table and the slowly permeable or very slowly permeable substratum. Areas generally need extensive filling for any type of development.

There are also numerous other soil groups within the study area which represent significantly smaller areas.

e. Vegetation

Figure 8 displays the natural communities that are common to traprock ridgelines. The study notes that the red cedar ledges, subacidic cliffs, subacidic talus, and subacidic talus forest/woodlands are all natural communities with limited examples within Connecticut. It indicates that for this reason occurrences of these communities are tracked by the Department of Environmental Protection's Natural Diversity Database. The report provides an exhaustive

Toposequence diagram of a traprock ridge system. From Metzler (no date).

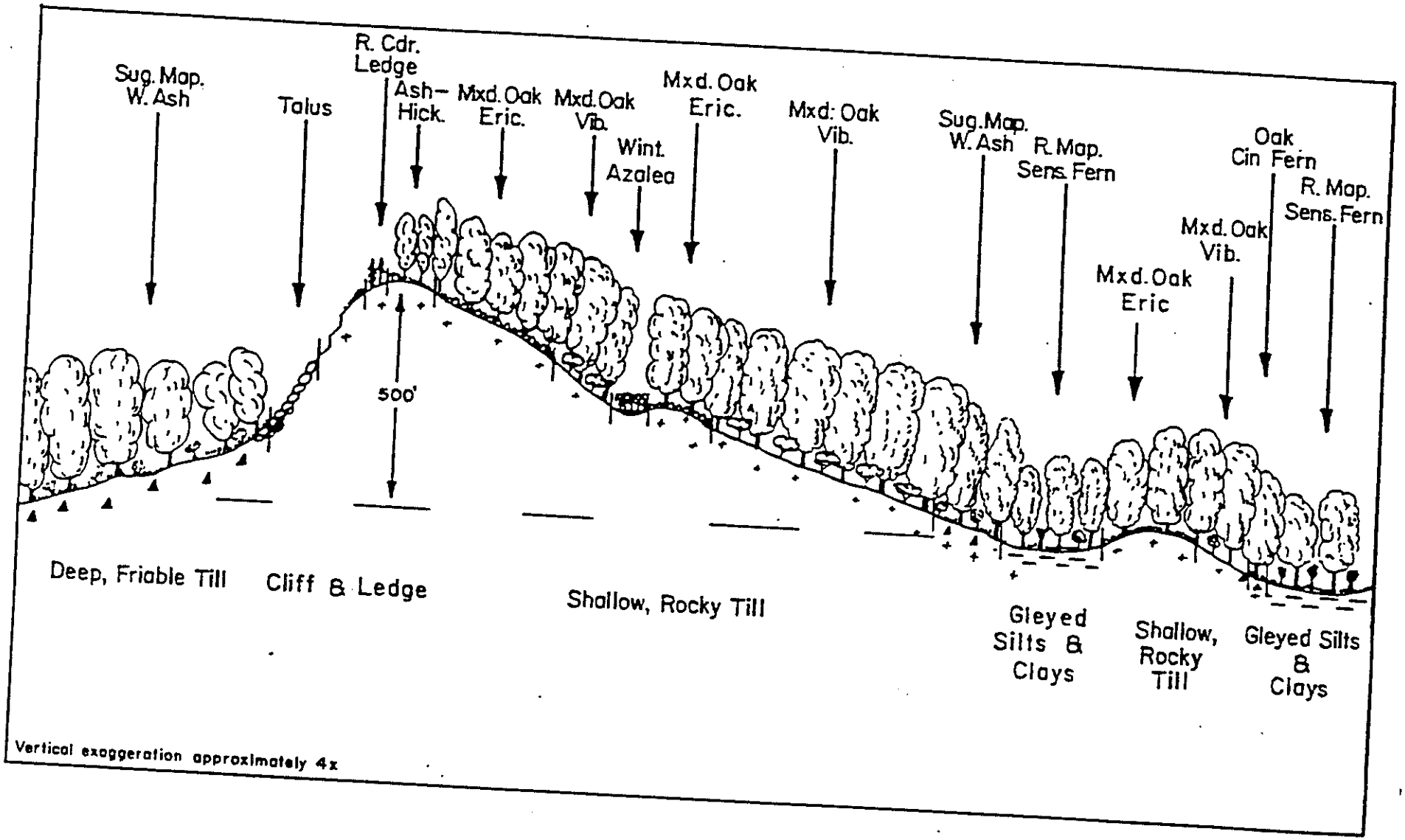


Figure 8

list of plant and animal species identified on the mountain, including the coyote, wild turkey, red tailed hawk, pheasant, ruffed grouse, white tailed deer, turkey vulture and copperhead snake.

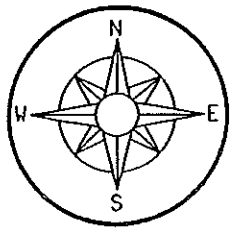
In 1992 the Tri-Town Project employed Ms. Beth Lapin, a botanist with The Nature Conservancy, to conduct a natural resource inventory of the traprock ridgeline. This report identified the natural communities along the ridgeline in detail and in the study area in general. Portions of the report can be found in Appendix I.

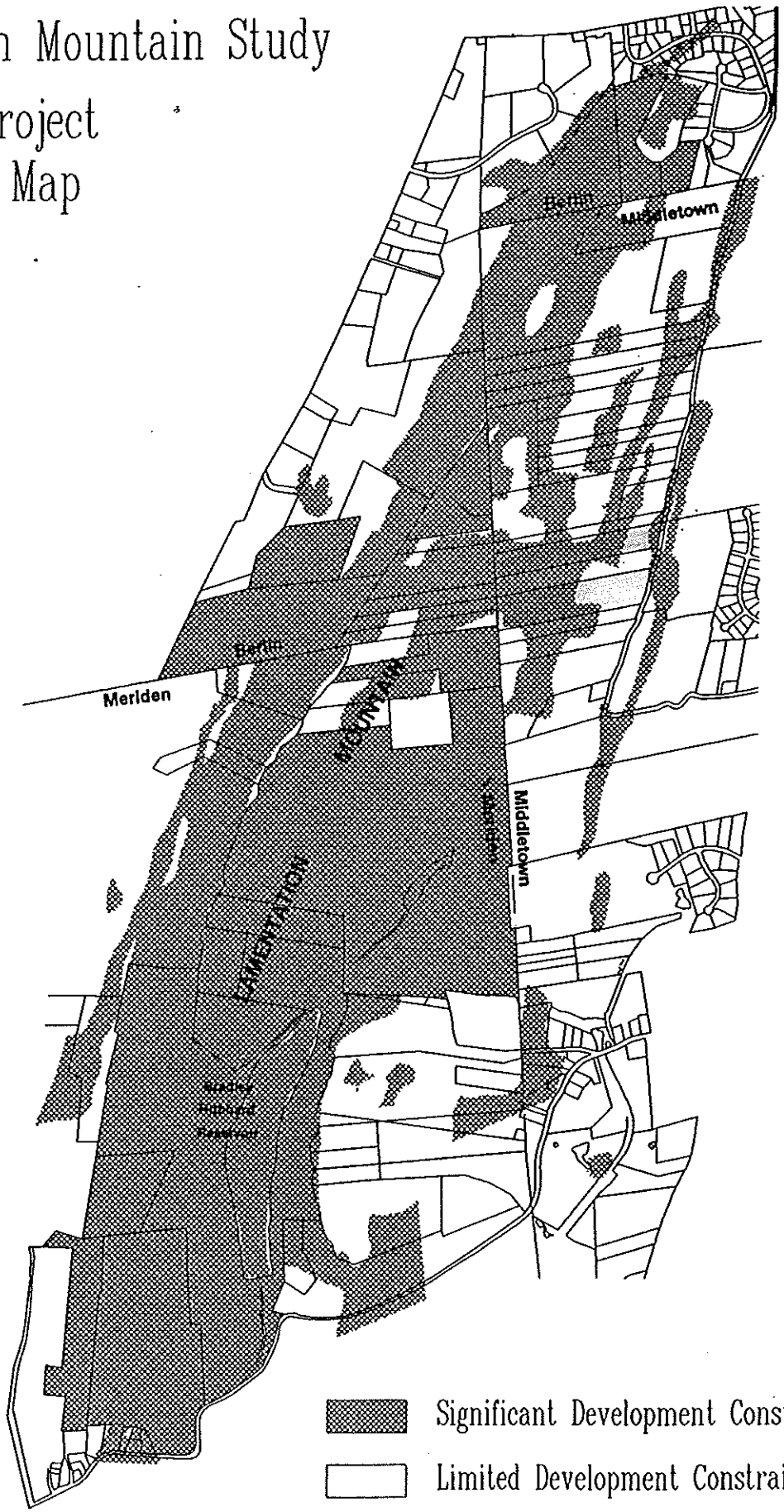
The study identified two species of plants on Lamentation Mountain that are on the State threatened list. These are the wallrue spleenwart (*Asplenium ruta mararia*) and the yellow corydalis (*Grydalis flavula*). The field study also identified the Falcate Orange Tip (*Paramidea midea*) as an unusual invertebrate in this area. This small white butterfly is not listed by the Stat of Connecticut as threatened, endangered, or of special concern, however, its distribution is restricted and being tracked by the Natural Diversity Database. Because of the sensitivity of the above noted species, detailed information is restricted and exempt from the Freedom of Information Act.

VIII. LIMITATION COMPOSITE MAP

In order to better analyze the development opportunities and identify those areas most suited for development, a limitations composite map was developed. The Limitations Composite Map, (Figure 9), shows which areas are encumbered by a combination of soil, wetlands, slope and/or ownership factors and areas where lands are more easily developable. As displayed on the Limitations Composite Map, a developable band of property exits along the lower eastern slopes of Lamentation Mountain and Chauncey Peak. These areas are not encumbered by soil type, land ownership, or steep slopes. The only other area that holds significant development potential is a band of land along the western extreme of the study area. This area has direct access to the Berlin Turnpike and public utilities. The remainder of the area, with the exception of four small isolated islands of developable land, can be considered generally undevelopable. To develop these areas, blasting, extensive regrading, and other significant modifications would be required. In most areas the ownership pattern of several long narrow wood lots adds additional difficulty for future development. Any unified development would require the assemblage of several parcels.

Lamentation Mountain Study
Tri-Town Project
Constraints Map





Scale: 1 inch equals 2000 feet.

Figure 9

IX. PROPOSED LAND USE MAP

Based on site visits, an analysis of the Limitations Composite Map, the location of access points and the availability of utilities, the attached Proposed Land Use Map was formulated. (see Figure 10).

a. Meriden

In Meriden on the eastern slope there are three large parcels of privately owned land that hold limited development potential. These properties are somewhat constrained by soil type. For any significant development to occur on these properties, Stantack Road in Middletown would have to be improved to more acceptable standards, and a unified development plan for the three parcels, with development concentrated at lower elevations, would have to be formulated. Due to the existing salvage yard, locating potable wells may be an additional constraint to development. The existing quarry should be gradually reclaimed for a more compatible land use.

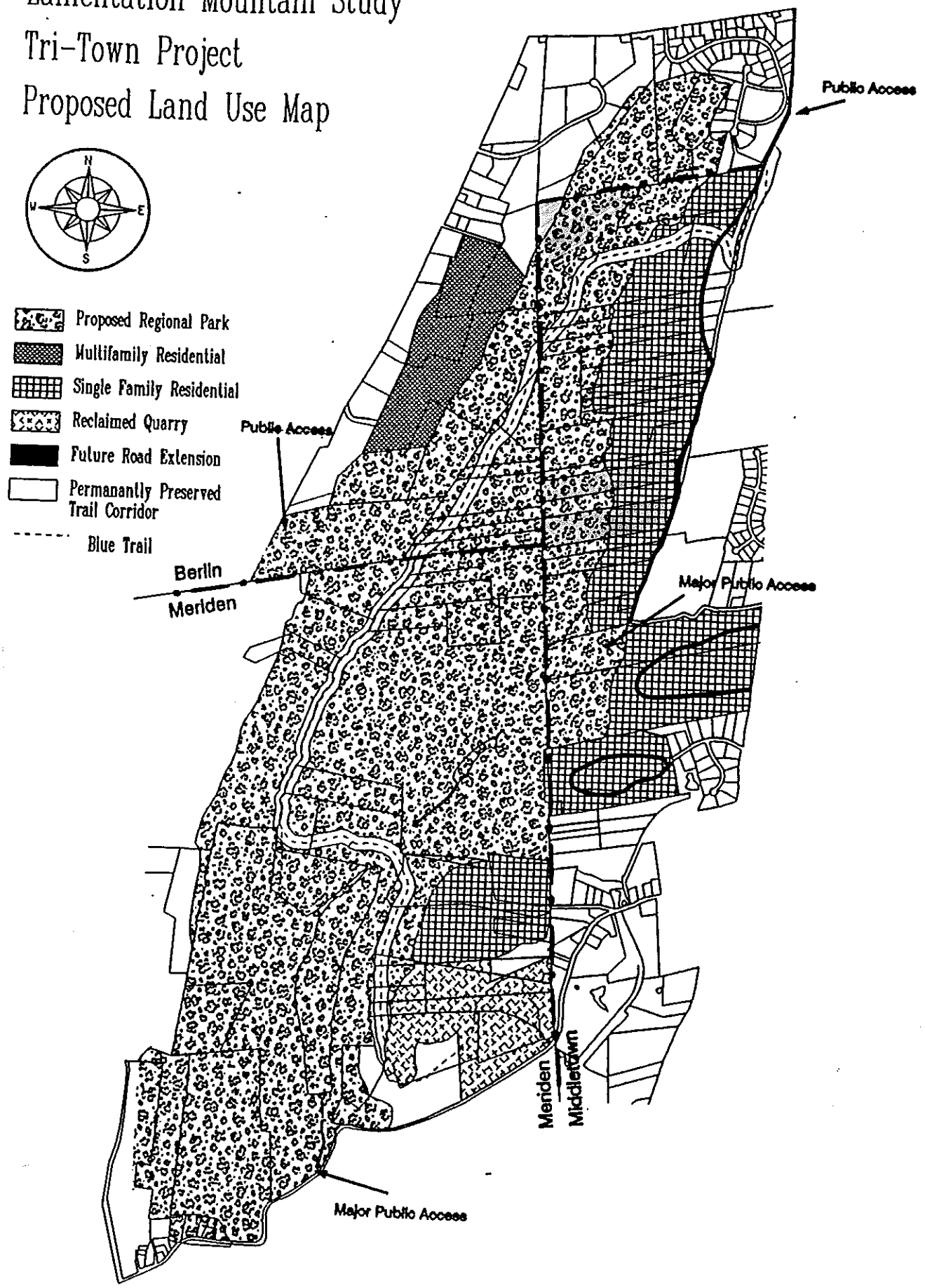
b. Middletown

In Middletown the majority of development should occur along Stantack Road at the lower eastern slope. Stantack Road runs at the base of several long and narrow wood lots. Due to this ownership pattern, it is unlikely that these lots will be assembled to allow a large unified development. Therefore, the potential in this area will most likely be limited to single family homes fronting on Stantack Road. There are some lots that could hold potential for small subdivisions. Home sites should be clustered at lower elevations and the less developable lands should be left undisturbed.

To encourage cluster development, Middletown should consider incentives such as reduction in lot area and frontage requirements and waivers of city street standards. In this way property owners would be allowed fair and economical use of their property while at the same time higher elevations would be preserved as permanent open space.

To accommodate development Stantack Road will have to be improved to acceptable standards. Considering the character of the area, this proposed land use plan does not

Lamentation Mountain Study
Tri-Town Project
Proposed Land Use Map



Scale: 1 inch equals 2000 feet.

Figure 10

recommend that Stantack Road be improved to full city standards. Rather, consideration should be given to waiving some of the road standards to allow a progressive and economical extension of the road as lots are developed.

To the south of the intersection of Stantack Road and Footit Drive there are two large parcels of land extending to the east out of the study area. These parcels are approximately 45 and 74 acres respectively. These parcels could support cluster development similar to that at the adjacent Old Farms Subdivsion. When development plans are formulated for these parcels, consideration should be given to preserving the wetland corridor and the western extreme of the lots abutting Giuffrida Park as open space.

c. Berlin

At the western base of Lamentation Mountain in Berlin there is a large area of land suitable and approved for multi-family development. This area has direct access to Route 15 and all utilities. Once again, this development should be clustered at lower elevations to preserve the very steeply sloping cliffs and talus slopes as permanent open space. Unlike other developments, each year thousands of hikers will look down upon this development. Therefore, in developing these areas very careful attention must be given to the visual impact of the development from the ridgeline so as to create the most aesthetically pleasing viewing experience.

d. Tri-Town Open Space Corridor

In terms of open space, the 1964 "Middletown Plan of Development" proposed that the area of rugged land on Lamentation Mountain become a "City forest and wilderness park". The plan goes further and indicates that such a forest would provide "activities such as camping, picnicking, hiking, horseback riding... and many others". In light of this, consideration should be given to the establishment of a "regional forest and wilderness park". Clearly, as the region becomes more completely saturated with development a regional open space such as this could prove to be an irreplaceable resource in the Central Connecticut region. An example of an active open space similar to the one proposed can be found on Avon Mountain on Metropolitan District Commission land straddling the towns of Avon, West Hartford, Farmington and Bloomfield.

As the first step toward this "regional park" this plan strongly recommends that a corridor along the Blue Blazed Mattabessett Trail be preserved permanently as open space. This corridor should run from the southern to the northern extreme of the study area and traverse the Chauncey Peak and Lamentation Mountain ridgelines. This will ensure permanent access to the ridgeline for hikers, preserve the beauty of the ridgeline from below, and protect the rare species identified in the Natural Resource Inventory. To accomplish this objective, the State and each municipality should direct open space preservation funds towards this area. Furthermore, consideration must be given to creative strategies that allow for formal conservation easement and/or the purchase or transfer of development rights to lower elevations. Access points to the trails should be formalized and publicized so as to attract more visitors to this precious resource. Until a permanent corridor is formed, each municipality should work cooperatively with landowners and the Connecticut Forest and Parks Association to insure the long term existence and accessibility of the many formal and informal trails on the mountain. The following findings and recommendations outline the actions necessary to implement this plan and create the Tri-Town Open Space Corridor/Regional Park.

X. FINDINGS AND RECOMMENDATIONS

1.) State, Regional and Local Plans of Development must all clearly articulate the findings and recommendations established in this study and local commissions need to incorporate this plan in their decision making in order to set consistent land use policy for the entire area.

2.) The Tri-Town Committee must strive to keep open clear lines of communication with property owners to promote the implementation of this plan.

3.) Local Plans of Development should encourage extensions of public infrastructure as needed to implement the proposed land use plan and should discourage extensions of public infrastructure to higher elevations.

4.) There is a complete absence of permanently preserved open space in Middletown. Therefore, local and state open space acquisition monies should be targeted to this area.

5.) Meriden should focus efforts toward acquiring the scattered and isolated inholdings which are surrounded by state and city property.

6.) As the envisioned "regional park" increases in area, the municipalities may consider establishing a jointly funded regional budget to promote the park, hire conservation officers to patrol the park, and establish routine maintenance of the park. Additionally, a system of land care volunteers could assist in the protection of the resource while increasing citizen interest in land use issues.

7.) Zoning among the three towns is not well coordinated. The three towns should work in concert to develop unified zoning and development regulations that will:

- Allow for compatible land uses on the mountain;

- Allow for density bonuses and other incentives that promote cluster development at lower elevations in order to protect higher elevations as open space;

- Allow for control over the placement of dwelling units and driveways to limit the disturbance of steeply sloping areas and to locate building silhouettes below the ridgeline.

- Incorporate very specific and uniform land development and erosion and sedimentation control regulations that minimize disturbance if steeply sloping and other sensitive lands are altered.

- Ensure that during the review of development applications, very careful and creative site planning is employed to avoid disturbance of sensitive lands and so that homes are located in the pockets of more developable land.

8.) The Middletown Zoning should be modified to eliminate natural resource extraction.

9.) The industrial zoning in Meriden allows a number of inappropriate and incompatible uses. A more appropriate zone should be considered to gradually guide this area toward more compatible land uses.

10.) Landowners should be encouraged to participate in the Chapter 490 Preferential Tax Assessment Program.

11.) Quarrying activities in Meriden have led to significant degradation of this area. These activities should be carefully regulated and limited.

12.) The automotive salvage yard in Meriden could contribute to the environmental degradation of the area. Therefore, ongoing careful monitoring of this use is required.

13.) Large stands of Hemlock occur in the study area. A plan to address the eventual die off of these Hemlock due to wooly adelgid should be created, particularly in the public watershed area.

14.) The existence of approximately twelve (12) abandoned cars, litter, numerous informal campsites and significant trail erosion was noted in the study area. Maintenance of the trail system with periodic-clean up days should be promoted and access to the trail system should be limited to non-motorized forms of transportation by securing access points.

15.) Evidence of the irresponsible use of firearms was noted in numerous locations. Efforts should be made to curb the irresponsible use of firearms.

16.) It is presumed that the abandoned cars, the abundant use of firearms and irresponsible social activities that occur within the study area create an unsafe feeling for many property owners and visitors to the area. This situation must be addressed. Controlling access to non-motorized vehicles will help greatly and the promotion of the area, which will attract more people, and will certainly foster a greater feeling of security.

APPENDIX I

LAMENTATION MOUNTAIN

NATURAL RESOURCE INVENTORY REPORT

ACKNOWLEDGMENTS

This project was supported by financial assistance from the City of Middletown (with a partial grant from the Rockfall Foundation), the City of Meriden, and the Town of Berlin. I also gratefully acknowledge contributions from the following: Juliana Barrett (TNC), Glen Dreyer (CONN College), Wendy Dreyer, Bob Dubos (UCONN), Larry Gall (Peabody Museum) Alison Guinness, Barry Hastings, Marcy Klattenberg, Ron Klattenberg, Ken Metzler (DEP), Nancy Murray (DEP), Leslie Starr, and Jim Steele (Midstate Regional Planning).

INTRODUCTION

Lamentation Mountain is a traprock ridge located in the towns of Middletown, Meriden and Berlin, in the counties of Middlesex, Hartford and New Haven (see Figure 1). It is comprised of over 1,000 acres surrounded by highway I-91 on the east and U.S. 5/15 on the west. Lamentation Mountain is one of a series of Connecticut traprock ridges that are found within the Central Valley from New Haven north to the Massachusetts border.

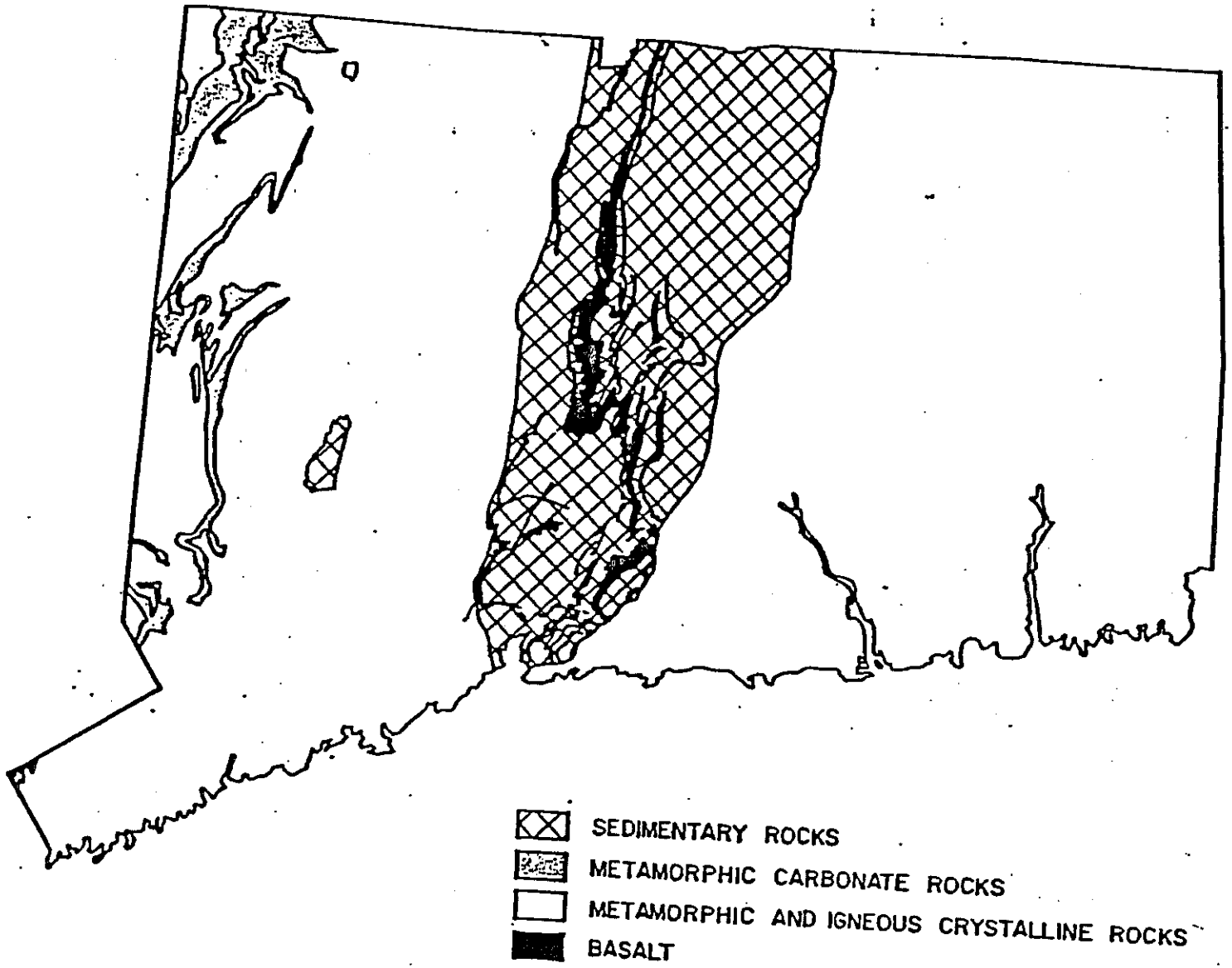
TRAPROCK RIDGES-GENERAL

"Traprock" is a word derived from the Swedish "trappa" meaning step. This term is used for these basalt outcrops because the rocks tend to fracture in regular, block-like sections. As these sections crack and fall away from the main part of the cliff, the remaining rock resembles a series of steps.

Traprock is a fine-grained, grey-green igneous rock called basalt. Its color is due to the presence of the mineral pyroxene. After exposure to air, however, the traprock appears yellow to brownish due to oxidation of iron in the basalt, which produces the minerals geothite and limonite.

In Connecticut, traprock ridges are found in the Central Lowland area of the state, extending from the southern coast near New Haven to the Massachusetts border, where they continue northward (see Figure 2). In some areas, the ridges form a continuous belt, such as the Metacomet

Figure 2. Distribution of basalt in Connecticut



Range. Other portions of the ridges, such as Hanging Hills in Meriden and Higby Mountain in Middletown, are found in disjunct sections across the valley.

Traprock was formed as lava flows during the Triassic and Jurassic periods about 205 million years ago. At the same time, erosion from the eastern and western highlands on either side of valley deposited coarse rocks near the valley sides and finer sands in the center of the area. This deposition caused the formation of shales, sandstones, and conglomerates. Three different volcanic events occurred during this time period, as streams of lava bubbled through these sediments and spread across the valley. The most visible of these volcanic events is the second, which deposited a 250 to 500 foot thick layer of Holyoke lava, which forms the most prominent of Connecticut's traprock ridges. This geologic history produced a valley filled with alternating sedimentary and volcanic rocks, resembling a giant layer cake. Subsequent subsidence of the valley to the east tilted the western edges of these layers. Erosion has removed many of the sedimentary features, exposing the basalt or volcanic outcrops. Because of this history of their formation, the ridges generally have a steep western cliff and a gentle eastern flank. Lee (1985) and Nichols (1982) present excellent non-technical descriptions of the formation of the ridges and their components.

Over time, the exposed cliff faces erode away, resulting in an accumulation of rock debris at the base. This pile, called talus or scree, typically develops as 30 degree slopes of graded material, with the largest at the bottom. Since glacial activity cleared away existing talus deposits during the Ice Age, all present talus has accumulated in the last 15,000 years.

Traprock ridges are prominent features, rising 500 to 1,000 feet above the valley floor, provide a striking visual image while one drives along Route I-91 or I-84 in central Connecticut. The string of these basalt ridges are in distinct contrast from the flat, moist valleys that run between them. Because of their location, topography, and history, these ridges also are critical habitat for many plant and animal species that are found nowhere else in the state. Because the ridges are west-facing, very arid with shallow soils, and have large areas of exposed rock, they provide a warmer micro-climate that resembles areas in southern United States. This allows some species to reach the northern extent of their range on the traprock ridges of Connecticut. In addition, the structure of the talus slopes at the base of the cliffs also produces unusually cool and moist conditions for some species, such as striped maple (*Acer pensylvanicum*) that are more

typically found north of our state. Warm air rising up from the talus slopes provide the thermal air currents utilized by many raptor species such as red-tailed hawks. Thus, ecologically the traprock ridges are very interesting areas.

Because of the steepness of the rock formations and shallow soils, many of Connecticut's ridges remain unaltered by human activities. However several are heavily quarried, since traprock is often crushed for road-building purposes. In general, the expanse of ridges running through the center of the state provides a relatively undisturbed wildlife corridor for many animal species. These ridges are also popular hiking trails, due to the vistas from the peaks, the lack of development on them, and the length of trail available.

LAMENTATION MOUNTAIN

This ridge, running approximately 3.5 miles north to south, has a maximum elevation of 720 feet and includes Lamentation and Chauncey Peaks. It is typical of many ridges in Connecticut with its steep west-facing cliff and much more gradually sloping east side. The ridge runs on a slight southwest to northeast direction. The southeast corner of the ridge near Chauncey Peak is an active quarry, with extensive removal of the traprock material. The northern and eastern slopes are being encroached by housing developments. The remainder of the area is undisturbed, except for numerous dirt roads, trails, and selective timbering on some tracts.

One of the distinguishing characteristics of Lamentation Mountain is the presence of one state threatened plant species and the historical record of another species. Records of both of these plants are available through the efforts of the staff of the Natural Diversity Data Base (NDDB), a component of the Natural Resources Center, Connecticut Department of Environmental Protection. A complete discussion of these unique plant species can be found on page 10.

NATURAL COMMUNITIES - ESTABLISHMENT

Nichols (1914) described the general succession of plants and plant associations on traprock ridges, from which the following summary is derived. Traprock ridges provide severe environmental conditions that challenge the advent of vegetation. Intense solar radiation, extreme

temperature changes, scarcity of water for long time periods, and the difficulty in securing a foothold in the rock all contribute to these difficult conditions.

Pioneer species which inhabit freshly exposed trap rock are crustose lichens, which give a black or grayish color to the surface. These lichens secrete acids which help dissolve the rock. This helps create a micro-habitat that allows the establishment of the next plant pioneers, foliose and fruticose lichens and mosses.

Crevice vegetation becomes established as dust and sand collect in the numerous fissures in the traprock. Small pockets of substrate allow the establishment of xerophytic (dry-loving) grasses, such as little blue stem (*Andropogon scoparius*), ferns, and forbs, such as wild columbine (*Aquilegia canadensis*). These herbaceous plants produces shade that eliminate the original pioneer species.

As vegetation takes root, there is an increase trapping of the associate sand and soil. Soil also begins to accumulate in shallow depressions which allows an increase in the amount of plant cover. As this occurs, roots, rhizomes and soil bind together to form sod. This allows shrubs such as staghorn sumac (*Rhus typhina*) and blueberries (*Vaccinium* sp.) to grow. Eventually trees, such as red cedar (*Juniperus virginiana*) and scrub oak (*Quercus ilicifolia*), take root. These species are very intolerant of shade. As these trees and shrubs arrive, their shade provides a more humid environment for more shade tolerant species such as chestnut oak (*Quercus prinus*). These shade-tolerant species eventually eliminate the original trees and grow into a woodland with scattered patches of herbaceous plants. Over time, a continuous canopy develops and the ensuing forest has a very different understory of shade tolerant species.

Succession also occurs along the talus slopes. Rich soil is washed down to the bottom of the slope, where water accumulates. Here a forest can quickly develop, due to the rich mineral input and available water. Often a forested belt develops mid-slope under the overhang of the basalt outcrop, where shade provides a less harsh environment. Eventually the forested belt and bottom forest meet and the entire talus slope becomes forested. Pioneer plants in the open talus are again lichens and crevice plants, such as poison ivy (*Toxicodendron radicans*). Shrubs (sumacs) and mesophytic (water-loving) trees such as black birch (*Betula lenta*), American basswood (*Tilia americana*), and Eastern hemlock (*Tsuga canadensis*) follow.

NATURAL COMMUNITIES - DESCRIPTIONS

The natural communities found on Lamentation Mountain are typical of those found in the traprock system. The following descriptions of the communities are derived from unpublished documents of the Natural Resources Center, Department of Natural Resources (Metzler 1990, no date). They are delineated on the overlay entitled "Natural Resources of Lamentation Mountain." These demarkations were made through the use of aerial photographs and field observation May through September 1992. Because the bedrock at Lamentation is basalt, the communities are often termed "subacidic." This is a reflection of the pH of the rock, which tends to closer to 7.0. A general toposequence diagram of a traprock system can be found in Figure 3.

Red cedar ledges

Red cedar ledges or subacidic rock summits and outcrops are dry to xeric exposed summits and outcrops with a vegetation of low shrubs, grasses and herbs on basalt, diabase, and calcareous schists (Metzler 1990). These exposed bedrock areas may be quite extensive, with vegetation only in the cracks in the rocks. Other areas may be comprised of small exposures of rock, interspersed with vegetation. The vegetation generally is comprised of tall, perennial, warm-season grasses and small herbaceous plants, with occasional stunted shrubs or trees. Characteristic species include little bluestem (*Andropogon scoparium*), Canada bluegrass (*Poa compressa*), and red cedar (*Juniperus virginiana*). Bastard toadflax (*Comandra umbellata*), scrub oak (*Quercus ilicifolia*), black huckleberry (*Gaylussacia baccata*) and blueberry (*Vaccinium* sp.) are typical components of traprock summits and outcrops.

Running north to south along the ridgeline of Lamentation and Chauncey Peaks are such areas of outcrops of the basalt. These open areas may be kept in this successional stage by human-caused fires, exposed winds, and other harsh environmental conditions. The natural role of fire is unknown in the Northeast, although similar natural communities in the mid-west have historical evidence of regular fire activity.

Subacidic cliffs, Subacidic talus, and Subacidic talus forest/woodland

These three communities are delineated on the map as a group, mainly due to their close proximity and the difficulty in differentiating among them on the aerial photos and maps.

Subacidic cliffs are dry to xeric exposed and shaded cliffs and cliff faces with sparse vegetation in cracks, crevices, and other fissures (Metzler 1990). These vertical exposures of resistant bedrock have minimal soil development, which leads to the sparse vegetation. In New York, typical plants of this community are rock polypody (*Polypodium virginianum*), marginal wood fern (*Dryopteris marginalis*), and common hairgrass (*Deschampsia flexuosa*) (Reschke 1990).

At Lamentation Mountain and Chauncey Peak, there are numerous small cliff exposures. In general, the cliffs are 60 feet or less in height. Several of these cliffs are considered examples of challenging rock climbing in Connecticut (Nichols 1982).

Subacidic talus is dry, coarse-textured colluvial deposits of rocks and boulders below cliffs and ledges with an open vegetation of vines, scattered herbs, and lichens on basalt, diabase, and calcareous schists (Metzler 1990). At Lamentation Mountain, the western and southern edge of the traprock summit is constantly fracturing into chunks of basalt that fall to the base of the western and southern slope. As this rubble accumulates, it provides a slope covered with talus material. There are still pockets of open talus on Lamentation's slopes.

Subacidic talus forest/woodland is dry to moist open woodland or forest on coarse colluvial deposits with soil and humus in pockets between the rocks (Metzler 1990). THese forets develop over time on the previously open talus. Some of the characteristic species of this type of community in New York are sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), chestnut oak (*Quercus montana*), red oak (*Quercus rubra*), and white oak (*Q. alba*), with ground layer including ferns such as bulbet fern *(Cystopteris bulbifera*), fragile fern (*Cystopteris fragilis*), and christmas fern *(Polystichum acrostichoides*) (Reschke 1990). At Lamentation, the talus areas are predominantly forested, which indicates that the talus has been undisturbed for quite some time.

Sugar maple-white ash Association

Sugar maple-white ash forests are "moist to wet fertile forests that occur on lower slopes, on talus, in coves, or on the higher pars of alluvial floodplains. Sugar maple and white ash generally dominte the tree canopy.

Tulip poplar (*Liriodendron tulipifera*) and American basswood (*Tilia americana*) also occur in these forest types. The sugar maple-white ash forests are differentiated from other forests ... by the large number of nutrient-demanding species such as bloodroot (*Sanguinaria canadensis*), spring beauty (*Claytonia virginica*), silvery spleenwort (*Diplazium acrostichoides*), blue cohosh (*Caulophyllum thalictroides*), and wild leek (*Allium tricoccum*)" (Metzler no date). These areas are generally rich in nutrients due to the erosion by rain water from the upland slopes. The nutrients tend to accumulate at the base of the slopes, where this natural community develops.

At Lamentation Mountain, there probably are examples of this forest all along the base of the western slope; however this area was not included in the field work of this particular study. The slopes of Lamentation and Chauncey join together along the canal that feeds into Bradley Hubbard Reservoir; these slopes are good examples of this type of community.

Ash-Hickory Association/Oak-Ericaceous Shrub subassociation

The **ash-hickory association** "is a group of dry, poorly growing forests often dominated by pignut hickory (*Carya glabra*)and white ash with a mixture of other hickory species, white pine *Pinus strobus*) and oaks. Ash-hickory forest occur exclusively on dry, rocky summits where their low stature, sporadic shrub layer, and 'grass' ground cover give them a distinctive park-like appearance. Grasses and sedges often dominate the ground layer along with a number of herbaceous species indicative of dry, rocky conditions. Small ferns, such as woodsia (*Woodsia obtusa, W. ilvensis*) and ebondy spleenwort (*Asplenium platyneuron*), occur scattered on ledges and rock outcrops" (Metzler no date). The **oak-ericaceous shrub subassociation** (part of the mixed oak association) is "a dry-poorly-growing forest with a dominance of oak species. On the driest sites, scarlet and chestnut oak (*Quercus prinus*) predominate. On the less droughty sites the forets canopy is a mixture of oak, hickory, and conifers. This sub-association is distinguished by the dwarf shrub layer of black huckleberry (Gaylussacia baccata*) and/or low bush blueberry (*Vaccinium vacillans, V. angustifolia*) and the presence of species such as pink lady's-sliper (*Cypripedium acaule*), bracken (*Pteridium aquilinum), spotted wintergreen (*Chimaphila maculata*), pin-cushion moss (*Leucobryum glaucum*), and hair-cap moss (*Polytrichum commune*)* (Metzler no date).

At Lamentation Mountain, the vegetation east of and between the outcrops falls into these two communities. Ash and hickories are very common

along the forested edge contiguous with the outcrop. In the main portion of the forest, oaks and hickories dominate. On the accompanying overlay, this mixed community comprises the unmarked areas within 50' of the Blue Trail along the ridge line only.

There also are large patches of Eastern hemlock along the ridge line between the outcrops. Many of these trees are infected with hemlock woolly adelgids, an insect that often kills the hemlock trees.

According to the Natural Community Classification, red cedar ledges, subacidic cliffs, subacidic talus, and subacidic talus forest/woodland are all natural communities with limited examples within Connecticut. For that reason, occurrences of these communities are tracked by the NDDB.

RARE PLANT SPECIES

Two species of plants that are on the state threatened list are known from Lamentation Mountain, based on records from NDDB. It is important to note that these species are very sensitive; information about these species is restricted and must not be distributed.

ADDITIONAL PLANT AND ANIMAL SPECIES

During site visits on May 13, June 10, July 11, August 11, and September 10, 1992 a comprehensive list of vascular plants was compiled. This list contains species noted anywhere along the entire length of the Blue Trail from its intersection with Spruce Brook Road south to the junction with Country Club Road. Species were identified using standard field guides and plant manuals. During cases of uncertain identification, comparisons with specimens at the University of Connecticut Herbarium and Connecticut College Herbarium were made. A number of specimens were made available to the UCONN herbarium for inclusion in that collection. The list of vascular plants located during this study (Appendix I) certainly is not exhaustive and additional species undoubtably will be added by subsequent visits by botanists. Additional attention to grasses and sedges is particularly recommended. The common and scientific names were standardized by using those provided by Dowhan (1979) and are arranged in taxonomic order.

Although the predominant focus of the field work in this study was botanical, opportunistic observations of animal species, both vertebrate and invertebrate, were made. The list of such species observed during this study are in Appendix II. Standardized names and taxonomic order are from Connecticut DEP (1987) for vertebrates and Miller (1992) for butterflies.

APPENDIX I

VASCULAR PLANT LIST

LAMENTATION MOUNTAIN

SCIENTIFIC NAME	COMMON NAME
Lycopodium sp.	Club-moss
Asplenium platyneuron	Ebony Spleenwort
Cystopteris fragilis	Fragile fern ($)
Dryopteris marginalis	Marginal wood-fern ($)
Polypodium virginianum	Polpody
Polystichum acrostichoides	Christmas fern
Pteridium aquilinum	Bracken fern
Juniperus virginiana	Red cedar
Pinus rigida	Pitch pine
Pinus strobus	White pine
Tsuga canadensis	Eastern hemlock
Andropogon scoparius	Little bluestem
Aristida dichotoma	Poverty grass
Brachyelytrum erectum	Long-awned wood grass
Bromus purgans forma laevivaginatus	Brome-grass
Danthonia spicata	Poverty grass
Elymis sp.	Wild rye
Hystrix patula	Bottle-brush grass (s)

$: specimen provided to UCONN herbarium
?: identification uncertain
s: specimen available

Muhlenbergia sobolifera	
Oryzopsis racemosa	Rice-grass
Panicum clandestinum	Broad-leaved panic-grass (s)
Panicum lanuginosum	
Poa compressa	Canada bluegrass (s)
Setaria glauca	Yellow foxtail
Arisaema triphyllum	Jack-in-the-pulpit
Commelina communis	Common dayflower
Juncus tenuis	Path rush
Allium canadense/vineale	Wild garlic/field garlic
Erythronium americanum	Trout lily
Lilium philadelphicum	Wood lily [1]
Maianthemum canadense	Wild lily-of-the-valley
Medeola virginiana	Indian cucumber-root
Polygonatum biflorum	Small solomon's-seal
Smilacina racemosa	False solomon's-seal
Smilax rotundifolia	Common catbriar
Trillium erectum	Red trillium
Uvularia perfoliata	Bellwort
Cypripedium acaule	Pink lady's-slipper
Populus tremuloides	Quaking aspen
Myrica pensylvanica	Bayberry
Carya ovata	Shagbark hickory

[1] reported by M. Klattenberg, R. Klattenburg and A. Guinness 1991

$: specimen provided to UCONN herbarium
?: identification uncertain
s: specimen available

Carya tomentosa ?	Mockernut
Betula lenta	Black birch
Betula papyrifera	Paper birch
Ostrya virginiana	American Hop-hornbeam
Fagus grandifolia	American beech
Quercus alba	White oak
Quercis ilicifolia	Scrub oak
Quercus prinus	Chestnut oak
Quercus rubra	Northern red oak
Quercus velutina	Black oak
Celtis occidentalis ?	Hackberry (s)
Comandra umbellata	Bastard toadflax
Asarum canadense	Wild ginger
Polygonum lapathifolium	Pale smartweed
Polygonum persicaria?	Lady's-thumb
Polygonum scandens	Climbing false buckwheat
Rumex acetosella	Sheep-sorrel
Phytolacca americana	Pokeweed
Dianthus armeria	Deptford pink
Paronychia canadensis	Forked chickweed
Silene alba	White campion
Anemone quinquefolia	Wood anemone
Anemonella thalictroides	Rue-anemone
Aquilegia canadensis	Wild columbine
Hepatica americana	Round-lobed hepatica

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?: identification uncertain
s: specimen available

Ranunculus abortivus	Small-flowered crowfoot
Ranunculus bulbosus	Bulbous buttercup
Ranunculus fascicularis	Early buttercup
Thalictrum polygamum	Tall meadow-rue ($)
Berberis thunbergii	Japanese barberry
Caulophyllum thalictroides	Blue cohosh
Lindera benzoin	Spice bush
Sassafras albidum	Sassafras
Corydalis flavula	Yellow corydalis
Corydalis sempervirens	Pale corydalis
Dicentra cucullaria	Dutchman's-breeches
Sanguinaria canadensis	Bloodroot
Arabis canadensis	Sicklepod ($)
Arabis laevigata	Smooth rock-cress
Arabis lyrata	Low rock-cress
Brassica sp.	Mustard turnip
Cardamine parviflora	Narrow-leaved bitter cress
Mitella diphylla	Miterwort
Saxifraga virginiensis	Early saxifrage
Hamamelis virginiana	Witch-hazel
Agrimonia gryposepala	Hairy agrimony
Amelanchier stolonifera?	Thicket shadbush
Fragaria virginiana	Common strawberry
Pontentilla argentea	Silvery cinquefoil ($)
Potentilla arguta	Tall cinquefoil ($)

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Potentilla simplex	Common cinquefoil
Potentilla sp.	(s)
Prunus serotina	Black cherry
Prunus virginiana	Choke-cherry
Pyrus malus	Apple
Rosa carolina	Pasture rose ($
Rosa multiflora	Multiflora rose
Rosa virginiana	Wild rose
Rubus sp.	Bramble species
Amphicarpa bracteata	Hog-peanut
Desmodium glutinosum	Large tick-trefoil
Lespedeza capitata	Round-headed bush-clover
Lespedeza sp.	clover (s)
Lespedeza violacea	Violet bush-clover
Trifolium pratense	Red clover
Oxalis europaea	Yellow wood-sorrel
Geranium carolinianum	Carolina cranesbill
Geranium maculatum	Wild geranium
Geranium robertianum	Herb-robert
Rhus glabra	Smooth sumac
Rhus typhina	Staghorn sumac
Toxicodendron radicans	Common poison ivy
Staphylea trifolia	Bladdernut
Acer rubrum	Red maple
Acer saccharum	Sugar maple

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Impatiens capensis	Spotted jewelweed
Ceanothus americanus	New Jersey tea
Parthenocissus quinquefolia	Virginia creeper
Vitis sp.	Grape
Tilia americana	American basswood
Hypericum gentianoides	Orange-grass
Hypericum mutilum	Dwarf St. John's-wort
Hypericum perforatum	Common St. John's-wort
Viola latiuscula ?	Broad-leaved wood violet
Viola pedata	Birdfoot-violet
Viola pubescens	Downy yellow violet
Violoa renifolia ?	Kidney-leaved violet
Aralia racemosa	Spikenard
Sanicula canadensis	Black snakeroot
Cornus stolonifera	Red osier
Chimaphila maculata	Spotted wintergreen
Chimaphila umbellata	Pipsissewa
Monotropa uniflora	Indian-pipe
Gaylussacia baccata	Black huckleberry
Kalmia latifolia	Mountain-laurel
Vaccinium vacillans ?	Early sweet blueberry (s)
Lysimachia quadrifolia	Whorled loosestrife
Fraxinus americana	White ash
Apocynum androsaemifolium	Spreading dogbane
Asclepias quadrifolia	Four-leaved milkweed

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Verbena simplex	Narrow-leaved vervain
Clinopodium vulgare	Wild basil
Collinsonia canadensis	Horse-balm
Isanthus brachiatus ?	False pennyroyal
Lycopus uniflorus	Common bugleweed
Prunella vulgaris	Heal-all (s)
Pycnanthemum incanum	Hoary mountain-mint
Pycnanthemum tenuifolium	Narrow-leaved mountain-mint
Solanum dulcamara	Climbing nightshade
Agalinis tenuifolia	Slender gerardia
Aureolaria virginica	Downy false foxglove
Linaria vulgaris	Butter-and-eggs
Pedicularis canadensis	Common wood-betony
Penstemen digitalis	Foxglove beard-tongue
Verbascum thapsus	Common mullein
Plantago major	Common plantain
Galium pilosum	Hairy bedstraw
Galium triflorum	Sweet-scented bedstraw ($)
Mitchella repens	Partridge-berry
Diervilla lonicera	Bush-honeysuckle ($)
Lonicera sempervirens	Trumpet-honeysuckle
Lonicera tatarica	Tatarian honeysuckle
Triosteum sp.	Horse-gentian
Viburnum acerifolium	Maple-leaved viburnum
Viburnum rafinesquianum	Downy arrow-wood ($)

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Viburnum recognitum?	Northern arrow-wood ($)
Campanula rotundifolia	Harebell
Specularia perfoliata	Venus' looking-glass
Achillea millefolium	Common yarrow
Ambrosia artemisiifolia	Common ragweed
Anaphalis margaritacea	Pearly everlasting
Antennaria plantaginifolia	Plaintain-leaved pussytoes
Aster cordifolius	Heart-leaved wood aster
Aster divaricatus	White wood aster
Aster dumosus	Bushy aster
Aster laevis	Smooth blue aster
Aster linariifolius	Stiff-leaved aster
Aster macrophyllus	Large-leaved aster
Bidens frondosa	Common beggar's-ticks
Erigeron philadelphicus	Common fleabane
Erigeron strigosus	Daisy fleabane
Eupatorium rugosum	White snakeroot
Helianthus divaricatus	Woodland sunflower
Hieracium caespitosum/pretense	King devil ($)
Hieracium paniculatum	Panicled hawkweed
Krigia virginica	Dwarf dandelion
Lactuca canadensis	Wild lettuce
Prenanthes trifoliata ?	Gall-of-the-earth
Senecio vulgaris	Common grounsel
Solidago bicolor	Silver-rod ($)

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Solidago graminifolia ?	Bushy goldenrod
Solidago caesia ?	Blue-stemmed goldenrod
Taraxacum officinale	Common dandelion

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?: identification uncertain
s: specimen available

APPENDIX II

INVERTEBRATES AND VERTEBRATES

LAMENTATION MOUNTAIN

INVERTEBRATES

ORDER	SCIENTIFIC NAME	COMMON NAME
Coleoptera	*Cicindela sexguttata*	Six spotted green tiger beetle
Hemiptera	*Apiomerus sp.*	Bee assassin
Lepidoptera		
	Papilio polyxenes	Black swallowtail
	Pterourus glaucus	Tiger swallowtail
	Paramidea midea	Falcate orange tip
	?	Hairstreak on pearly everlasting
	Celastrina argiolus	Spring azure
	Nymphalis antiopa	Mourning cloak
	Satyrodes eurydice	Eyed brown

VERTEBRATES

Amphibia	*Rana catesbeiana*	Bullfrog
	Rana palustris	Pickerel frog
Reptilia	*Coluber contrictor*	Black racer
	Elaphe obsoleta ?	Black snake
Aves	*Cathartes aura*	Turkey vulture
	Accipiter striatus ?	Sharp-shinned hawk
	Buteo mamaicensis	Red-tailed hawk

	Falco sparverius	American kestrel
	Zenaida macroura	Mourning dove
	Colaptes auratus	Northern flicker
	Contopus virens	Eastern wood-pewee
	Cyanocitta cristata	Blue jay
	Parus atricapillus	Black-capped chickadee
	Hylocichla mustelina	Wood thrush
	Turdus migratorius	American robin
	Mniotilta varia	Black-and-white warbler
	Seiurus aurocapillus	Ovenbird
	Pipilo erythrophthalmus	Rufous-sided towhee
Mammalia	*Sciurus carolinensis*	Gray squirrel
	Canis latrans	Coyote
	Procyon lotor	Raccoon
	Odocoileus virginianus	White-tailed deer