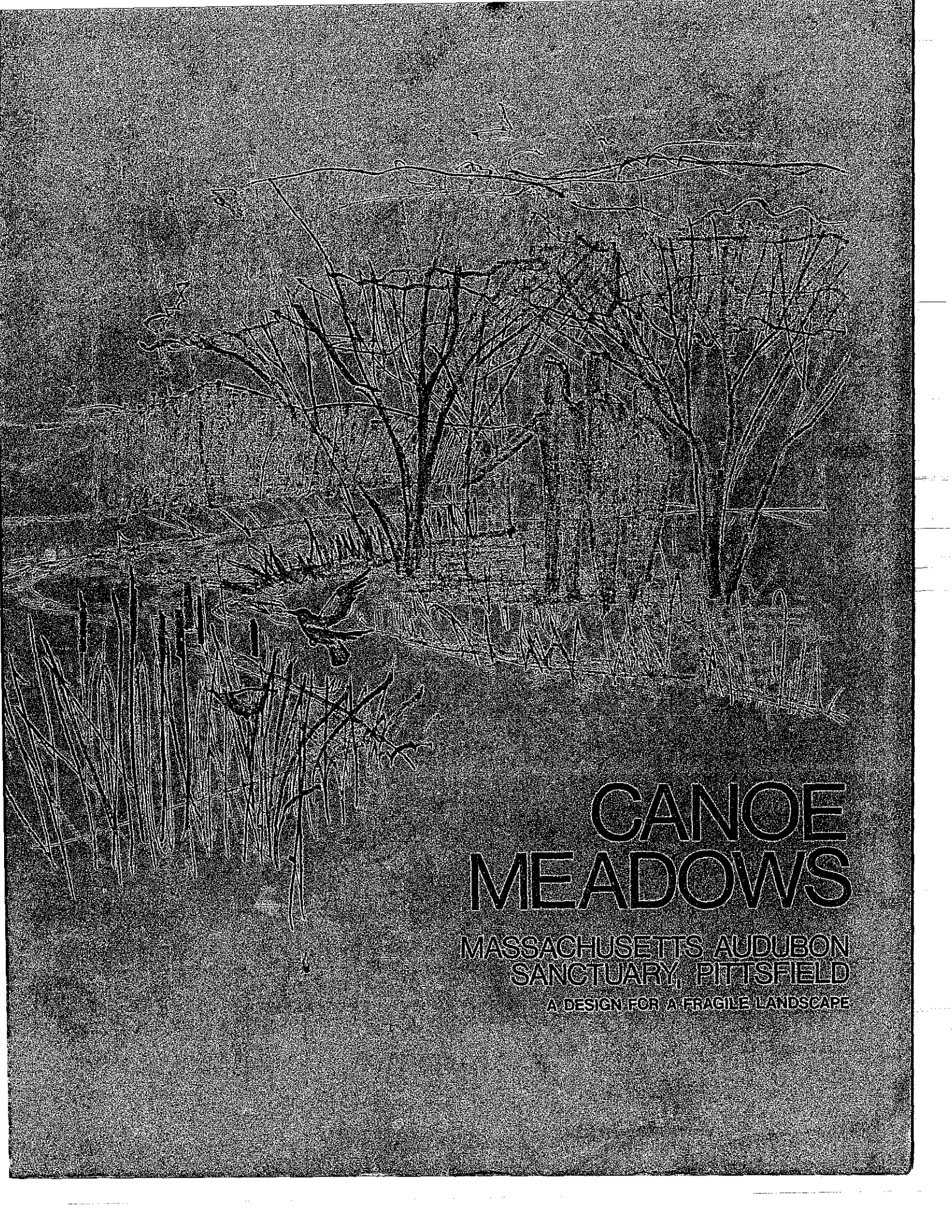




University of
Massachusetts
Amherst

Canoe Meadows: Massachusetts Audubon Sanctuary, Pittsfield: A Design for A Fragile Landscape

Item Type	Masters Project
Authors	Baranowski, Walter
Download date	2026-05-11 00:11:20
Link to Item	https://hdl.handle.net/20.500.14394/57000



CANOE MEADOWS

MASSACHUSETTS AUDUBON
SANCTUARY, PITTSFIELD

A DESIGN FOR A FRAGILE LANDSCAPE

CANOE MEADOWS

MASSACHUSETTS AUDUBON SANCTUARY, PITTSFIELD:
A DESIGN FOR A FRAGILE LANDSCAPE

by
Walter P. Baranowski

Submitted in partial fulfillment of the requirements for the degree of
Master of Landscape Architecture
April 1975

CANOE MEADOWS
MASSACHUSETTS AUDUBON SANCTUARY, PITTSFIELD:
A DESIGN FOR A FRAGILE LANDSCAPE

A Terminal Project for a Master of Landscape Architecture Degree
by
Walter P. Baranowski

Approved as to style and content by:

Nicholas T. Dines, Chairman of Committee



Harold E. Mosher, Committee Member

TABLE OF CONTENTS

iv LIST OF ILLUSTRATIONS

v ACKNOWLEDGEMENTS

1 INTRODUCTION

Scope and Nature of Problem

Specific Situation

Project Process

SECTION 1 - ANALYSIS

3 HISTORY

Forces Affecting Regional Landscape

Land Use Trends

Canoe Meadows History

5 LOCATION & CONTEXT

8 TOPOGRAPHY

10 SOILS

Types

Pertinent Design Considerations

11 VEGETATION

Diversity of Flora

Association Formation

Major Concerns

14 WILDLIFE

15 CLIMATE

Berkshire Macro-Climate

Canoe Meadows Micro-Climate

17 VISUAL ASPECTS

Overall Site Character

Experiences Along the Service Road

Upland Forest Experience

Lowland Forest Experience

Open Land Experience

Edge Experience

Visual Interest

SECTION 2 - PROGRAM DEVELOPMENT

20 PROGRAM FOR CANOE MEADOWS/BERKSHIRE SANCTUARY

SECTION 3 - CONCEPTUAL PLAN

24 CONCEPTUAL DESIGNS FOR CANOE MEADOWS/BERKSHIRE SANCTUARY

General Explanation

Aspects in Common

Concept 1

Concept 2

Concept 3

Concept 4

Concept 5

Composite Concept

SECTION 4 - PROPOSALS

38 PROPOSALS

39 SECURITY

41 DESIGN ASPECTS FOR INTERPRETIVE AREAS

43 MANAGEMENT PROPOSALS

48 SPECIAL CONSIDERATIONS

APPENDICES

50 APPENDIX 1 - LIST OF PLANTS

58 APPENDIX 2 - LIST OF INVERTEBRATES

60 APPENDIX 3 - LIST OF VERTEBRATES

62 APPENDIX 4 - LIST OF BIRDS

64 APPENDIX 5 - MAPS AND DESIGN DEVELOPMENT PLANS

65 SELECTED BIBLIOGRAPHY

LIST OF ILLUSTRATIONS

5a LOCATION - SHEET A1

5b CONTEXT - SHEET A2

6a ACCESS & CIRCULATION - SHEET A3

15a CLIMATE - SHEET A8

27 CONCEPT 1 - SHEET C1

29 CONCEPT 2 - SHEET C2

31 CONCEPT 3 - SHEET C3

33 CONCEPT 4 - SHEET C4

35 CONCEPT 5 - SHEET C5

37 COMPOSITE CONCEPT - SHEET C6

APPENDIX 5 TOPOGRAPHY & HYDROLOGY - SHEET A4

SOILS - SHEET A5

VEGETATION - SHEET A6

SPECIAL FEATURES - SHEET A7

VISUAL ASPECTS - SHEET A9

ANALYSIS SYNTHESIS - SHEET A10

DESIGN & MANAGEMENT PROPOSALS - SHEET D1

VISITOR CENTER DEVELOPMENT PROPOSAL - SHEET D2

ACKNOWLEDGEMENTS

The author wishes to thank Mr. David Blanchard, Director of Sanctuary Operations, Massachusetts Audubon Society for providing the opportunity to contribute to this ongoing project as well as information resources to expedite the completion of this terminal project. Additional members of the Audubon Staff - Lowell McAllister, Director of Berkshire Sanctuaries; David Burg, Cane Meadows Resident Naturalist; and William Giezentanner, Audubon Planning Consultant - provided information and guidance enthusiastically.

I gratefully acknowledge the guidance, assistance, and genuine interest extended by Professors Harold E. Mosher and Nicholas T. Dines. In a university filled with faculty, "Hal" and "Nick" are friends foremost.

Walt Baranowski

INTRODUCTION

Scope and Nature of Problem

In the course of the planning process, many areas of the landscape are set aside or reclaimed as open space to be utilized as wildlife conservation areas, preservation trusts, sanctuaries, or developed into more formally designed areas such as parks, arboretums, and botanical gardens. While intended to be used as limited passive recreation areas, these sites are often extremely susceptible to the effects of heavy human use that may deteriorate the natural quality that keynotes the site. Design solutions can minimize the impact of human usage of the land, allow greater pedestrian mobility, as well as further the ability of the user to appreciate the site's features. The specific purpose of this study will be to produce a design proposal and management procedure for Canoe Meadows that will incorporate program facilities, while minimizing site disturbance or deterioration of visual character and maximizing usage potential within ecologically fragile landscape areas.

Specific Situation

Canoe Meadows, a two hundred and eighteen acre site along the banks of the Housatonic River in western Massachusetts, represents a fragile landscape of farmland, marshes, meadows, waterways, and woodland adjacent to urbanized areas of Pittsfield, but still within the Berkshire Hills context. As an Audubon sanctuary, the site will continue to function primarily as a wildlife conservation area and agricultural reserve, but as a program of structured and unstructured environmental education evolves, it must be able to withstand more intensive human use. Control over such aspects as vehicular and pedestrian entry, accessibility and use to maintain the site's natural and cultural features for the enjoyment of future generations will be implemented through a

comprehensive examination of the site's physical and visual characteristics, features, and potentials to arrive at a design proposal based on the specified program formula.

Project Process

The success of Canoe Meadows depends on site design, construction, management, and public use that carefully respects its fragile character. My role in this project, assisted by guidance, review and final approval by Massachusetts Audubon, consists of the following phases:

- 1. ANALYSIS - compile existing base material assembled to date by Massachusetts Audubon, supplement with any additional necessary data, and synthesize data into relevant analysis base plans with descriptive accompaniment.
- 2. PROGRAM DEVELOPMENT - utilize broad policy guidelines of Audubon and specific program requirements for Canoe Meadows as formulated with Audubon administration, staff, general society membership, and sanctuary management to compile an approved program for design development.
- 3. CONCEPTUAL PLAN - diagram and describe the functional relationships of elements in the program in a series of proposals at the conceptual level for Committee and Audubon selection and approval. The conceptual chosen for design development should serve as a framework for elements outlined in the program, as well as allow for future alterations.
- 4. DESIGN PROPOSALS - formulate and submit design proposals in the form of rendered presentation plans with sections and sketches as needed to show significant features involved in design development. Recommendations for landscape management and conclusions accompany design proposals

SECTION 1
ANALYSIS

HISTORY

Forces Affecting Regional Landscape

Since the first colonial settlements in Berkshire County around 1744, agriculture has been an important industry. Nearly all of the forestlands covering the rugged landscape were cleared for crops such as grains, potatoes, legumes; pasturage and hay fields supported dairy and beef cattle, as well as sheep. The Berkshire County Agricultural Society, the first society of its kind in the country, contributed to the advancement of farming practices. From the period of the rapid industrial development of New England, farming has declined in Berkshire County: 77.7% of the land was used for agriculture in 1880, 57.6% in 1920, 21% in 1952, and 15% in 1972. Pittsfield has tended to retain a higher percentage of land in agricultural use - 32% in 1952 and 25% in 1972 - despite urbanization (Latimer and Lanphear 1929: 1268-69; MacConnell and Niedwiedz 1975: 40). Dairying is the major agricultural activity within the region today.

Land Use Trends

Although the population of Pittsfield is presently growing at a slow rate, the percent of residential land has increased 31% between 1952 and 1972. Most of the development has taken place on agricultural land, with land percentage in forest remaining relatively fixed. Development in outlying rural areas has been the major trend in Pittsfield as well as surrounding towns (MacConnell and Niedwiedz 1975: 46-47). Many vacationers and second home owners enjoy the exceptional outdoor recreational activities of the Berkshire area.

Canoe Meadows History

Archaeological evidence indicates that Indians utilized the open lowland portion of the Housatonic before the area was settled by Europeans. The sanctuary's

4

name was chosen by its donor to connote this heritage. Much of the land has been used for some sort of agricultural activity over the years. The decline of agriculture has seen the return of large portions of the site to forestland, although the upper fields are still tilled for crops. Open pastures off Holmes Road and near the south boundary are mowed for hay; many smaller open areas are infilling with the first stages of successional forest growth. The residential development along Gravesleigh Ter. is the site of the former Graves estate whose realm extended to Canoe Meadows below. The lodge, presently utilized as a residence by the sanctuary director, served as the center of the family's outdoor recreational activities: fishing for trout in the stocked pond it overlooks, hunting in the woodlands and meadows, or simply viewing the scenery from the front porch which was comfortably outfitted with rustic camp-style furniture. The estate edifice, after remaining unoccupied and vandalized, was torn down and the Gravesleigh subdivision constructed in the 1960's. Cooley Graves Crane, owner of the property, commissioned a development feasibility study to be undertaken on the remainder of the property, but no development was undertaken. In December 1975 she donated the 218 acre parcel to the Massachusetts Audubon Society with the hope that its policy of conservation, education, and research would ensure its preservation for future generations.

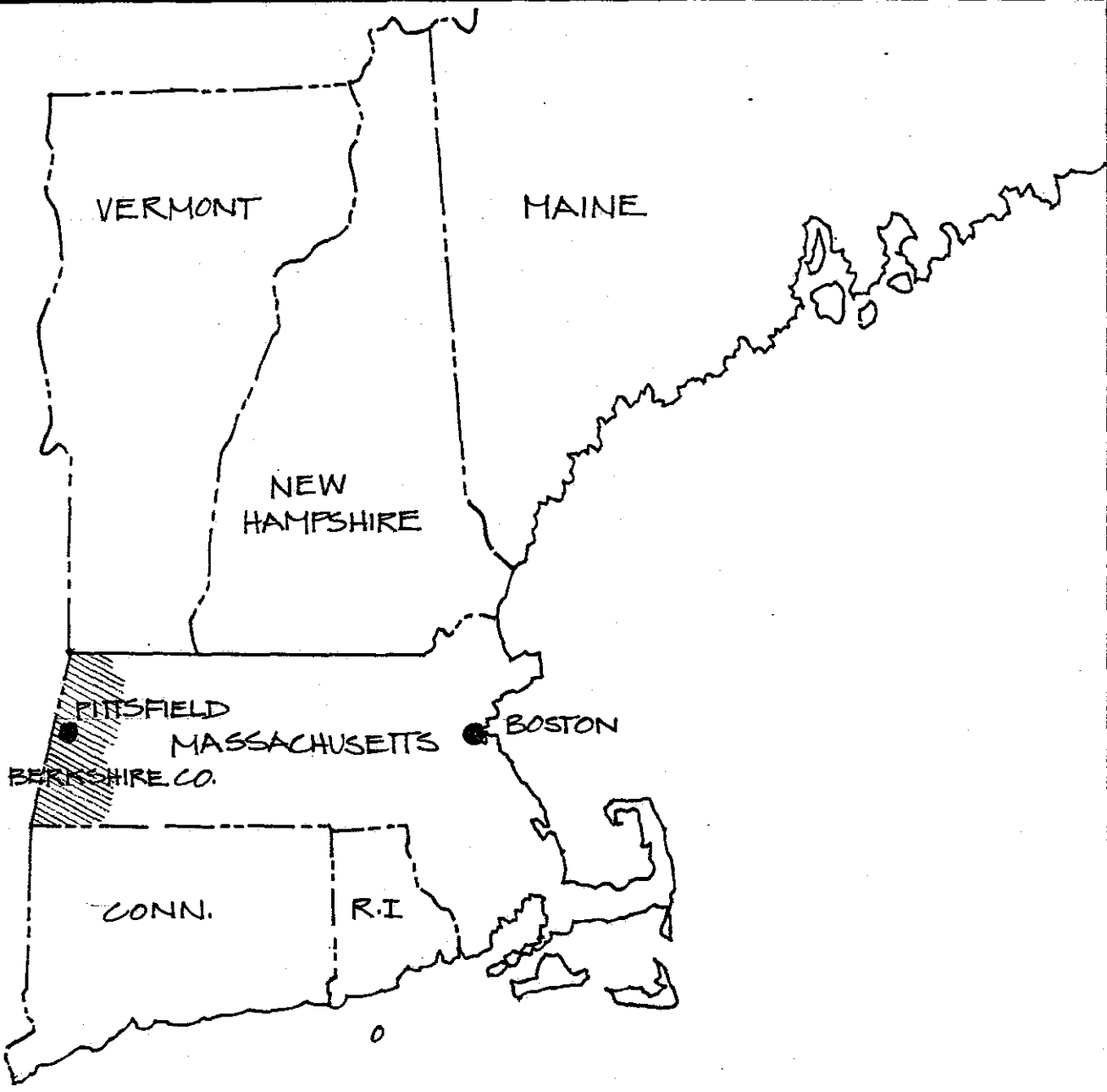
LOCATION & CONTEXT

Pittsfield, the hub and largest city within Berkshire County, lies near the central western border of Massachusetts high in the Berkshire Hills. State routes 7 and 9, running north-south and east-west respectively, cross through the heart of the city and county. Ten miles to the south lies the Massachusetts Turnpike, which connects to Springfield, Worcester, and finally to Boston, 130 miles to the east (See Sheet A1 - LOCATION). Massachusetts, lying within the highly populated eastern seaboard megalopolis, is actually nearly two-thirds woodland, which places more people in close proximity to forestlands, than anywhere else on earth (MacConnell and Niedwiedz 1975: 9). The Canoe Meadows/Berkshire Sanctuary site abuts the southeastern edge of the urbanized center of Pittsfield (See Sheet A2 - CONTEXT). A growing population within the broad, smoothly rolling Housatonic River Valley lies to the immediate south, saddled between the undeveloped uplands of October and Lenox Mountains to the southeast and southwest. Pleasant Valley/Berkshire Sanctuary, a sister Audubon sanctuary about four miles away along Lenox Mountain, complements the predominantly river bottom/and character of Canoe Meadows.

The location of the Canoe Meadows site has been considered to provide opportunities of critical conservation importance:

- "1. It is Housatonic River bottom land, very little of which is presently preserved in Massachusetts.
- "2. It is situated so as to potentially become part of link or wildlife corridor, between October and Lenox Mountains, both with extensive upland conservation areas.
- "3. Its urban-suburban setting is ideally suited to a model program and approach for wildlife management." (Coddington, Field, and Lazell 1976: 1).

While location presents educational and passive recreational opportunities convenient to Pittsfield's population, it also inherently presents a potential

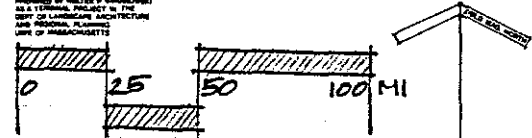


LEGEND/NOTES

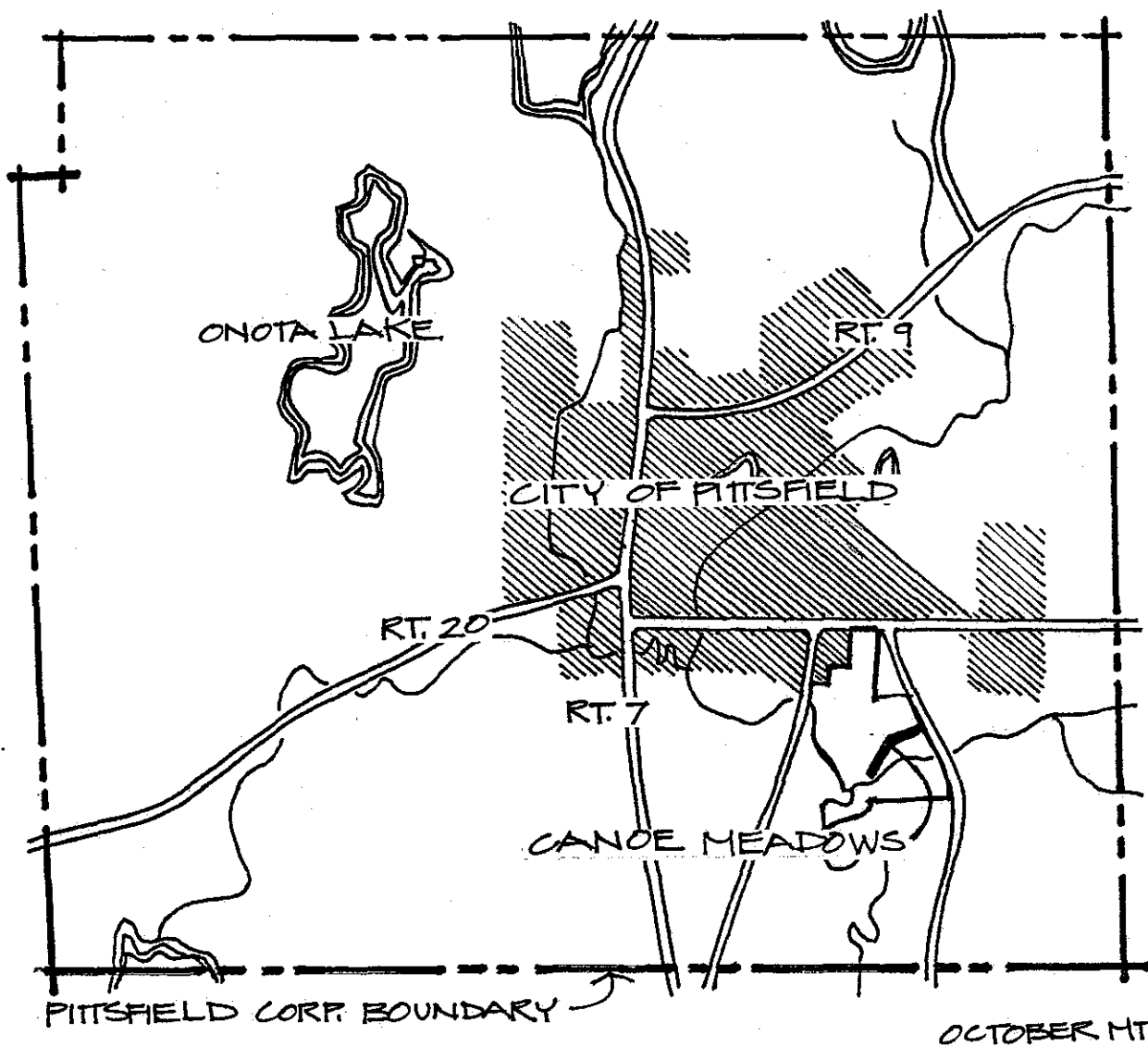
CANOE MEADOWS

MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY

DESIGNED BY WALTER P. SANDERSON
 AS A TERRAZZO PROJECT IN THE
 DEPT. OF LANDSCAPE ARCHITECTURE
 AND REGIONAL PLANNING
 UNIV. OF MASSACHUSETTS



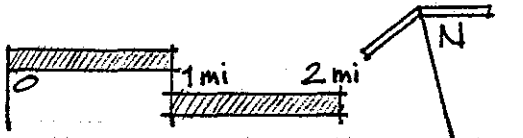
TITLE: LOCATION PART: A1



LEGEND/NOTES

CANOE MEADOWS

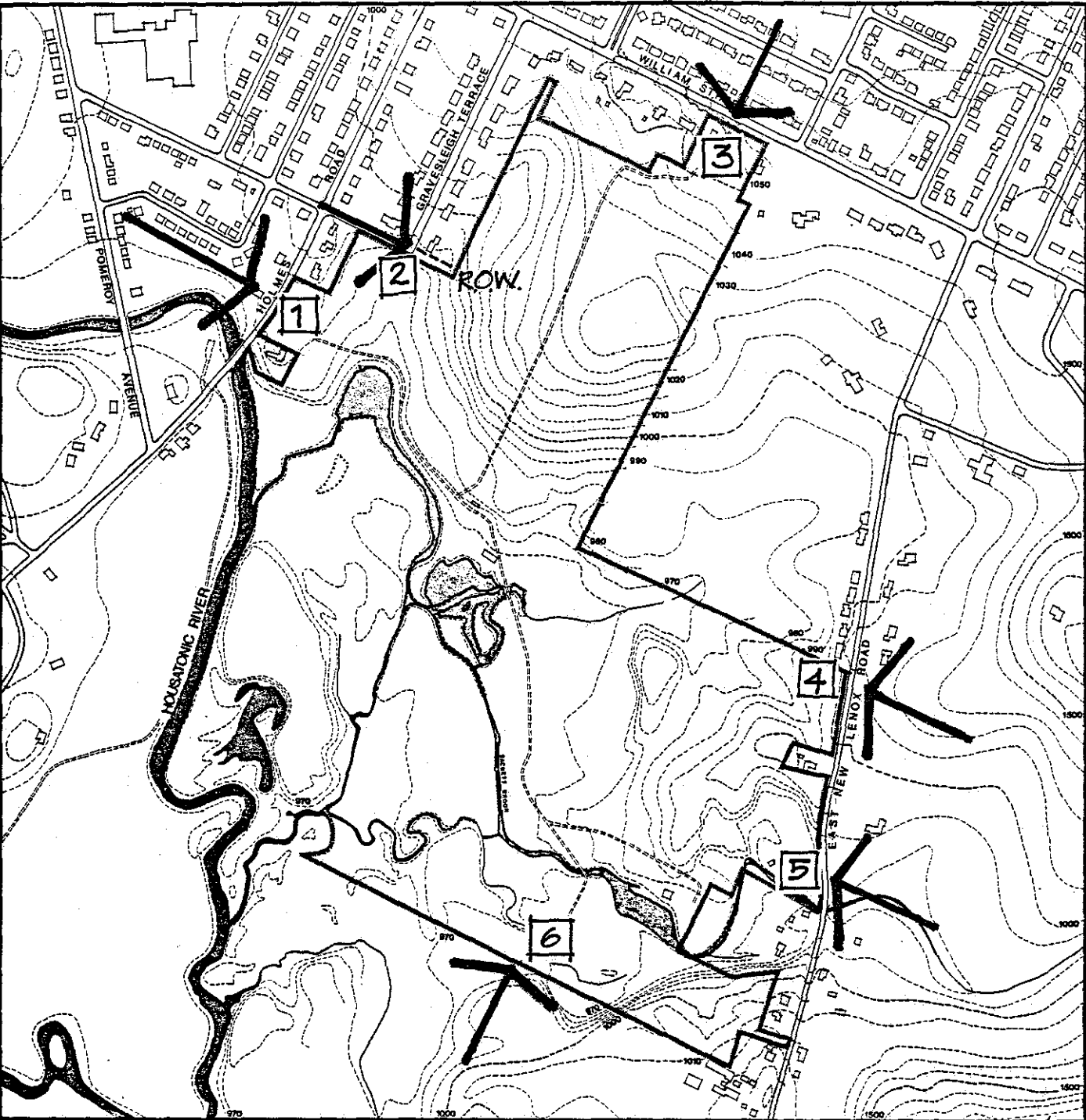
MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



CONTEXT A2

area of conflict between continued urbanizing trends which concentrate within lowlands and the need to preserve corridors for wildlife between the surrounding uplands. The mere designation of conservation land can be an impetus to circumferential development which could isolate wildlife, hindering links vital to maintaining viable populations.

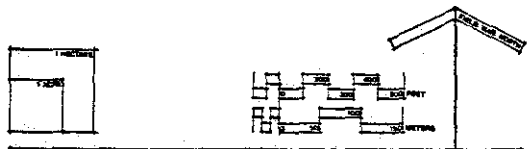
The site is bordered on the northwest corner by a band of low density residential development ($\frac{1}{2}$ to 1 acre lots) along Gravesleigh Ter. and William St. (See Sheet A3 - ACCESS & CIRCULATION). A large area of medium density residential development ($\frac{1}{4}$ to $\frac{1}{2}$ acre lots) continues beyond this. Three schools within this area are within a few minutes walking distance; the commercial center of Pittsfield is within two miles of this site. There is a major access point at the William St. farmstead and a right-of-way continuing off the shorter leg of Gravesleigh Ter. whose use as an access point is discouraged. To the west, a small area of medium density residential development extends along Holmes Road south to the Housatonic. The site's frontage of about 175 feet along Holmes Road marks the beginning of the less heavily developed portion of the valley. The access from this point presents the highest degree of public visibility. An extensive frontage along the Housatonic River forms the major western boundary; the southern boundary abuts a large parcel of privately owned wetland and farmland. A few clusters of residential development, Pittsfield's major sewage disposal facility and the Housatonic River Valley Wildlife Management Area lie within a few miles of the southern border. Access to Canoe Meadows from this direction is over private farmland and limited to small service road for farm use. The remainder of the property line is fenced with four foot welded wire mesh. The eastern and northeastern boundaries along East New Lenox Road have some light



LEGEND/NOTES

- | | |
|--------------------------|----------------------------|
| 1 HOLMES ROAD | 4 E. NEW LENOX RD.- |
| 2 GRAVESLEIGHTER. | 5 NORTH & SOUTH |
| 3 WILLIAM STREET | 6 NOBLE PROPERTY |

CANOE MEADOWS
 MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



ACCESS & CIRCULATION A3

residential development, wooded areas, and open pastures. Although there are six-foot chain link gates at two points of access along the road, the major portion of the wooded frontage is not fenced. A six foot chain link and barbed wire fence extends from the north gate along the northeastern boundary. This fence continues onto the site obscured by the large shelter belt, separating the upper agricultural fields from the lower areas. The east boundary of the agricultural fields is bordered by woodland to the south, open pasture, and light residential development along William Street. Of the three main roads to the north, east and west, only Holmes Road is a major artery of Pittsfield. All three are rural, uncurbed thoroughfares capable of supporting the increased traffic that would be generated by developing Canoe Meadows' sanctuary facilities.

Although there are a number of possible access points for Canoe Meadows, it would be desirable to limit public access to specified areas. The access at William Street (See Sheet A3 - ACCESS & CIRCULATION) would continue to adequately serve as an entry for the proposed agricultural center development, but due to walking distance and level change to major sanctuary features, this would not necessarily be appropriate for major access (Scape 1977: Appendix 3). The Holmes Road entry would best serve this purpose due to site visibility, ease of entry, potential for adequate parking and visitor center sites, as well as site access and surveillance opportunities. Public entry by other access points would be less feasible as well as desirable.

TOPOGRAPHY & HYDROLOGY

Canoe Meadows can be divided into two basic regions for purposes of examining the effects of topography and hydrology on the perceived uses of the site (See Sheet A4 - TOPOGRAPHY & HYDROLOGY). The service road basically divides the upper better drained south facing hillsides from the flatter river bottom lands. From a highpoint of a little over 1055' near the William St. farmhouse, the land gently slopes to the south initially about 4.5%, then drops more steeply to about 8.3%, with a maximum slope along the hillside of about 20% in small areas. The slopes along the Holmes Rd. entry are gentle: about 4.5% to a maximum of 8.3% along one hillside. The swale extending from the west pond to Gravesleigh Ter. drops about 2.4% toward the pond. The section of the site has gently rolling hills with slopes of about 5-7% with a few steep areas of about 34%. Footing is relatively dry in most of the upper areas, with the exception of some surface runoff principally in the spring.

The lower portion of the site is nearly flat with slopes of 0-3% and a few embankments along waterways reaching 50%. Lowest areas of about 960' are along the southern waterways, or about 95' below the highest point. The portion of the Housatonic River meandering along the western border is presently designated class B - swimmable, fishable, potable only with treatment. Numerous small oxbow lakes, cut off as the river changed course, demonstrate various stages of successional infilling. Sackett Brook, originating in the highlands to the east, is impounded for reservoirs before it descends to Canoe Meadows. The continuation of populations of stocked trout in the brook attest to its water quality. Drainage patterns in the poorly drained lowland portions have changed

over the years with the natural erosional and silting action of the river and streams, the damming of the east pond, the rerouting of Sackett Brook and creation of the west pond sometime after 1923, and the impoundment of waters by beavers. The major portion of this lowland area is within the extent of the calculated 100 year flood plain; annual flooding effects most areas along waterways. Permanently water laden marshlands and sedges along with generally high watertables render pedestrian passage within the lowland area difficult to nearly impossible without specific design provisions such as boardwalks or mounded earthen walkways. Most of the lowlands are have value as aquifer and floodwater storage areas (Envirland 1975a: 1-2).

SOILS

Types

The five soil types found within Canoe Meadows are Winooski sandy loam and Limerick silt loam of the Flood Plain grouping; Copake fine sandy loam and Pittsfield stony, fine sandy loam of the river valley Terrace group; and Amenia very stony silt loam of the Upland group. Their distribution and characteristics are designated on Sheet A5 - SOILS.

Pertinent Design Considerations

With the exception of a few embankment areas, there are no soils with slopes that are not readily adaptable to the foreseen uses of Canoe Meadows: visitor and day camp center with parking facilities, interpretive areas, wildlife management areas and untouched natural areas. Winooski and Limerick types along the southwestern area of the site are nearly flat, poorly drained, seasonally flooded, and subject to erosion. Limited interpretive trails could be planned on the highest areas if dry footing is provided, while other areas will require raised walkways for access. Copake type soil has a moderately permeable surface layer underlain with well-drained beds of sand and gravel. Its well-drained nature and moderate slopes of 3-8% are ideal for structural development and major interpretive areas above the flood plain. Pittsfield and Amenia types are stony, and have water tables or rock ledge within a few feet of the surface that would limit development potential. In addition, most of the areas having soils of these types have been designated agricultural reserves and are currently utilized for this purpose (Envirland 1975: 1-12).

VEGETATION

Diversity of Flora

Contrasting with the topography which lacks significant complexity, the vegetational elements within the relatively small area of Canoe Meadows exhibit great variety that becomes the framework for its diverse wildlife habitats as well as visual appeal. The list of plants (see Appendix 1), the result of a preliminary survey by Coddington, Field, and Lazell 1976, represents the extensive flora found within the site. The plants are generally found growing within certain vegetative associations determined by them to primarily consist of:

- (1) Fields and Open Areas
- (2) Coniferous Woods
- (3) Upland Deciduous Woods
- (4) Riverbank
- (5) Lowland Deciduous Woods
- (6) Cattail Marsh
- (7) Sedge Meadows
- (8) Fencerows and Planted Areas

The configuration of the various associations can be seen in Sheet A6 - VEGETATION (The numbers in parentheses in the appendix listing and map refer to their eight major vegetative associations.). The location of rare and visually significant flora has been indicated on Sheet A7 - SPECIAL FEATURES.

Association Formation

The pattern of major associations results from natural factors such as soil type and pH, depth to bedrock, slope steepness and orientation, climate, water

availability, as well as cultural factors effecting them over time. The primeval vegetative cover of the Berkshire area has undergone great changes slowly over the milleniums, due to natural forces such as glacial advances and recessions, extremes of climatic conditions ranging from arctic to tropical, as well as more rapid changes resulting from flooding, forest fires, and hurricanes. All these natural forces continue to effect the flora and its distribution pattern within Canoe Meadows; some changes are often unobservable over a single human lifetime, but others, regarded by man as "natural disasters", merely serve to return portions of the landscape to a previous stage of successional growth. Variety, not present in entire regions covered with climax forest, can thus be achieved. The pattern of Colonial settlement and agricultural activity, beginning in the Berkshire area around 1744, marks a drastic alteration of landscape appearance that continues today. The clearing of nearly all woodland from the hillsides for subsistence farms, subsequent abandonment of major portions of farmland in the mid 1800's, the rapid return of successional stages of vegetation, numerous periods of timbering, and finally the growth of consumptive populations within the area have all been direct cultural forces which alter the character of Canoe Meadows. Agricultural activities such as plowing, crop raising, stock grazing and mowing basically hold back stages of vegetative succession. New England is characterized by having a remarkably regenerative landscape capable of proceeding with the successional pattern within a few years of the abandonment of agricultural activities. The alteration of water levels and courses by both natural and cultural forces can also change vegetational associations by drying or flooding soils beyond the critical tolerances of various plants, making way for others better suited to the new conditions.

Major Concerns

Compaction of soils results in the destruction of delicate surface feeding roots by preventing the normal passage of air and water causing vegetational and erosional damage. This is a major concern associated with intense human use of an area. It has been suggested that particular attention be addressed to preserving rare or visually significant plants, such as many of the site's wildflowers which are uniquely appealing as well as easily destroyed by trampling, soil compaction, and picking (Coddington, Field and Lazell 1976). In this case, a limited ability to reproduce at a competitive rate or adapt to conditions other than those within prescribed environmental conditions could obliterate many of the more fragile wildflower communities. The major vegetational associations of Canoe Meadows are, as a whole, remarkably resistant to deterioration and could be expected to rapidly recover or adapt after any foreseen natural or cultural forces have had an effect. Existing open areas are particularly resistant to deterioration, but are also prone to infilling with successional growth unless actively managed by returning these areas to active pasturage, or maintaining a periodic mowing program. Loss of open areas to an eventual infilling by sub- or climax woodland would diminish the gross diversity within the site, as well as eliminate "edge effect" vital to the existence of many forms of wildlife. Diversity of spatial elements would also be effected, resulting in the deterioration of major visual aspects.

WILDLIFE

The diversity demonstrated in the vegetational associations and configurations, combined with the site's location between the more extensive upland conservation lands on October and Lenox Mountains to the southeast and southwest, undoubtedly contribute to the diverse and abundant wildlife populations of Canoe Meadows. Proximity to residential populations of Pittsfield, while contributing to a readily accessible educational program in wildlife management, poses a major threat to many forms of wildlife (Coddington, Field, and Lazell 1976: 1). Among the wildlife forms observed within the confines of Canoe Meadows (See Appendices 2-4, and Sheet A7 - SPECIAL FEATURES), the larger mammals, notably deer, foxes, raccoons, woodchucks, and squirrels, have been rated by the public to constitute a major visual attraction of the site (Coddington, Field and Lazell 1976: 16). While the maintainance of wildlife corridors is essential to the viability of many species, the designation of conservation lands could foresee the stimulus to develop residences peripheral to this desirable amenity, and thus isolating wildlife populations. The continued acquisition of lands along the Housatonic River for wildlife corridors is compatible with the goals of other concerns, such as the Housatonic River Watershed Association which is currently examining the feasibility of downstream land acquisition as an alternative to expanding constructed devices for flood control (S. Weisman, pers. comm.).

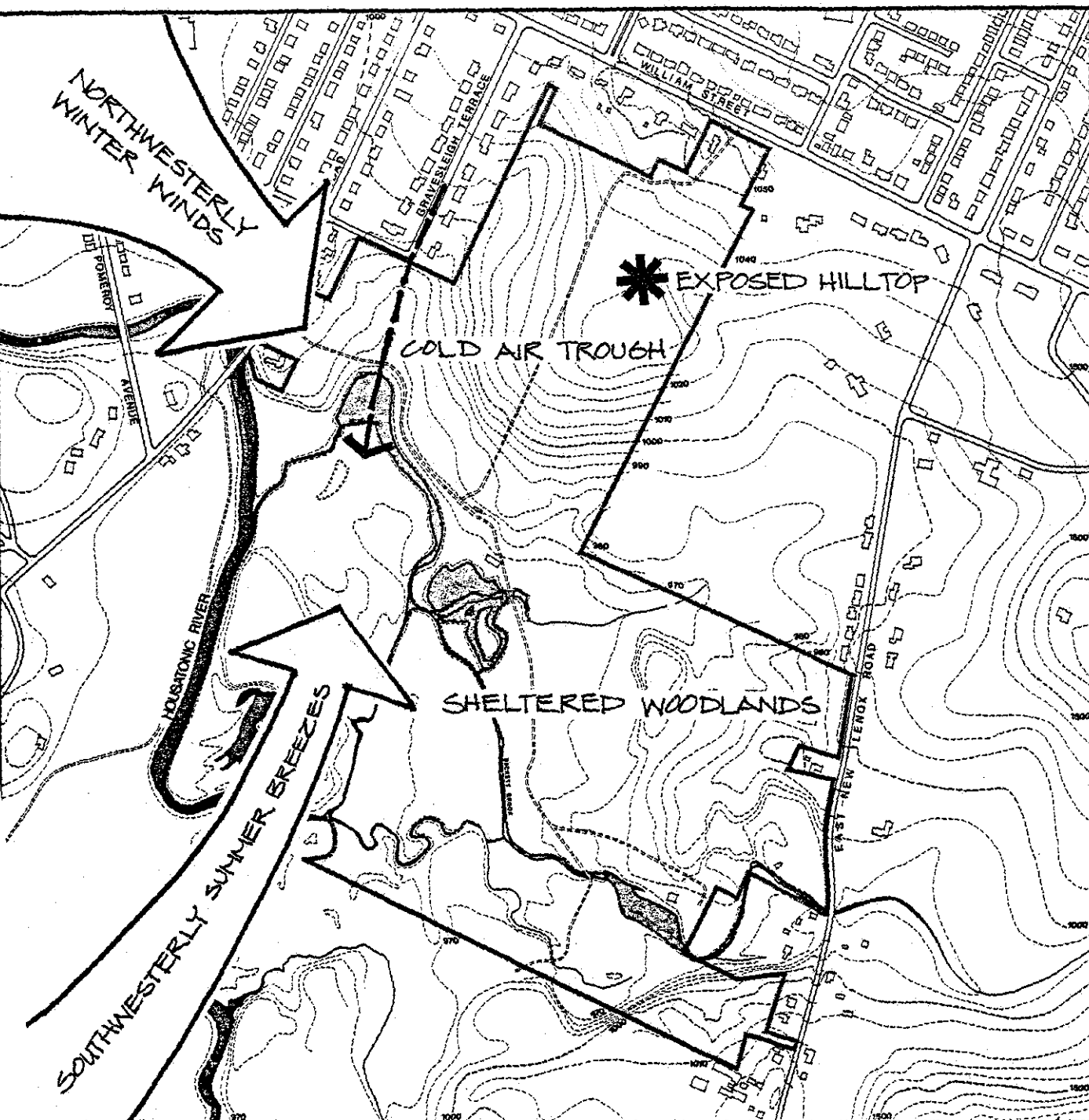
CLIMATE

Berkshire Macro-Climate

Within the Berkshire Hills, the winter is long, cold, and snowy, the summers short, mild or cool. The annual average mean temperature is 45.5°F, with a recorded low of -26° and a high of over 96°. The mean temperature is 23.9° in winter and 66.5° in the summer months of June, July and August. Winter snowfall averages 54.8 inches annually, often arriving early in November and remaining in isolated pockets late into spring. The annual average precipitation of 38.30 inches, varying from extremes of 30.48 to 54.51 inches per year, is well distributed throughout the year. Melting snows in spring are the principal cause of lowland flooding within this region. The frost-free season is a relatively short 144 days, with the average date of the last and first killing frosts on May 8 and September 29. Frosts as late as May 25 have been recorded; their extent is usually limited at this late date to low pockets and can greatly damage buds on fruit trees (Latimer and Lanphear, 1929: 1269-70). Winter winds, principally from the northwest, are strong, gusty, and are often laden with snow flurries. Summer breezes come from the southeast.

Canoe Meadows Micro-Climates

The general climatic conditions of Canoe Meadows are much the same as the surrounding Berkshires with some minor alterations. Due to the southern orientation of many slopes, there is an increase in insolation reaching the site. The farmstead on William Street, near the crest of a large hill, is in an exposed situation - the few sugar maples along the street and the expansive agricultural fields to the south of the farm do not significantly alter the intensity of northwesterly winter winds. The open meadow near the Holmes Road



NOTES

CANOE MEADOWS 
 MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



entrance forms a trough that aligns with the north-facing leg of Gravesleigh Terrace, allowing the passage of northwesterly winter winds, as well as the general flow of cool air masses. This same feature, combined with the funneling action of vegetation, would also channel summer breezes from the south.

Water bodies on the site are not extensive enough to significantly moderate climate; their low situation is principally associated with cool, damp to humid conditions. Plant materials are a primary micro-climate moderator. The large stands of hemlock, white pine, and red pine create cool pockets and diminish wind speeds throughout the year; the forests of mixed deciduous vegetation offer some exposure to the warming sun in winter and cooling effects in summer. The southfacing sides of shelterbelts and forest edges act as sunpockets to trap the warm rays of the sun much appreciated on winter walks. Areas of vegetation having an initial spread of branches and foliage well above ground level effectively promote the passage of air masses with a general cooling effect. The basic orientation of slopes and the massing of vegetation can be utilized, primarily to maximize visitor comfort while on the site, as well as promote the energy efficient siting of proposed facilities.

VISUAL ASPECTS

Overall Site Character

The major and overriding visual aspect of Canoe Meadows is its strong sense of containment and isolation from the more urbanized areas of Pittsfield. From within the site, northern exposures are generally enclosed or buffered by topographic elevation and/or vegetation. Southern orientations afford panoramic views over and beyond the site to distant mountains in the Berkshire Hills; most notable viewing points are the open agricultural fields near the William St. and Holmes Rd. entrances. Within other open areas of the site, views are filtered by vegetation masses, particularly along waterway edges; densely wooded areas have limited vistas, but provide enclosed or directed views.

Experiences Along the Service Road

The sequence and character of spatial experiences along the service road are of primary consideration when examining the visual aspects of Canoe Meadows due to the extensive use of this axis. The periodic open areas along the road echo the experience of the site as a whole - closed to the north, open or filtered views to the south. In addition to the spatial experiences, the meandering quality of the road opens these different experiences of light and dark in a sequence, each an invitation to progress further. The diversity of colors, textures and twigging patterns of the various vegetation types seen along the route are further enhanced by occasional glimpses of waterways and the site's abundant wildlife. The bridge over Sackett Brook forms a logical conclusion and offers a special vantage point as one overlooks the small dam and pond, the extensive open meadow, and the director's lodge. The use of the service road for a major interpretive axis would in itself make accessible a diverse

sequence of visual experiences.

Upland Forest Experience

The area northeast of the service road has dense, high crowned forest vegetation offering a contained, canopied experience. Areas with mature hemlock have fewer low branches and understory to obstruct views into the forest, while areas with more deciduous growth are often so dense that visibility is extremely limited. Only a few small open clearings are found with this area. Although there are a few specimen hemlock, white pine, and pockets of woodland marsh as added visual features, the upland forest area is primarily devoid of significant visual diversity in its vegetation and gently sloping topography. Dead twiggy branches and large numbers of dying elms only impair its visual quality.

Lowland Deciduous Experience

The low, nearly level wetlands southwest of the service road extending to the Housatonic River and beyond are crossed by numerous sluggish meandering streams, brooks, sedge meadows, and marshes. Scattered areas are covered with thick, nearly impenetrable shrub growth and seasonal stands of herbaceous plants are particularly thick along the waterways. A sense of isolation and general containment is apparent within its water-laden realm.

Open Land Experience

As previously mentioned, the open areas at the principal entries offer expansive views to the south; other areas of meadow and agricultural land have more of a sense of containment due to thick forest-edge or shelterbelt vegetation allowing filtered views. Single specimen trees become a focal point and a sculptural entity of major compositional consequence, while smaller clumps of

shrubs under and around them help to integrate them into a more natural landscape.

Edge Experience

The edges formed by the juxtaposition of forest lands and meadows, the shelter-belts along agricultural land, and the bands of vegetation flowing along with meandering waterways all offer visual diversity and create a sense of enclosure within open lands. The straight shelter-belts, curiously ignoring the full and rounded topography and relating to only the plating of the agricultural fields, powerfully state their culturally derived purpose. The meandering vegetation along the streams, likewise created culturally as the limit to which fields could be mowed, form a definite visual contrast to the regularity of the hedgerows.

Visual Interest

In addition to the major visual elements outlined, the site offers a great diversity of wildlife, often fleetingly glanced, and an array of vegetation types, both enumerated in SPECIAL FEATURES - SHEET A7. The beauty or rarity of much of the flora and fauna on the site significantly enhances the visual appeal of the Canoe Meadows landscape.

SECTION 2
PROGRAM

SECTION 2

PROGRAM FOR CANOE MEADOWS/BERKSHIRE SANCTUARY

The following itemized program highlights discussions with and written reports of Audubon staff members and administrators of sanctuary operations. The specific elements have been organized under and reflect the three main policy objectives of Audubon: Conservation, Education, and Research.

A. CONSERVATION

- The landscape of Canoe Meadows has a combination of natural and cultural aspects whose visual quality, wildlife habitat, and ecological situations merit general preservation; changes to vegetation systems, topography and hydrology will therefore be minimal.
- Designated areas will continue to be actively maintained as agricultural areas or left untouched in their natural ecological situation.
- Other areas will have a management program developed to:
 - 1) improve visual quality, and/or
 - 2) improve wildlife suitability, and/or
 - 3) alter successional stages of vegetation.
- Wildlife migration corridors will remain as unobstructed as possible both within the site and connecting to its periphery.
- Site access will be controlled.
 - 1) Holmes Road entrance will continue to serve as the major access point to the site, with additional entrances to serve other specific uses.
 - 2) although a primary use of the site will be for educational enjoyment and understanding, there will not be an aggressive campaign to advertise the site, at least initially, to safe-guard the site's fragile areas.

-Site use will be controlled: in order to preserve site features, certain uses will be allowed or actively discouraged through signage, staff monitoring, or physical deterrents.

Allowed uses (May be restricted to specified areas)

- pedestrian enjoyment or interpretation
- canoe access along the Housatonic River and throughout the site's navigable waterways
- although not encouraged, more active recreational activities such as jogging and bicycling will be allowed only along the service road; cross country skiing in open meadows or along specific corridors within wooded areas
- picnicking
- walking dogs (if on short leashes)

Actively discouraged uses

- driving any motorized vehicles beyond specified parking areas (excepting vehicles for staff, servicing or agricultural needs within the site)
 - walking unleashed dogs
 - building fires
 - vandalizing activities
- The privacy of residents around and within the site will be acknowledged and actively maintained.

B. EDUCATION

- As a primary objective, Canoe Meadows will provide a variety of educational experiences that will complement, supplement, and be non-competitive with Pleasant Valley/Berkshire Sanctuary
- The visitor center, a year-round energy efficient facility (7,500 sq. ft.

or less) will serve to welcome, orient, and instruct the visitor. The specific design, to be provided by a consulting architect, will include a display/lecture areas, office space, restrooms with interior and exterior access, and a small apartment for resident staff. Concerns for siting visitor center include:

- energy efficiency

- educational intent

- views

- policeability

- ease of access and drop off

- concealed parking area for cars (50±) and buses

- The interpretive areas will expose the observer to a sample of the natural and cultural aspects of wildlife habitat, terrain, vegetation, specific site features, and sequences of visual experiences observable within the site and its immediate context.

- The mode of interpretation will be primarily pedestrian: individuals, organized or informal groups, and natural history day campers will explore the site by way of self-guided tours (site map and/or signage), or naturalist's tours.

- The means of interpretation will be through a hierarchy of trail systems that will present a prescribed sequence of experiences for visitors with different interests and time allowances/attention spans. (eg., at least two trails of 30-45 minute walking length will be provided for school groups).

- Agriculturally related activities and interpretation will be centered on the William Street access and will include:

- commercial agricultural use

- community gardens
 - facilities for domesticated livestock interpretive area (design of any new facilities or determination of structural stability and/or movability to be accomplished by a consulting architect)
 - small scale fruit orchard and apiary
- The possibility of residential lot sales for the purposes of obtaining funding for implementing proposed site improvements will be investigated further, pending an assessment of impact on the site.

C. RESEARCH

- Existing sanctuary framework facilitates its use as an accessible outdoor laboratory for research.

SECTION 3
CONCEPTUAL PLAN

CONCEPTUAL DESIGNS FOR CANOE MEADOWS/BERKSHIRE SANCTUARY

General Explanation

The exploration of possible functional relationships is the primary purpose of this series of conceptual designs. Although the concepts are based upon the specific physical constraints and advantages outlined in the various aspects of the analysis and generally adhere to intentions of the program, the configurations of the concepts are entirely diagrammatic representations of the general placement of facilities and major circulation systems. They are not intended to be literally interpreted. The major intent of the selected concept or aspects of a number of concepts will serve as a basis for the design development stages.

Aspects in Common

A number of aspects of the various concepts remain unchanged throughout the series due to an overriding acceptance of their functional placement and adaption to incorporation into the final design. For example, the director's residence utilizing the hunting lodge affords continuing site surveillance as well as providing accommodations for the director of Berkshire sanctuaries and his family. The farmhouse on William Street overlooks the entire site, serves as a monitoring point for site access on William Street and accommodates the resident naturalist and family. This area is the most logical place to develop an agriculturally oriented interpretive center. The entrance on Holmes Road has been determined to best fulfill the need of public awareness, entrance and access to the site, as well as allow for service access. The limited access

point on the southern border of the site is utilized by the abutting farmer to gain access to the lands in agricultural reserve which he leases from Audubon and would be restricted primarily to this use. The existing unpaved service road passes diagonally through the center of the site and divides on the north-west end extending to Holmes Road and William Street; on the southeast end it branches to the director's residence and to the adjacent farm. Its present alignment allows access from Holmes Road to the director's residence as well as acting as a spine for service access and visitor interpretation. A canoe launching facility and program being organized in conjunction with the Housatonic River Watershed Council will utilize a town right-of-way adjacent to the Holmes Street Bridge. The opportunity exists to allow canoe access into the Canoe Meadows site from the Housatonic River by way of an existing waterway loop which could be cleared of any major vegetational obstacles. The interjection of additional elements such as those found on the various concepts must recognize and respect these existing aspects of the site.

CONCEPT 1

Aspects

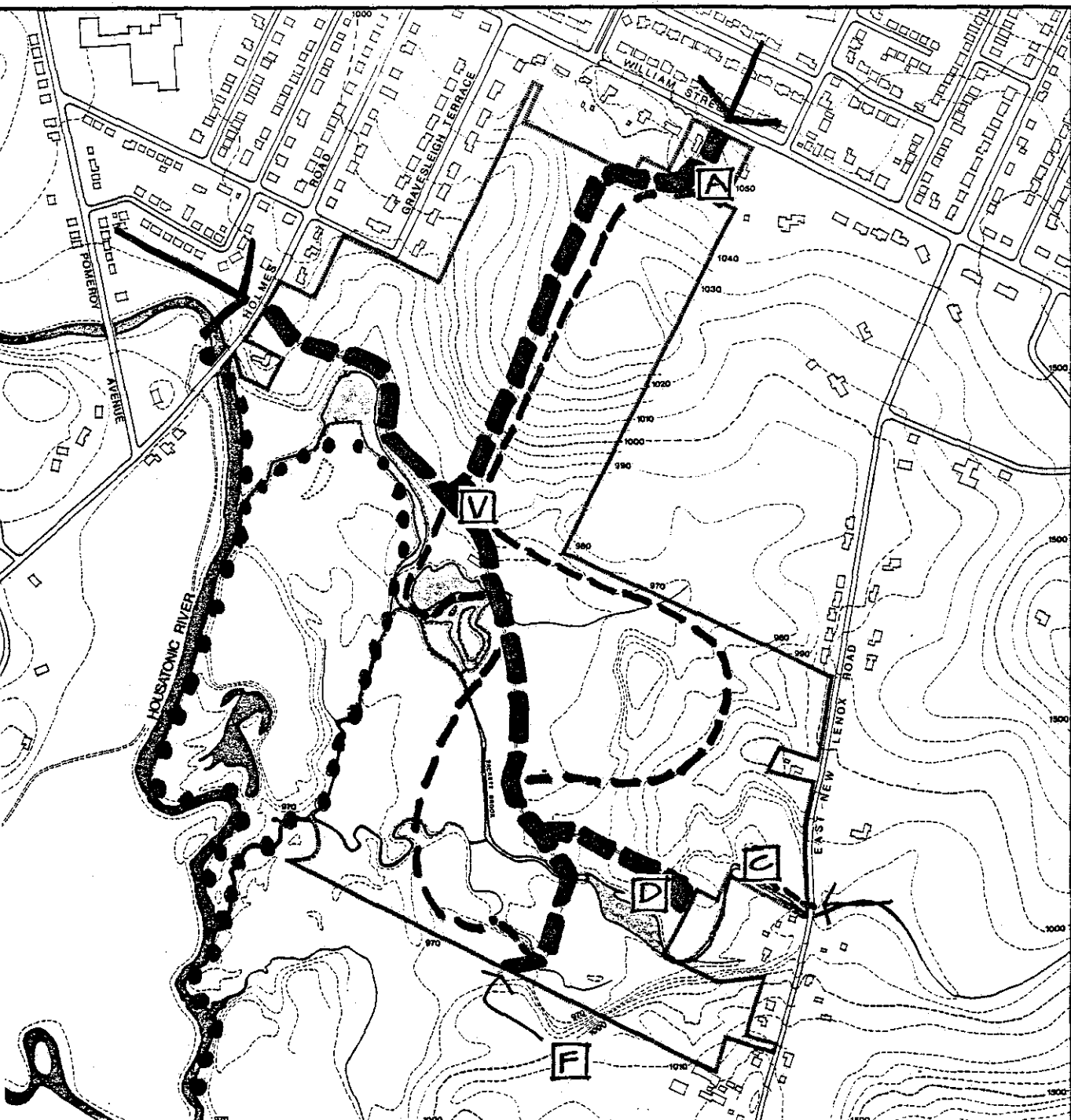
The major provision in this concept involves a centrally located visitor center utilizing the existing garage structure; a series of major loop trails emanate from it to a sampling of landscape habitats. The barn located across the road could be moved to the William Street farmstead to house the domesticated animals to be utilized in an interpretive program there.

Consequences

The use of the garage site for the visitor center would allow for unique opportunities to utilize energy efficient strategies in its design. The existing masonry structure, if found to be sound and capable of being waterproofed, offers a foundation inserted into a south-facing hillside offering possible access at two levels. Its longitudinal axis is within the 20° allowed declination from due southern exposure prescribed for the orientation of buildings to receive solar collecting units in the North temperate region. The existing shelter belt of nearly mature white pines, located a short distance to the north, and the mixed conifers grouped on the west, north and east sides of the structure afford ideal protection from the northwesterly winter winds. The basic trail system and central position of visitor center allows for an easily comprehensible interpretation area. Disadvantages of this concept include the problem of having to park at the Holmes Street entrance and walk to the visitor center or provide a more substantial vehicular access along the service road and parking facilities

20a

adjacent to the center. In addition, the utilization of the garage structure as the basis of a year round visitor center would require the insulation and water-proofing of the exterior of the masonry wall which would result in extensive excavation and possible damage to existing nearby vegetation.



GENERAL NOTES:

- V** VISITOR CENTER
- A** AGRICULTURE CTR.
- D** DIRECTOR'S RES.
- F** FARMER'S ACCESS
- C** CAMP/FIELD HOUSE
- █** SERVICE
- - -** MAJOR TRAIL
-** CANOE LOOP
- ←** MAJOR ACCESS
- RESTR. ACCESS

CANOE MEADOWS

MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



CONCEPT 1

C1

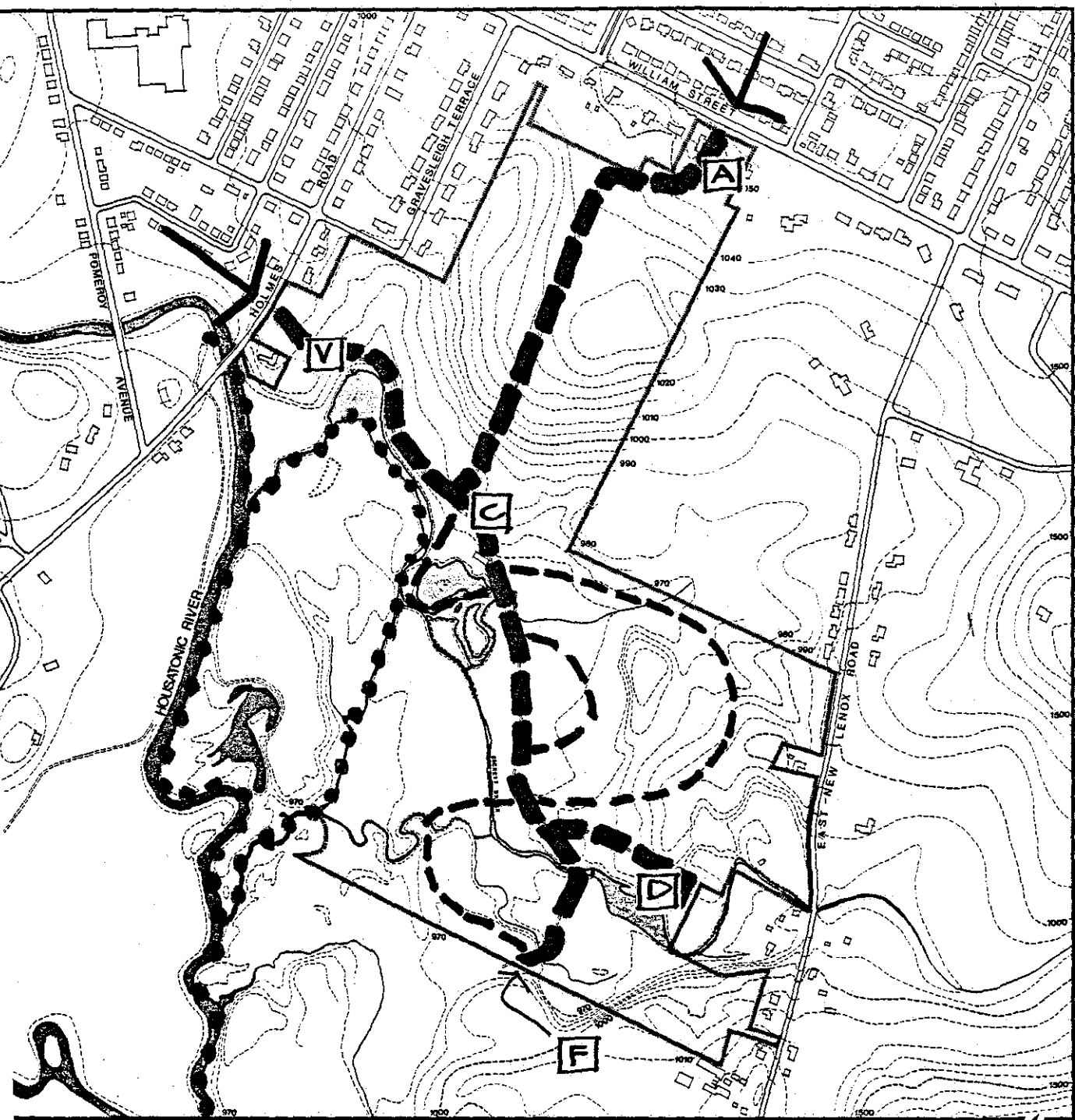
CONCEPT 2

Aspects

Location of the visitor center and parking facilities would be located in the immediate proximity of the Holmes Road entrance. The existing garage structure could be rebuilt for seasonal day camp use. The barn could also be utilized for this purpose, or could be moved to the William Street farmstead. The service road, although utilized in the interpretive trail, would not be emphasized; in this concept the major interpretive trail would 'snake' across the service road allowing a return to the visitor center at a number of points.

Consequences

This placement of the visitor center and parking has the advantage of allowing visibility and accessibility from Holmes Road, while minimizing the disruption of other more fragile areas of the site. The vantage point from the visitor center would allow an overview of many site features, providing a logical beginning and conclusion to an interpretive sequence. The more seasonal use of the garage site for day camp activities would have a minor impact on that area; pedestrian access could be by way of the Holmes Road or William Street entrances where vehicular pickup would be convenient.



- SEEN/NOTES
- V** VISITOR CENTER
 - A** AGRICULTURE CTR.
 - D** DIRECTOR'S RES.
 - F** FARMER'S ACCESS
 - Z** CAMP/FIELD HOUSE

- — — — —** SERVICE
- - - - -** MAJOR TRAIL
- • • • •** CANOE LOOP
- ←** MAJOR ACCESS
- RESTR. ACCESS

CANOE MEADOWS

MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



CONCEPT 2 C2

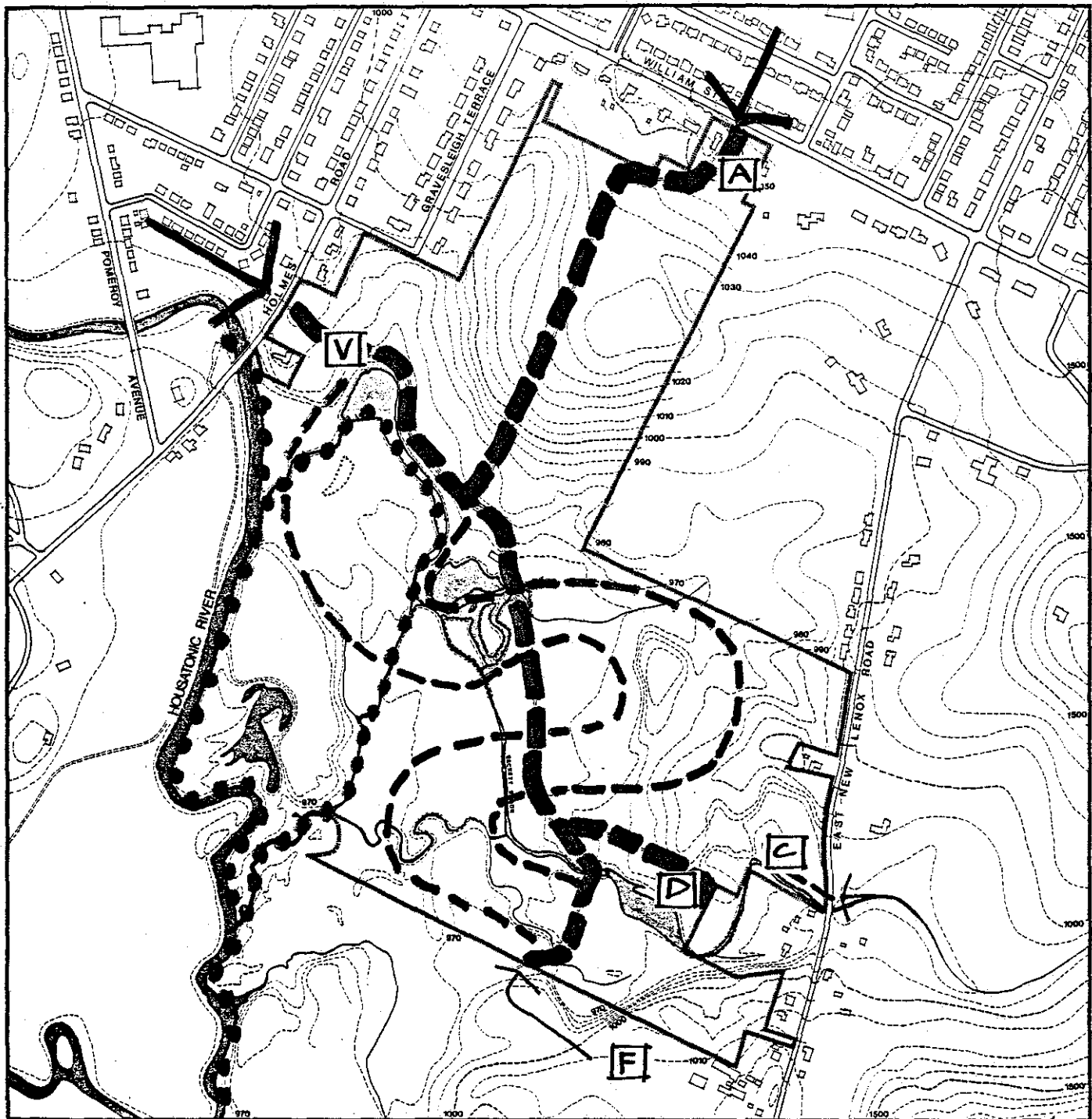
CONCEPT 3

Aspects

In this concept, the visitor center is again located in the vicinity of the Holmes Road entrance; the structure off East New Lenox Road would be utilized for day camp activities. The major interpretive trail network would again meander across the service road axis, but there would be a more extensive area of interpretation resulting from the double loops that diverge from the service road into more inaccessible areas of wetland by way of footbridges and raised boardwalks.

Consequences

As mentioned in Concept 2, the siting of the visitor center off Holmes Road would have definite advantages with minimal impact to more natural and fragile areas of the site. The proposed raised walkways and bridges within the wetland areas of this extensive interpretive trail system could be constructed with minimal disturbance to the area. Their presence would have to be evaluated in terms of their visual consequences on the natural landscape and the opportunity presented to penetrate into previously inaccessible areas that could result in the alteration of wildlife habitat and distribution as well as the visual deterioration of the landscape itself. Access and use of these trails could be restricted to guided or supervised tours. Maximum interpretive opportunities could be provided by this type of trail system.



LEGEND/NOTES

- | | |
|------------------|---------------|
| VISITOR CENTER | SERVICE |
| AGRICULTURE CTR. | MAJOR TRAIL |
| DIRECTOR'S RES. | CANOE LOOP |
| FARMERS ACCESS | MAJOR ACCESS |
| CAMP/FIELD HOUSE | RESTR. ACCESS |

CANOE MEADOWS

MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



CONCEPT 3

C3

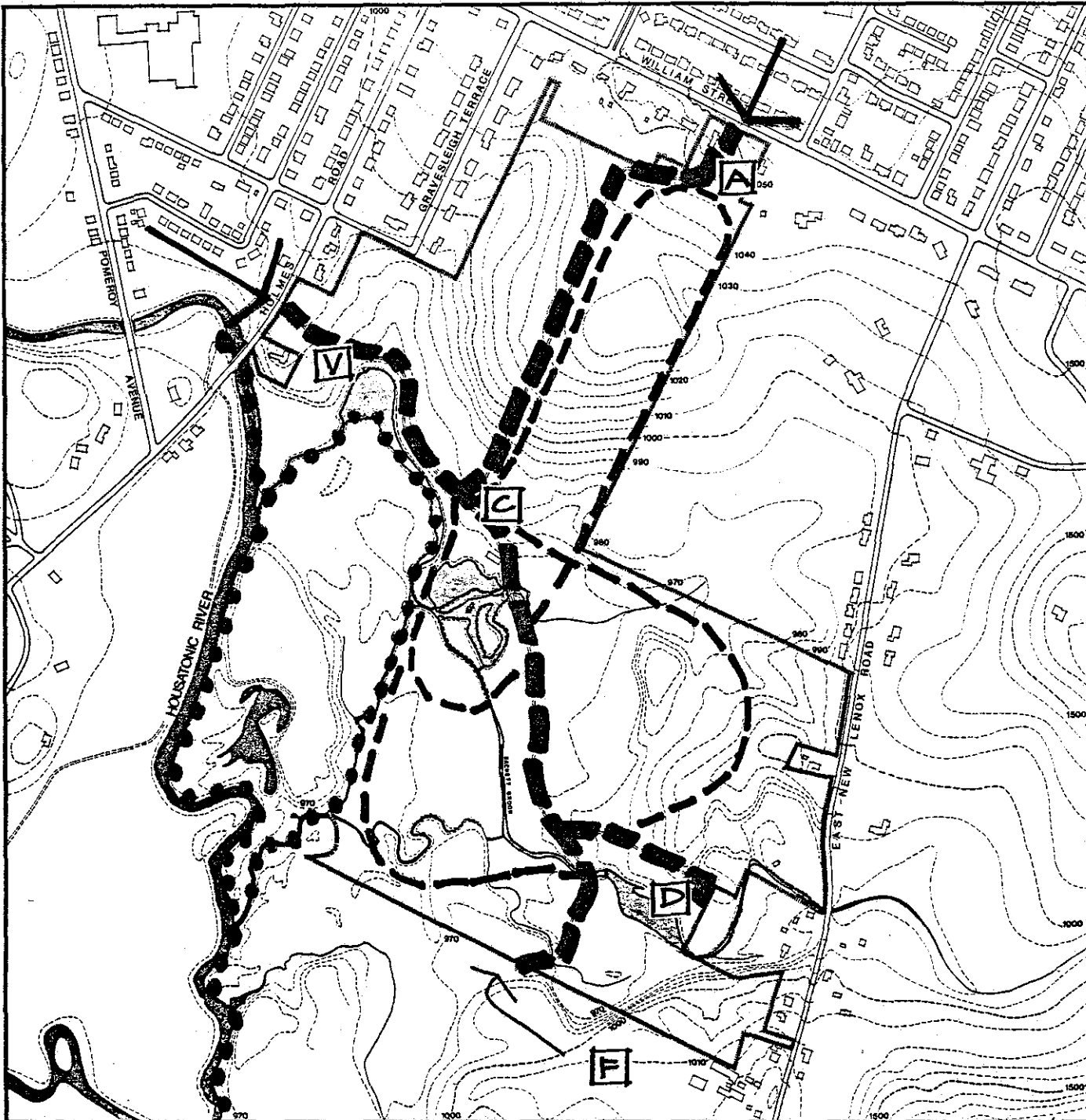
CONCEPT 4

Aspects

The visitor center would be located as in Concepts 2 and 3; the garage is again utilized for day camp activities. The major trail system involves a few large concentric loops that emanate principally from the visitor center. Penetration into the wetland areas is less extensive than in Concept 3.

Consequences

The advantages of placing the visitor center and day camp facilities as shown are considered in Concept 2; the advantages and problems of the interpretive area penetrating into wetland areas is covered in Concept 3, but in this case land along the Housatonic River is not made accessible to pedestrians (excepting the possibility of access by canoe).



LEGEND/NOTES

V VISITOR CENTER

A AGRICULTURE CTR.

D DIRECTOR'S RES.

F FARMER'S ACCESS

C CAMP/FIELD HOUSE

█ SERVICE RD.

--- MAJOR TRAIL

●●●● CANOE LOOP

← MAJOR ACCESS

→ RESTR. ACCESS

CANOE MEADOWS

MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



CONCEPT 4

CA

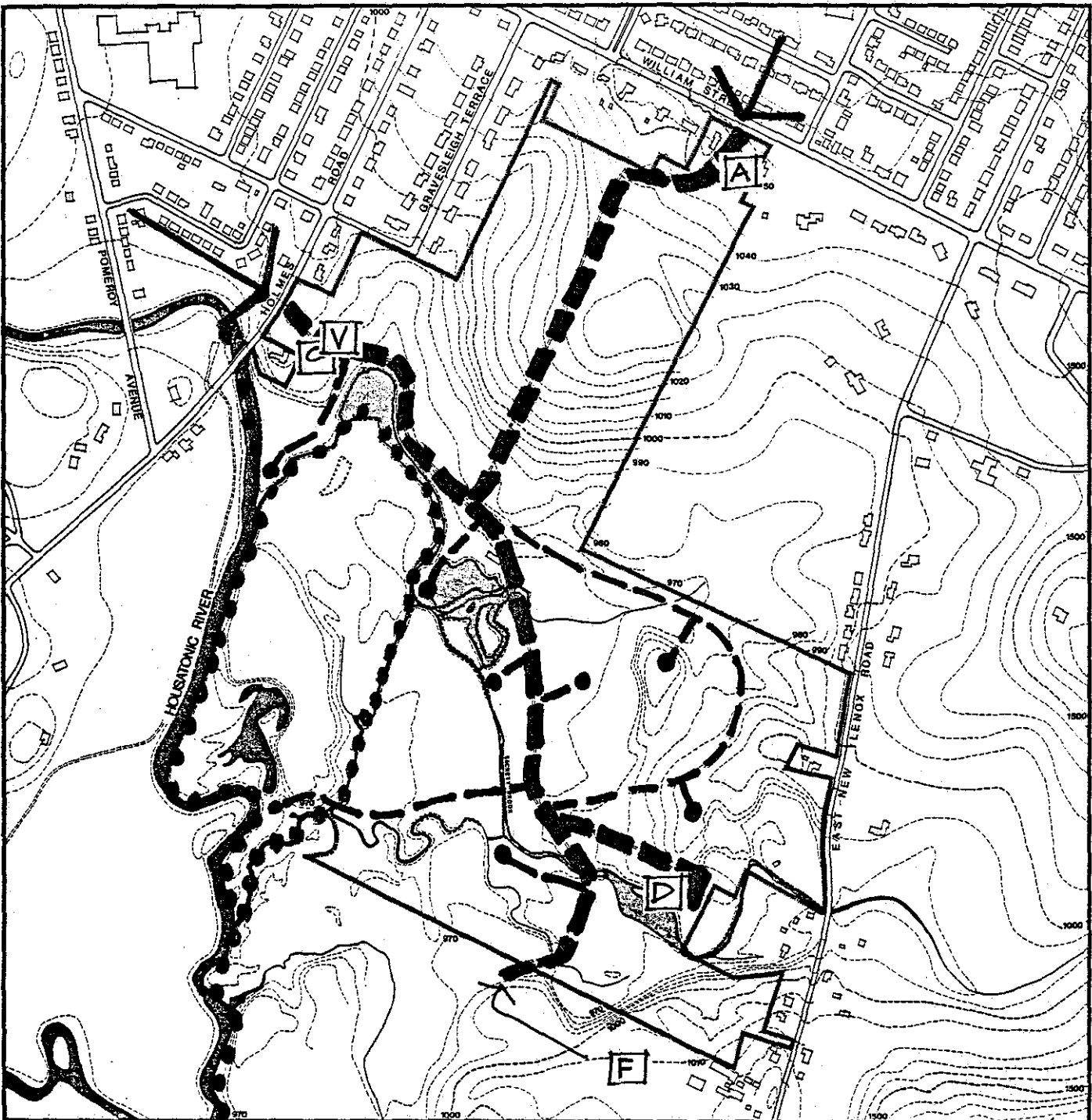
CONCEPT 5

Aspects

In this concept, the visitor center is again located near the Holmes Road entrance, but also accomodates day camp activities. The garage is used for storage and the barn is dismantled and moved to the William Street agriculture center. The interpretive area is restricted to the service road and a loop through the upland forest region. Access to specific areas of features is primarily through short spur trails off the main trails and could have simple seating facilities at their endpoints.

Consequences

This arrangement would minimize the deterioration of site features and general character. Utilizing the facilities of the visitor center for day camp use would concentrate maximum activity on the area least susceptible to deterioration, but this increase may be inconsistant with the residential character of the Holmes Road entry area. By restricting the interpretive area to the immediate vicinity of the service road, there is the possibility of concentrating visitors into a restricted area that would limit their ability to perceive the natural character of the landscape. The small spur trails would allow a minimal penetration into different habitat areas and their endings provide a place of rest and contemplation, allowing major portions of the site to remain relatively untouched.



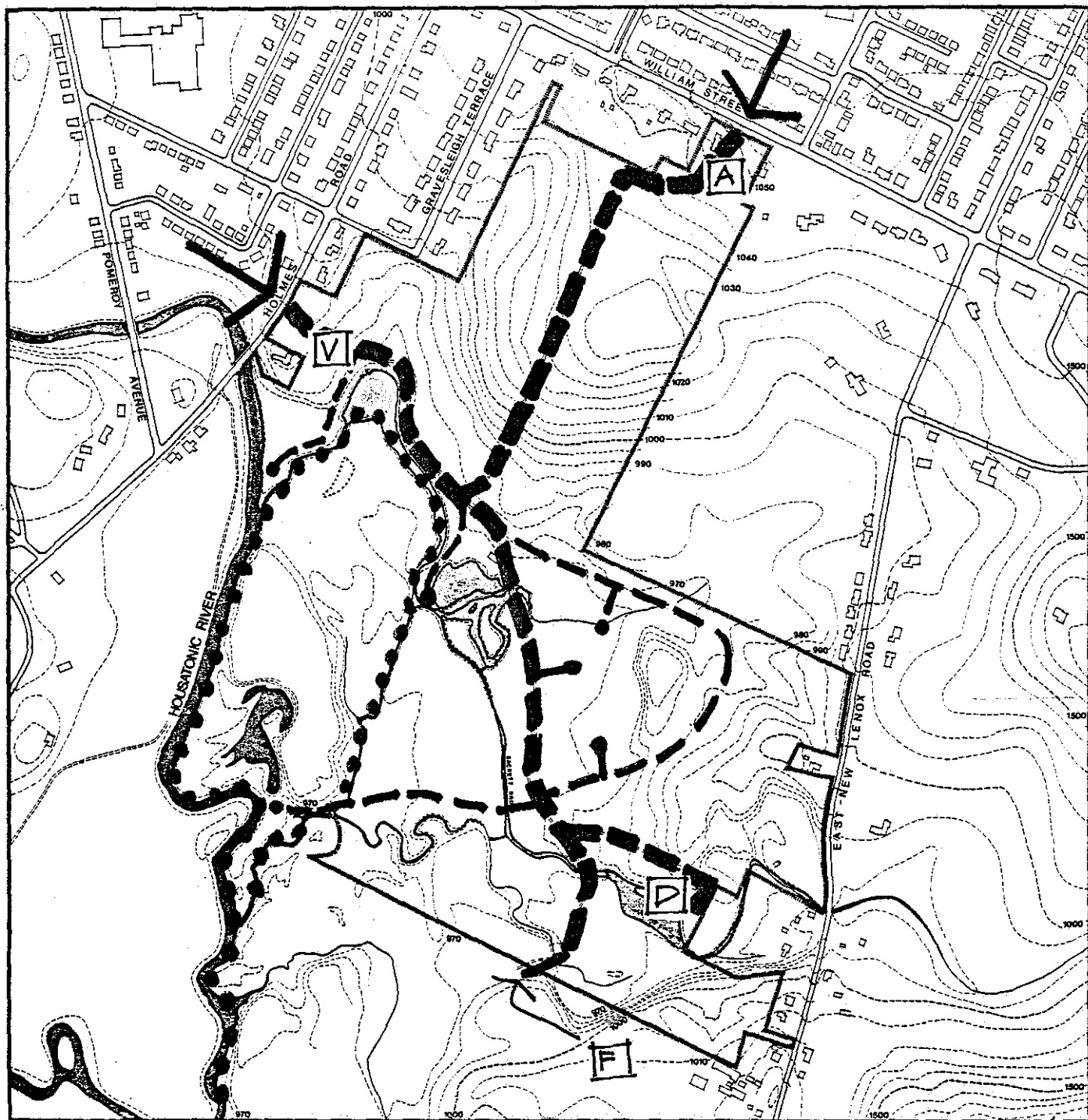
LEGEND NOTES

VISITOR CENTER	SERVICE	CANOE MEADOWS MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY
AGRICULTURE CTR.	MAJOR TRAIL	
DIRECTOR'S RES.	CANOE LOOP	 CONCEPT 5 SCALE OF THIS CONCEPT PLAN IS 1:10,000 (APPROXIMATE)
FARMER'S ACCESS	MAJOR ACCESS	
CAMP/FIELD HOUSE	RESTR. ACCESS	

C5

CONCEPT COMPOSITE

Examination and evaluation of Concepts 1-5 has resulted in a composite concept that extracts the major advantages and minimizes disadvantages within the concepts. Siting the visitor center near the Holmes Road entrance best fulfills the requirements of visibility and views, accessibility, service needs, as well as affording an opportunity to plan for energy efficiency. Trails would best relate to individual problems and possibilities within different habitats. In general, extensive loop trails are more suitable to the upland forest areas as these areas could withstand more use than the wetter lowlands. The woodlands are conducive to experiencing the visual patterns of trees and patches of open sky. The low areas have problems of high watertables rendering extensive trails impractical, the wildlife would be adversely affected, and the thicker vegetation would suggest a slower, more meandering trail. Spur trails with observation areas at their terminals would allow ample interpretation opportunity, minimal impact to wildlife, and less capital outlay. Many of the open areas are ideal for cross-country skiing, but in more wooded areas, selective clearing could provide unimpaired access to other open areas. The cottage off East New Lenox Road would be ideal for ongoing research projects; limited research and student studies could utilize the second floor of the farmhouse, as suggested by Blanchard 1977.



LEGEND/NOTES

- V VISITOR CENTER
- A AGRICULTURE CTR.
- D DIRECTOR'S RES.
- F FARMER'S ACCESS
- C CAMP/FIELD HOUSE
- SERVICE
- MAJOR TRAIL
- CANOE LOOP
- MAJOR ACCESS
- RESTR. ACCESS

CANOE MEADOWS
 MASSACHUSETTS AUDUBON SOCIETY BERKSHIRE SANCTUARY



SECTION 4
PROPOSALS

SECTION 4 - PROPOSALS

Before any proposals can be formulated, it is necessary to identify and communicate to Audubon staff and the general public what are the most significant features that characterize Canoe Meadows. In order to protect, manage, or design, it must be clear what one is protecting, managing or designing for. Significant areas in the lower wetlands and upland forests represent prime wildlife habitats and ecological systems nearly untouched by the recent activities of man; the greatest resource of these areas is the potential use for outdoor research laboratories essential to a continuing understanding of the site and ecosystems as a whole, as well as limited use for interpretive trails. The most significant asset of the service road area is its visual and biological diversity. Since this area is presently a major source of recreational enjoyment, priority should be given to intensive management along this corridor. While topographic features within the site are not outstanding, the enframed and focused viewsheds to distant mountains as seen from the William St. and Holmes Rd. entrances are essential to a spatially orienting overview of the site as a whole (Forest Service 1973: 46). From these points, the contained quality of Canoe Meadows is observed; progression into the site strengthens this aspect. The motion and wildlife activity as well as the general visual quality of waterways on the site is also a great resource to be safeguarded (Forest Service 1973: 50). These major features may seem rather obvious, but they must be preserved or reinforced in all aspects of design and management proposals.

SECURITY

The location of the proposed and existing sanctuary facilities (See Sheet D1 - DESIGN & MANAGEMENT PROPOSALS) will greatly facilitate the policibility of the site by continued normal use of these strategic areas by Audubon personnel. The continued residential use of the lodge by the Director of Berkshire Sanctuaries and his family greatly contributes to security through normal vehicular use of most of the length of the service road. Views across the open meadow afford surveillance of the gate along the south border of the property. Pedestrian entrance from the abutting land should be allowed at this point. A substantial wooden gate capable of being locked should be provided allowing only vehicles relating to agricultural use to gain access. A narrow sluice would admit pedestrians and bicycles, but not other vehicles. If the existing wire fence is replaced, a realignment of a similar fence following the vegetation masses would significantly improve the visual appearance of the upper south meadow (Forest Service 1977: 39). The two chain-link gates along East New Lenox Road should impair access, especially if adequate signage suggested the use of the main entrance at Holmes Road. Pittsfield officials will be contacted regarding a restriction on street parking along roads bordering the sanctuary (Blanchard 1977: 6). The main problem with fencing is the disruption of vital wildlife corridors; a suggestion to remove all internal fencing would be a definite advantage. The posting of Audubon signage around the site periphery should be undertaken as soon as possible as a primary defense mechanism. Audubon administration is acutely aware of monitoring possible surrounding land use changes; the possible threat of a Pittsfield bypass would sever 10 acres of the southeast area of the sanctuary (Blanchard 1977: 6). The consequences of this

action would be a major interruption of wildlife corridors, as well as a severe disruption to the dairy farm along southern boundary which needs access to the sanctuary's agricultural reserves.

DESIGN ASPECTS FOR INTERPRETIVE AREAS

There will be two totally distinct visitor centers for interpretive purposes: the agricultural center off William St. and the main visitor center off Holmes Rd. (See Sheet D1 - DESIGN & MANAGEMENT PROPOSALS for locations of design elements). The existing farmhouse will continue to house the resident naturalist; the addition of other farm-related buildings to house domesticated animals will be a major feature. The carriage barn presently located on the lower portion of the site would be ideally suited to this purpose. A determination would have to be made as to whether the building could be dismantled and moved. Recommended siting for this building attempts to provide adequate, climatically considered exterior areas for farm animals, with minimal disturbances to nearby residents. The present location of community gardens with larger scale commercial farming operations beyond forms an ideal open space buffer between the edge of the residential district and the more undisturbed sanctuary areas to the south. Recommended plantings of shade trees function to enframe views and provide climatic modification in the summer. The location of the small fruit orchard and apiary on the north side of the crest of the hill would provide additional visual buffering between the residential area and farm operations. Parking facilities in the open area between the farmhouse and the barn will be on roughly graded ground with 4" of woodchips for dry footing.

The visitor center at the Holmes Rd. entrance will be the major center of interpretation for the site. The impact of the parking area will be minimized by its location behind the existing clump of sugar maples, cherries, and

deciduous shrubs along the road, by lowering its surface level, and forming earth mounds around its perimeter. Open field areas could provide overflow parking. The existing clumps of lilacs and splitrail fence along the remainder of the road psychologically divides the entry area from the street, while allowing visual penetration to the open meadows and the proposed visitor center. The location of the center takes into consideration maximizing views, access for service, soils, floodplains, and energy efficiency. Although the site slopes to the east, the southern orientation of the building would allow an architectural solution that could receive solar collection panels on its roof. By stepping the structure down the slope and banking soil along its northern foundation the visual impact of the building would be minimized and energy efficiency maximized. Suggested planting masses of white pines to the north and sugar maples to the south continue these major considerations. A private yard area is provided for the staff apartment included in the structure. An observation area is planned along the south and east sides as a place for an overview of the site before progressing onto the trails. Location of the visitor center on a south-facing slope would result in a more visually and climatically exposed situation, or require the consideration of a site that would permeate more fragile or active agricultural areas.

The location of the service road is ideal for more casual interpretation, especially by large groups. A good selection of visual experiences, habitats, and wildlife can be observed along its length. The major trails are provided to increase interpretation within specific ecosystems: the upland forest trails and more extensive loops due to the less fragile and generally well-drained conditions present there, whereas the wetland trails are spurs that penetrate

a short distance into the heavy shrub growth. The construction of extensive areas of boardwalks within the wetlands has been minimized by attempting to avoid areas with seasonal or permanently wet soils. The termination of these trails are ideal places for a "blind" to observe wildlife, or merely rest before returning to other trails. The alignment of trails takes into consideration "the lay of the land" and vegetative cover. In situations where vegetation is low, as in open grassy areas, trails curve in broad arcs; within dense, visually impenetrable vegetation, trails curve sharply to increase the effect of containment. The location of trails attempts to maximize the visual experiences and special features of the site. Coddington, Field and Lazell 1976, have recommended that some of the particularly fragile features be incorporated into natural areas without trails. In the case of multiple feature areas, some were purposely avoided, others carefully circumscribed. The exact layout of trails would have to be executed in the field under the supervision of Audubon staff. The surfaces of trails should be maintained: the service road would benefit from the addition of porous drainage material such as 'trap rock' along its wetter sections; other major trails could be established with a few inches of woodchips for dry footing. Boardwalk construction would have to be carefully executed to protect the features in the immediate vicinity of the work area. Signage along the interpretive trail should be simple and minimal, merely serving to designate the nature of the ecosystems at the beginning, and possibly additional signage at major features.

MANAGEMENT PROPOSALS

The purpose of managing the landscape of Canoe Meadows should relate to accessibility for interpretation; maintaining or improving wildlife habitat and diversity, and preserving or enhancing visual character. A management program can satisfy all three objectives without any detrimental effects to any of the others. Diversity in the landscape, for example, is highly desirable for ecological stability as well as visual interest. The recreational experiences enjoyed by people within woodlands most often involve a "close range... series of visual impressions, as a sequence of discrete scenes rather than a single panorama" (Brush 1976: 744). For this reason, visual management proposals will primarily concentrate around the service road and major trails. Wildlife management areas may be visually improved, but this would be a secondary consideration.

The management areas proposed by Blanchard 1977, p.2 - Natural Area, Wildlife Management Area, Agricultural Reserves, and Interpretive Area - and indicated on the Preliminary Master Plan (Blanchard and Burg 1977) are more concerned with a determination of proposed land use than with comprehensive management. The proposed management areas (See Sheet D1 - DESIGN & MANAGEMENT PROPOSALS) utilize their intentions, but attempt to define management practices necessary to maintain existing features or improve others.

Non-managed Areas, the equivalent of "Natural Areas" have representative ecosystems that would remain untouched, serving as "biological reservoirs" and as "a site for baseline ecological research" (Blanchard 1977: 2). Interpretive use of

these areas will be minimal and limited to specified trails. Occasional removal of trail impedances, such as overgrown shrubs and fallen limbs will be the only maintenance undertaken within these areas.

Managed areas include lands designated by the sanctuary as "Agricultural Reserves" which are presently leased and actively cultivated for fodder and hay crops essential to the continued operation of the abutting Noble dairy farm. Not only is the loss of actively used farmland detrimental to the state as a whole, but its discontinued use within Canoe Meadows would destroy significant open buffer areas, decrease diversity of wildlife habitat and visual quality, as well as risk the viability and development potential of the Noble farm. Should these agricultural areas not be actively cultivated, they should be kept open by yearly mowing, preferably late in summer to allow ground nesting birds to fledge their young (Blanchard 1977: 4). In addition to these areas, smaller patches of open grassland will be retained by mowing or selective cutting of all woody vegetation. Other open areas will be created by cutting into woodlands to open vistas to the lowlands and mountains beyond, increase biological diversity by producing a more extensive "edge effect", and provide a more convenient route for cross-country skiers. These areas would then be managed in the same manner of other small open areas on the site.

Within wooded areas, there would also be intensively managed zones. The plantations of red pine enclosing the service road along the west pond should be pruned of any dead lower branches which act as a "visual barrier". This would increase the tunnel-like feeling within the stand. Some upward pruning of dead or low branches within the hemlock grove would increase the filtered

view west to the waterways and deciduous wetlands as well as create a larger, more open space within the dark canopy. On the east side of the hemlock grove, some selective thinning would increase light intensity at the ground level, stimulating understory shrubs that would form a barrier between the preserved unmanaged forest beyond. Some areas of woodland in the east section of the property are fairly young, even-aged stands which would benefit from removal of lower branches and creation of small irregular clearings appropriate to the gently rolling topography (Brush 1976: 745-747). This eastern area, not planned for major interpretive use, would be used principally as a wildlife management area (Blanchard 1977: 2; Blanchard and Burg 1977: map). The many dead elms, while not a visual asset, serve as prime nesting areas for many bird species that are "cavity" or "snag" nesters. The spread of "Dutch elm" disease and phloem necrosis to other areas could present an argument for their removal; much of the Housatonic River Valley bottomlands are already effected, making the removal of dead elms within the interpretive areas primarily a visual factor. The edges of open fields, and the vegetative thickets along waterways would benefit from the removal or thinning of branches or thickets of taller saplings that impair a view to the surrounding mountains. It should be noted that most of the shrub growth of smaller plants such as red osier dogwood and alder prevent erosion caused by pedestrian traffic and floodwaters, and form good protective cover and food for wildlife. Access for interpretation along waterways could be made at specific points by clearing vegetation in the case of continuous impenetrable thickets. The addition of introduced plant materials at key points of interpretation, such as around the visitor center, has been minimal in the design proposals and would be limited to native plants that

might conceivably grow in the immediate Pittsfield area. Their function would be primarily for purposes of screening views, modifying climate, attracting wildlife or adding to the aesthetic appreciation of Canoe Meadows.

SPECIAL CONSIDERATIONS

The maintainance of privacy for the resident naturalist, director, and their families should be considered. Allotment for private spaces has been indicated in the plan of the William St. farmhouse. The pond adjacent to the director's residence forms a natural divide between the family's private yard area and the rest of the sanctuary. The addition of plantings to constrict the fork of the access road to the residence would direct visitors to continue forward to the bridge and open meadow beyond.

The cabin off East New Lenox Road is suitable for use by researchers studying the site; minimal renovations would be needed to provide comfortable work space. The second story of the farmhouse has also been considered as work areas for students/researchers.

The problem of excessive siltation in the west pond from storm sewer runoff coming from Gravesleigh Terrace could be remedied by the installation of a Lead-wall that would allow storm water to pass into a mowed grass swale. The present topography in the meadow would allow this feature with minimal grading involved. Silt deposits could easily be removed periodically.

It has been determined that the sale of four one-half acre residential lots (or possibly 2 one-acre lots) along the south side of Gravesleigh Ter. would benefit the sanctuary by augmenting present financial endowments as well as provide additional control of access along the roadway. Should the land be put on the market, it may in fact be purchased by residents of Gravesleigh Ter. collectively

for preserving open space and views, but defeating the purpose of controlled access at this point. It may be to Audubon's advantage to consider the unprecedented action of acting as the developer of four energy efficient residences which would be highly salable considering their prime location. Revenue from their sale would be substantial, Audubon would have complete authority over initial design, and the objective of access control along Gravesleigh Ter. would be fulfilled. In addition, the residences would be exemplary to Audubon's commitment to educating the public to have a concern for the environment. What better way to expand their program than to provide examples of residences that could demonstrate energy efficient architectural design, siting, and plantings (which could also be selected for attracting wildlife and providing privacy). Owners may wish to participate in an annual open house program that would supplement an ongoing program demonstrating features of the visitor center design.

APPENDIX 1 - LIST OF PLANTS (Coddington, Field and Lazell 1976: 6-15)

(Numbers in parentheses are vegetative associations.
Butterflies are listed opposite their food forms.)

EQUISETACEAE

- Equisetum arvense -- field horsetail (4,7)
- E. sylvaticum -- wood horsetail (3)
- E. hiemale -- scouring rush (3,4)

LYCOPODIACEAE

- Lycopodium tristachyum -- ground pine (2,3)
- L. complanatum -- ground cedar (3)
- L. lucidulum -- shining clubmoss (2,3)
- L. clavatum -- staghorn clubmoss (2,3)

OSMUNDACEAE

- Osmunda claytoniana -- interrupted fern (2)
- O. cinnamomea -- cinnamon fern (3,8)
- O. regalis -- royal fern (6)

POLYPODIACEAE

- Dennstaedtia punctilobula -- hayscented fern (2,3)
- Pteridium aquilinum -- bracken fern (2)
- Adiantum pedatum -- maidenhair fern (3)
- Matteucia struthiopteris -- ostrich fern (3,4,5)
- Onoclea sensibilis -- sensitive fern (1,2,4,5,8)
- Athyrium Filix-femina -- lady fern (2,3,4,5,8)
- Cystopteris bulbifera -- bulblet fern (3,5)
- Thelypteris noveboracensis -- New York fern (2,3,4,5,8)
- T. palustris -- marsh fern (2,6,8)
- Gymnocarpium dryopteris -- oak fern (2)
- Dryopteris spinulosa -- spinulose wood fern (2,3)
- D. marginalis -- marginal wood fern (3)
- D. cristata -- crested fern (3)
- Polystichum acrostichoides -- Christmas fern (2,3,4)

TAXACEAE

- Taxus canadensis -- yew (2,3)

PINACEAE

- Picea glauca -- white spruce (8)
- P. rubens -- red spruce (8)
- P. abies -- Norway spruce (8)
- Tsuga canadensis -- hemlock (2,3,4)
- Larix laricina -- larch (8)
- Pinus strobus -- white pine (2,3,8)
- P. resinosa -- red pine (8)

TYPHACEAE

- Typha latifolia -- cattail (6)

ALISMATACEAE

Alisma triviale -- water plantain (4,5)
Sagittaria latifolia -- arrowhead (4,6)

GRAMINAE

Eragrostis sp. -- love grass (6)
Poa compressa -- Canada blue grass (1)
Phragmites communis -- reed (6)
Avena sp. -- oats (1)
Phleum pratense -- timothy (1)
Leersia sp. -- cut grass (5,6)

Grasses of undetermined species are eaten by pearly eye (*Lethe portlandia*), eyed brown (*L. eurydice*), little wood satyr (*Euptychia cymeta*), wood nymph (*Cercyonis pegala*), and many skippers (Hesperiidae, 19 spp.)

CYPERACEAE

Scirpus validus -- great bulrush (7)
S. rubrotinctus -- bulrush (6,7)
Carex stricta -- sedge (6,7)
Carex sp. -- sedge (7)

Sedges of undetermined species are eaten by the black dash (*Euphyes conspicua*) and mulberry wing (*Poanes massasoit*).

ARACEAE

Arisaema atrorubens -- jack-in-the pulpit (3)
Symplocarpus foetidus -- skunk cabbage (5)

LEMNACEAE

Lemna sp. -- duckweed (6)

JUNCACEAE

Juncus grunei -- rush (7)
J. effusus -- rush (7)

LILIACEAE

Veratrum vivide -- false hellebore (4,5)
Allium tricoccum -- wild leek (4)
Lilium canadense -- Canada lily (1)
Erythronium americanum -- trout lily (2,3)
Clintonia borealis -- clintonia (2)
Maianthemum canadense -- Canada mayflower (2,3)
Uvularia sessilifolia -- wild oats (2,5)
Polygonatum biflorum -- Solomon's seal (3)
Trillium erectum -- wakerobin (2,3,5)
T. undulatum -- painted trillium (2,3)
Convallaria majalis -- lily of the valley (4)

IRIDACEAE

Iris versicolor -- blue flag (6,7)
Sisyrinchium sp. -- blue-eyed grass (6,7)

ORCHIDACEAE

Cypripedium acaule -- moccasin flower (2)
C. reginae -- lady's slipper (2)
Habenaria lacera -- ragged fringed orchis (1)
Epipactis helleborine -- helleborine (4,5)

SALICACEAE

- Populus alba -- white poplar (5)
- P. tremuloides -- quaking aspen (5)
- P. deltoides -- cottonwood (3,4)
- Salix nigra -- black willow (4,5,8)
- S. bebbiana -- beaked willow (1,5)
- Salix sp. -- (7)

Poplars and willows are eaten by green comma (Polytonia faunus), mourning cloak (Nymphalis antiopa), viceroy (Limenitis archippus), striped hairstreak (Satyrium liparops), Acadian hairstreak (S. acadica), dreamy dusky-wing (Erynnis icelus), and Perseus dusky-wing (E. perseus).

JUGLANDACEAE

- Juglans cinerea -- butternut (4)
- Carya cordiformis -- bitternut hickory (8)
- C. glabra -- pignut hickory (6)

CORYLACEAE

- Ostrya virginiana -- hornbeam (3)
- Carpinus caroliniana -- ironwood (3,4)
- Betula lutea -- yellow birch (3)
- B. papyrifera -- white birch (3,4,5)
- B. populifolia -- gray birch (3,4,5,6,8)
- Alnus incana -- speckled alder (1,5,6,7)

Birches are eaten by green comma (Polytonia faunus), Compton's tortoise shell (Nymphalus vaualbum), and banded purple (Limenitis arthemis).

FAGACEAE

- Fagus grandifolia -- beech (3)
- Quercus michauxii -- basket oak (3)
- Q. velutina -- black oak (3)
- Q. rubra -- red oak (3)

Oaks are eaten by striped hairstreak (Satyrium liparops), banded hairstreak (S. calanus), Juvenal's dusky-wing (Erynnis juvenalis), and Horace's dusky-wing (E. horatius).

ULMACEAE

- Ulmus rubra -- slippery elm (4,5)
- U. americana -- American elm (3,4,5,8)

Elms are eaten by questionmark (Polytonia interrogationis) and comma (P. comma).

MORACEAE

- Morus alba -- white mulberry (8)

URTICACEAE

- Urtica dioica -- nettle (5)
- U. gracilis -- slender nettle (5)

Nettles are eaten by Milbert's tortoise shell (Nymphalis milberti), and red admiral (Vanessa atalanta).

ARISTOLOCHIACEAE

- Asarum canadense -- wild ginger (3,4)

POLYGONACEAE

- Rumex acetosella -- sheep sorrel (1,4)
- R. crispus -- curled dock (1)

Eaten by American copper (Lycaena phleas americana), and bronze copper (L. thoe).

CHENOPODIACEAE

- Chenopodium album -- lamb's quarters (1,8)

PHYTOLACCACEAE

- Phytolacca americana -- pokeweed (8)

PORTULACACEAE

Claytonia caroliniana -- spring beauty (4)

CARYOPHYLLIACEAE

Silene cucubalus -- bladder campion (1,3,4)
Saponaria officinalis -- bouncing bet (1)
Dianthus deltoides -- maiden pink (1)
D. armaria -- Deptford pink (1)

NYMPHACEAE

Nuphar variegatum -- bullhead lily (4)

RANUNCULACEAE

Coptis groenlandica -- goldthread (2)
Caltha palustris -- marsh marigold (6)
Ranunculus acris -- buttercup (1)
Thalictrum polygamum -- tall meadow rue (3,4,5,8)
Anemone canadensis -- Canada anemone (5)
A. quinquefolia -- wood anemone (4)
Anemonella thalictroides -- rue anemone (3,5)
Clematis verticillaris -- purple clematis (5)

BERBERIDACEAE

Podophyllum peltatus -- mayapple (3)
Caulophyllum thalictroides -- blue cohosh (4)
Berberis thunbergii -- Japanese barberry (3,4,5)
B. vulgaris -- common barberry (3,4)

PAPAVERACEAE

Sanguinaria canadensis -- bloodroot (3,4)
Chelidonium majus -- celadine (4)

CRUCIFERAE

Nasturtium officinale -- water cress (6)
Hesperis matronalis -- dame's rocket (1)
Allaria officinalis -- garlic mustard (1)
Brassica sp. -- "mustard" (1)
Berteroa incana -- hoary alyssum (1)

Various crucifers are eaten by fulcate orange-tip (Anthocaris midea), cabbage butterfly (Pieris rapae), and checkered white (P. protodice).

CRASSULACEAE

Penthorum sedoides -- ditch stonecrop (1)
Sedum purpureum -- orpine (8)

SAXIFRAGACEAE

Saxifraga sp. -- (3)
Tiarella cordifolia -- foam flower
Ribes nigrum -- black currant (4)

Grey comma (Polygonia progne).

HAMAMELIDACEAE

Hamamelis virginiana -- witch hazel (3)

PLANTANACEAE

Plantanus occidentalis -- sycamore (4)

ROSACEAE

- Spirea latifolia -- meadowsweet (1,4,5,6,7)
- S. tomentosa -- steepleshbush (1,7)
- Fragaria virginiana -- strawberry (5)
- Potentilla simplex -- common cinquefoil (1)
- P. canadensis -- dwarf cinquefoil (1)
- P. fruticosa -- shrubby cinquefoil (1)
- Geum canadense -- white avens (3,5)
- Rubus hispidus -- dewberry (8)
- R. idaeus -- raspberry (5,8)
- R. occidentalis -- black raspberry (5,8)
- Rubus sp. -- (1,4,8)
- Rosa carolina -- pasture rose (1)
- Prunus serotina -- black cherry (3,4,5,8)
- P. virginiana -- choke cherry (8)
- Pyrus malus -- apple (4,5)
- Crataegus sp. -- hawthorn (4,5,8)
- Amelanchier laevis -- shadblow (3,4)
- Cydonia oblonga -- quince (8)

Cherries are eaten by tiger swallowtail (Papilio glaucus), red-spotted purple (Limenitis astyanax), and coral hair-streak (Harkenclenus titus).

LEGUMINOSAE

- Trifolium pratense -- red clover (1)
- T. repens -- white clover (1)
- Melilotus alba -- sweet white clover (1)
- Medicago sativa -- alfalfa (1)
- Vicia sp. -- vetch (1)

Clovers are eaten by orange sulphur (Colias eurytheme), clouded sulphur (C. philodice), and northern cloudy sing (Thorybes pylades).

OXALIDACEAE

- Oxalis stricta -- yellow wood sorrel (1)

EUPHORBIACEAE

- Euphorbia cyparissias -- cypress spurge (1)

ANACARDIACEAE

- Rhus radicans -- poison ivy (8)
- R. typhina -- staghorn sumac (4,6)

CELASTRACEAE

- Celastrus scandens -- bittersweet (8)
- Euonymus alata -- winged euonymous (8)

ACERACEAE

- Acer saccharum -- sugar maple (3,4,8)
- A. nigrum -- black maple (5)
- A. rubrum -- red maple (4,5)
- A. saccharinum -- silver maple (4,5)
- A. negundo -- box elder (4,8)

BALSAMINACEAE

- Impatiens capensis -- spotten jewelweed (5,8)

RHAMNACEAE

Rhamnus cathartica -- buckthorn (4,5)

VITACEAE

Vitis riparia -- river grape (4,8)
Parthenocissus quinquefolia -- Virginia creeper (8)

TILIACEAE

Tilia americana -- linden (5)

MALVACEAE

Malva neglecta -- common mallow (1)

GUTTIFERAE

Hypericum perforatum -- common St. John's-wort (1)
H. canadense -- Canadian St. John's-wort (1)
H. punctatum -- spotten St. John's-wort (1)

VIOLACEAE

Viola sp. -- violets (2,3,4,5,8) Violets are eaten by variegated fritillary
 (Euptoieta claudia), Atlantis fritillary
 (Speyeria atlantis), great spangled
 fritillary (S. cybele), Aphrodite fritillary
 (S. aphrodite), silver-bordered fritillary
 (Boloria selene), and meadow fritillary
 (B. toddi).

LYTHRACEAE

Lythrum salicaria -- purple loosestrife (4)

ONAGRACEAE

Oenothera biennis -- common evening primrose (1)
Circaea quadrisculcata -- enchanter's nightshade (3,5)

UMBELLIFERAE

Daucus carota -- Queen Anne's lack (1) Black swallowtail (*Papilio polyxenes*).
Zizia aurea -- golden Alexanders (1,6)
Heracleum maximum -- cow parsnip (6)

CORNACEAE

Cornus amomum -- swamp dogwood (5) Spring azure (*Celastrira argiolus*)
C. stolonifera -- red osier dogwood (1,5,6,7)

PYROLACEAE

Monotropa uniflora -- Indian pipe (2,3)
Pyrola elliptica -- shinleaf (3)

ERICACEAE

Gaultheria procumbens -- wintergreen (2) Pink-edged sulphur (*Colias interior*),
Vaccinium corymbosum -- highbush blueberry (4) Henry's elfin (*Incisalia henrici*),
Kalmia latifolia -- mountain laurel (2) and brown elfin (*I. augustinus*).

PRIMULACEAE

- Lysimachia ciliata -- fringed loosestrife (1)
L. quadrifolia -- whorled loosestrife (5)
L. terrestris -- yellow loosestrife (1,5)
L. mummularia -- moneywort (4,5)
Trientalis borealis -- star flower (2)

OLEACEAE

- Fraxinus americana -- white ash (3,4,8)
Ligustrum vulgare -- privet (8)
Syringa vulgaris -- lilac (8)

GENTIANACEAE

- Gentiana crinita -- fringed gentian (5)

APOCYNACEAE

- Vinca minor -- myrtle (8)

ASCLEPIADACEAE

- Asclepias incarnata -- swamp milkweed (1) Monarch (Danaus plexippus)
A. syriaca -- common milkweed (1)

CONVOLULACEAE

- Convolvulus sp. -- bindweed (1)

BORAGINACEAE

- Myostis scorpioides -- forget-me-not (1,4,5)

POLEMONIACEAE

- Phlox maculata -- sweet william (1)

VERBENACEAE

- Verbena hastata -- vervain (1)

LABIATAE

- Leonurus cardiaca -- motherwort (8)
Thymus serpyllum -- creeping thyme (1)
Lycopus rubellus -- bugleweed (1)
Mentha arvensis -- wild mint (1)
Nepeta cataria -- catnip (7)

SOLANACEAE

- Solanum dulcamara -- nightshade (5,8)

SCROPHULARIACEAE

- Mimulus ringens -- monkey flower (1)
Verbascum thapsus -- mullein (4)
Chelone glabra -- turtlehead (5,6,7) Baltimore (Euphydryas phaeton).
Linaria vulgaris -- butter-and-eggs (1)

RUBIACEAE

- Houstonia caerulea -- bluets (1)
- Mitchella repens -- partridge berry (2,3)
- Galium mollugo -- bedstraw (1)
- Galium sp. -- cleavers (3,4)

CAPRICOLIACEAE

- Viburnum alnifolium -- hobblebush (3)
- V. trilobum -- highbush cranberry (4)
- V. dentatum -- arrowwood (3,5)
- Sambucus canadensis -- common elderberry (1,5,8)
- Lonicera tartarica -- tartarian honeysuckle (5)
- Lonicera sp. -- "honeysuckle" (4,5,8)

CUCURBITACEAE

- Echinocystis lobata -- wild cucumber (4,8)

CAMPANULACEAE

- Lobelia cardinalis -- cardinal flower (5)
- L. inflata -- Indian tobacco (1)
- L. spicata -- pale-spike lobelia (1)

COMPOSITAE

- Helianthus sp. -- sunflower (8)
- Rudbeckia hirta -- black-eyed susan (1)
- Bidens cernua -- bur marigold (5,6)
- Bidens sp. -- beggar's ticks (1)
- Ambrosia artemisiifolia -- ragweed (1)
- Achillea millefolium -- yarrow (1)
- Chrysanthemum leucanthemum -- daisy (1)
- Senecio sp. -- rag-wort (1,8)
- Tussilago farfara -- coltsfoot (1,5)
- Solidago sp. -- goldenrod (1,5)
- S. graminifolia -- goldenrod (1)
- S. nigosa -- goldenrod (1,4,8)
- Aster lowrieanus -- Lowrie's aster (3) Asters are eaten by silvery checker spot
A. acuminatus -- whorled wood aster (3,4,8) (Melitaea nycteis) and pearl crescent
Erigeron annuus -- daisy fleabane (1,4) (Phyciodes tharos).
- Eupatorium maculatum -- spotted Joe-Pye-weed (1,5)
- E. perfoliatum -- boneset (1,6)
- Arctium minus -- common burdock (8)
- Cirsium sp. -- "thistle" (1)
- Centaurea sp. -- "knapweed" (1)
- Hieracium aurantiacum -- hawkweed (1)
- Taraxacum officinalis -- common dandelion (1)
- Chicorium intybus -- chicory (1)
- Tragopon pratensis -- goat's-beard (1)

APPENDIX 2 - LIST OF INVERTEBRATES (Coddington, Field and Lazell 1976: 16-20)

(Numbers in parentheses are vegetative associations. See list of plant species for potential butterflies by food plants.)

BUTTERFLIES

Cercyonis pegala alope, southern wood nymph (1)
Cercyonis pegala nephele, northern wood nymph (1)
Lethe portlandica, pearly eye (3)
Lethe e. eurydice, eyed brown (1)
Danaus plexippus, monarch (1)
Boloria toddi, meadow fritillary (1)
Euphydryas phaeton, Baltimore (1)
Phyciodes tharos, pearl crescent (1)
Vanessa atalanta, red admiral (1)
Limenitis archippus, viceroy (1)
Satyrium calanus, banded hairstreak (3)
Celastrina argiolus, spring azure (3)
Colias eurytheme, orange sulphur (1)
Colias philodice, clouded sulphur (1)
Pieris rapae, cabbage butterfly (1)

DRAGONFLIES (all around water)

Boyeria vinosa
Anax junius
Plathemis lydia
Libellula pulchella
Libellula luctuosa
Sympetrum internum
Sympetrum obtusum
Pachydiplax longipennis

ARACHNIDS

Caddo agilis (2)
Odiellus pictus (2)
Leiobunum calcar (2,3)
Leiobunum ventricosum (2,3)
Leiobunum nigropalpi (2,3)
Pityophantes phrygianus (1,2,3)
Linyphia marginata (1,2,3)
Acharanea tepidariorum
Argyrodes trigona (2)
Argiope trifasciata (1)
Argiope aurantia (1)
Neoscona arabesca (1)
Araneus cavaticus
Araneus marmoreus (1)
Araneus trifolium (1)

ARACHNIDS (continued)

Tetragnatha versicolor (6)

Amaurobius benetti (2,3)

Agelenopsis sp. (2,3)

Wadotes hybridus (2,3)

Coras sp. (2,3)

Schizocosa sp. (2,3)

Pardosa sp. (2,3)

Xysticus sp. (2,3)

Sitticus palustris (2,3)

AMPHIBIANS (Numbers in parentheses are vegetative associations).

American toad (*Bufo americanus*); sight; calling (4)
Fowler's toad (*Bufo woodhousei*); potential.
Peeper (*Hyla crucifer*); sight; calling; photos (6,7)
Green treefrog (*Hyla versicolor*); potential.
Bullfrog (*Rana catesbeiana*); sight; calling (4)
Green frog (*Rana clamitans*); sight; calling (4,6,7)
Leopard frog (*Rana pipiens*); specimen, MCZ A-89505 (1,4,7,8)
Pickeral frog (*Rana palustris*); calling (6)
Wood frog (*Rana sylvatica*); sight; calling (2,3,4,5,6)
Two-lined salamander (*Eurycea bislineata*); specimens, MCZ F-3960-3 (2,3)
Woodland salamander (*Plethodon cinereus*); sight (2,3,4,5)

REPTILES (Numbers in parentheses are habitats where snakes have been encountered; they are not restricted to these. All turtles excavate nests on high, dry ground, even if they live in the water.)

Garter snake (*Natrix sirtalis*); photos; ubiquitous
Water snake (*Natrix sipedon*); potential
DeKay's snake (*Storeria dekayi*); potential
Green snake (*Opheodrys vernalis*); photos (2,3)
"Milk" or kingsnake (*Lampropeltis triangulum*); photos (3)
Painted turtle (*Chrysemys picta*); sight; photos
Snapping turtle (*Chelydra serpentina*); sight
Wood turtle (*Clemmys insculpta*); potential
Box turtle (*Terrapene carolina*); potential

MAMMALS (Numbers in parentheses indicate known habitats, but do not imply that species are so restricted; many mammals might occur anywhere. See Map of Special Features. Introduced exotics and feral domestics are not listed.)

Opossum (*Didelphis virginianus*); potential
Common mole (*Scalopus aquaticus*); potential
Hairy-tail mole (*Parascalops breweri*); potential (2,3)
Star-nose mole (*Condylura cristata*); specimen, MCZ F-3953 (2)
Short-tail shrew (*Blarina brevicauda*) specimens, MCZ F-3954-5 and F-3958 (2,3)
Masked shrew (*Sorex cinereus*); potential
Smoky shrew (*Sorex fumeus*); potential (2,3)
Water shrew (*Sorex palustris*); potential (5,6,7)
Woodchuck (*Marmota monax*); sight, dens (1,3,5,8)
Grey squirrel (*Sciurus carolinensis*); sight, voice
Red squirrel (*Sciurus hudsonius*); sight, voice
Chipmunk (*Tamias striatus*); sight; voice
Southern flying squirrel (*Glaucomys volans*); potential

MAMMALS (continued)

Northern Flying squirrel (*Glaucomys sabrinus*); potential (2,3)
Meadow vole (*Microtus pennsylvanicus*); sight (1,5,8)
Red-back vole (*Clethrionomys gapperi*); potential (4,5,6)
Muskrat (*Ondatra zibethica*); sight; tracks (1,4,5,6,7)
White-footen mouse (*Peromyscus leucopus*); sight
Deer mouse (*Peromyscus maniculatus*); potential (2,3)
Meadow jumping mouse (*Zapus hudsonicus*); potential (7)
Woodland jumping mouse (*Napaeozapus insignis*); potential (2,3)
Porcupine (*Erethizon dorsatum*); potential (2,3)
Beaver (*Castor canadensis*); potential; formerly seen
Eastern cottontail (*Sylvilagus transitionalis*); potential (2,3,5)
Snowshoe hare (*Lepus americanus*); potential (2,3,5)
Raccoon (*Procyon lotor*); tracks
Red fox (*Canis vulpes*); sight; den (1,8)
Grey fox (*Canis cinereoargenteus*); potential (2,3)
Mink (*Mustela vison*); sight (4,5,6,7)
Otter (*Lutra canadensis*); potential (4)
Skunk (*Mephitis mephitis*); sight
Deer (*Odocoileus virginianus*); sight; tracks

APPENDIX 4 - LIST OF BIRDS (Burg 1976: 1-4)

Great Blue Heron - transient
 Green Heron - potential nester
 Great Egret - irregular
 American Bittern - transient
 Canada Goose - introduced
 Mallard - introduced
 Black Duck - nesting
 Green-winged Teal - transient
 Wood Duck - nesting
 Hooded Merganser - transient
 Turkey Vulture - transient
 Goshawk - potential nester
 Sharp-shinned Hawk - transient
 Cooper's Hawk - transient
 Red-tailed Hawk - potential nester
 Red-shouldered Hawk - transient
 Broad-winged Hawk - potential nester
 Rough-legged Hawk - transient
 Marsh Hawk - transient
 Osprey - transient
 American Kestrel - nesting
 Ruffed Grouse - nesting
 Ring-necked Pheasant - introduced
 Killdeer - nesting
 American Woodcock - nesting
 Common Snipe - nesting
 Spotted Sandpiper - transient
 Solitary Sandpiper - transient
 Greater Yellowlegs - transient
 Pectoral Sandpiper - transient
 Least Sandpiper - transient
 Semipalmated Sandpiper - transient
 Mourning Dove - nesting
 Yellow-billed Cuckoo - transient
 Screech Owl - nesting
 Great Horned Owl - transient
 Barred Owl - potential nester
 Short-eared Owl - rare
 Common Nighthawk - potential nester
 Chimney Swift - potential nester
 Ruby-throated Hummingbird - potential nester
 Belted Kingfisher - potential nester
 Common Flicker - nesting
 Pileated Woodpecker - potential nester
 Hairy Woodpecker - nesting
 Downy Woodpecker - nesting
 Eastern Kingbird - nesting
 Great Crested Flycatcher - nesting
 Eastern Phoebe - nesting
 Alder Flycatcher - nesting

Least Flycatcher - transient
 Eastern Wood Pewee - nesting
 Horned Lark - transient
 Tree Swallow - potential nester
 Bank Swallow - transient
 Rough-winged Swallow - transient
 Barn Swallow - nesting
 Cliff Swallow - transient
 Blue Jay - nesting
 Common Crow - potential nester
 Black-capped Chickadee - nesting
 Tufted Titmouse - potential nester
 White-breasted Nuthatch - nesting
 Red-breasted Nuthatch - transient
 Brown Creeper - transient
 House Wren - nesting
 Winter Wren - nesting
 Carolina Wren - rare
 Mockingbird - nesting
 Gray Catbird - nesting
 Brown Thrasher - nesting
 American Robin - nesting
 Wood Thrush - nesting
 Hermit Thrush - potential nester
 Swainson's Thrush - transient
 Gray-checked Thrush - transient
 Veery - nesting
 Golden-crowned Kinglet - potential
 nester
 Ruby-crowned Kinglet - transient
 Water Pipit - transient
 Cedar Waxwing - potential nester
 Starling - introduced
 Solitary Vireo - nesting
 Red-eyed Vireo - nesting
 Black-and-White Warbler - transient
 Northern Parula - transient
 Yellow Warbler - nesting
 Magnolia Warbler - transient
 Cape May Warbler - transient
 Yellow-rumped Warbler - transient
 Black-throated Green Warbler - nesting
 Blackburnian Warbler - nesting
 Bay-breasted Warbler - transient
 Palm Warbler - transient
 Ovenbird - nesting
 Northern Waterthrush - potential nester
 Louisiana Waterthrush - nesting
 Common Yellowthroat - nesting
 American Redstart - nesting

House Sparrow - introduced
Bobolink - potential nester
Eastern Meadowlark - nesting
Redwinged Blackbird - nesting
Northern Oriole - nesting
Rusty Blackbird - transient
Common Grackle - potential nester
Brown-headed Cowbird - laying eggs
Scarlet Tanager - potential nester
Cardinal - nesting
Rose-breasted Grosbeak - nesting
Wild Turkey - stocked
Evening Grosbeak - transient
Purple Finch - nesting
Pine Grosbeak - transient
Common Redpoll - transient
American Goldfinch - nesting
Rufous-sided Towhee - nesting
Savannah Sparrow - potential nester
Vesper Sparrow - transient
Dark-eyed Junco - transient
Tree Sparrow - transient
Chipping Sparrow - nesting
Field Sparrow - potential nester
White-crowned Sparrow - transient
White-throated Sparrow - transient
Fox Sparrow - transient
Lincoln's Sparrow - transient
Swamp Sparrow - nesting
Song Sparrow - nesting

APPENDIX 5 - MAPS & DESIGN DEVELOPMENT PLANS

SOILS - SHEET A5

VEGETATION - SHEET A6

SPECIAL FEATURES - SHEET A7

VISUAL ASPECTS - SHEET A9

ANALYSIS SYNTHESIS - SHEET A10

DESIGN & MANAGEMENT PROPOSALS - SHEET D1

VISITOR CENTER DEVELOPMENT PROPOSAL - SHEET D2

SELECTED BIBLIOGRAPHY

- Blanchard, D. and Burg, D. "Canoe Meadows - Preliminary Master Plan." Lincoln, Mass.: Mass. Audubon Society, 1977. (Map.)
- Blanchard, David. "Canoe Meadows Wildlife Sanctuary: Recommendations for Future Policies and Programs." Massachusetts Audubon Society, Lincoln, Mass. October 1977. (Typewritten.)
- Burg, David. "A Checklist of Massachusetts Birds - Canoe Meadows." Pittsfield, Mass. 1976. (Written Checklist.)
- Brush, Robert O. "Spaces Within the Woods: Managing Forests for Visual Enjoyment." Journal of Forestry. 74 (November 1976): 744-747.
- Coddington, Jonathan A.; Field, Katharine G.; and Lazell, James D., Jr. "Canoe Meadows - A Preliminary Report on Plants and Wildlife." Massachusetts Audubon Society, Lincoln, 1976. (Typewritten.)
- Envirland Associates. "Environmental Analysis and Recommended Treatments for Property of Cooley G. Crane, Pittsfield, Massachusetts." Hadlyme, Connecticut, 1975. (Typewritten.)
- Envirland Associates. "Analysis and Planning Objectives for Property of Cooley G. Crane in Pittsfield, Massachusetts." Hadlyme, Connecticut, 1975a. (Typewritten.)
- Forest Service, U.S.D.A. National Forest Landscape Management. 1, Agriculture Handbook No. 434. 1973.
- Forest Service, U.S.D.A. National Forest Landscape Management. 2, Ch.3, RANGE. Agriculture Handbook No. 484. 1977.
- MacConnell, William P. Remote Sensing 20 Years Change in Massachusetts 1952-1972, Classification Manual, Land-Use and Vegetative Cover Mapping, Manual for use with Massachusetts Map Down Maps. Research Bull. 631. Amherst; Mass. Agr. Exper. Sta., 1975.
- MacConnell, William P. and Niedzwiedz, William. Remote Sensing 20 Years of Change in Berkshire County, Massachusetts, 1952-1972. Research Bull. 629. Amherst; Mass. Agr. Exper. Sta., 1975.
- Latimer, W.J. and Lanphear, M.O. Soil Survey of Berkshire County, Massachusetts. Washington: U.S. Government Printing Office, 1929.
- Scape Unlimited, Inc. "Canoe Meadows Wildlife Sanctuary Pittsfield, Massachusetts." Appendices 3-5. Springfield, 1977. (Plans.)
- U.S. Department of Agriculture, Soil Conservation Service. Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas. Maryland: College Park, 1975.