

The authors have made this information available to the National Park Service in order to provide recommendations concerning use and resource management along the Appalachian Trail corridor in Vermont. Specific locations of various Vermont natural resources of concern are presented. We believe that public disclosure of this report will not further endanger these resources. However, in order to ensure protection of these natural features, disclosure of this information is not encouraged.

Significant Ecological Features of the
Appalachian Trail Corridor
in Vermont

Final Report to the National Park Service
(Cooperative Agreement #CA-0631-9-8004)

Appalachian Trail Conference
and
U.S. Forest Service, Green Mountain National Forest

April 1991

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ACKNOWLEDGEMENTS

The authors wish to express their sincere thanks to those who provided information or otherwise assisted with this project, including: Ron Ahoe, Ray Auger, Preston Bristow, Jerry Jenkins, Craig Jolly, Kevin Peterson, Thomas Phillips, Elizabeth Thompson, and Ian Worley. This inventory was funded by the National Park Service (Cooperative Agreement #CA-0631-9-8004), the Appalachian Trail Conference, and the U.S. Forest Service, Green Mountain National Forest.

ABSTRACT

This project was initiated as part of a program to inventory the entire length of the Appalachian National Scenic Trail for threatened, endangered and sensitive species and exemplary natural communities. In Vermont, the Appalachian Trail extends for 142 miles from Massachusetts to New Hampshire, along the spine of the Green Mountains, then east through the Vermont Piedmont to the Connecticut River. Background data were collected from Vermont Nongame & Natural Heritage Program (VNNHP) files, topographic maps, National Wetlands Inventory maps, bedrock geology maps, soil maps, and individuals familiar with the trail. This process resulted in the identification of 172 potential sites. Field surveys were conducted at 107 sites, including all high priority sites and some of the low priority sites. A total of 32 sites were found to contain occurrences of threatened, endangered or sensitive species or exemplary natural communities. Low priority sites that have not been visited will be assessed from aircraft in 1991. Field evaluation of natural communities and rare species was based on rarity, quality of the occurrence, degree of disturbance, and level of threat. VNNHP field forms were used to record field data. All data were entered into the VNNHP map and computer database, which are managed and maintained by the Vermont Fish and Wildlife Department.

INTRODUCTION

Purpose

The National Trails System Act of 1978 established a system of trails to provide for the outdoor recreation needs of the nation, and to provide for "the conservation ... of the nationally significant scenic, historic, natural or cultural qualities of the areas through which the Trail may pass." Section 5(e) of the Act requires that a Comprehensive Plan for the management and use of the Appalachian Trail (AT) be prepared, and that the plan identify all significant resources to be preserved along the Trail. As management of the Trail has grown in complexity, it has become increasingly evident that more detailed resource information is needed to aid in the decision-making process regarding trail maintenance and management.

This project was undertaken for the purpose of identifying the locations of rare plants and animals and rare or outstanding natural communities along the 142 miles of the AT in Vermont. Species and natural communities listed by the Vermont Nongame & Natural Heritage Program (VNNHP) as S1, S2, S3, SH, SU, SX (for an explanation of these ranks see pages 10-11) were the focus of the inventory. A corridor of 0.5 mile on either side of the AT defined the study area. The results of this inventory are intended to provide the National Park Service (NPS), Appalachian Trail Conference (ATC), Green Mountain National Forest (GMNF), Green Mountain Club (GMC), and Dartmouth Outing Club (DOC) with

information vital to the protection of ecologically significant resources along the AT.

Description of the Study Area

The Appalachian Trail passes through two physiographic regions while in Vermont: Green Mountains and Vermont Piedmont. From Massachusetts, the AT extends for 142 miles following the upper elevations of the Green Mountains to Sherburne where the trail heads east through the mountain foothills and hilly Piedmont region to the Connecticut River. The trail generally stays above 2000 feet from Stamford to Bridgewater except where it crosses Route 9 in Woodford, the Mill River in Clarendon, the Cold River in Shrewsbury, and the Ottauquechee River in Sherburne. From Bridgewater, the AT gradually descends to the Connecticut River at 400 feet elevation. The highest point on the AT is on the shoulder of Killington Peak at 3920 feet; the lowest is along the Connecticut River at 400 feet.

Geology. The oldest bedrock of the Green Mountain region is Precambrian, dating back approximately 900 million years. The present-day Green Mountains are essentially remnant foothills of a much larger, earlier Appalachian Mountain range which today constitutes the continental shelf. Eroded sediments of earlier mountain ranges have been compressed and folded under tremendous heat and pressure to form the Green Mountains we see today. A

core of Precambrian rocks, representing the first Appalachian Mountain range, occur as outcrops in many areas of today's mountains. Generally, these ancient rocks of the Mount Holly complex are of volcanic origin (gneisses, quartz-biotite-chlorite schists, and greenstones) which have metamorphosed through millions of years of thrusting, dipping, and folding. Initial metamorphoses took place during a mountain-building event during Precambrian times. Much of this mountain region is characterized by an eroded anticlinorium, or major fold. Interbedded with the Precambrian age rocks are younger strata of Ordovician age (500 million years old), including carbonate beds, found along the western flank of the mountains.

Between Bridgewater and the Connecticut River, geology is more complex. Rocks date from the Precambrian Era to the Devonian Period (395 million years ago), and are metamorphosed structures of sedimentary and volcanic origin. This Piedmont region represents the extensively eroded foothills of the Green Mountains. Included in this region are interbedded zones of phyllites, schists, quartzite, gneisses, and amphibolite. In the eastern portion of the Piedmont region, limestones and marbles are evident as members of the Waits River Formation. Also evident here is the intense folding of the various strata.

Vermont was entirely glaciated at least 4 times within the past 3 million years. The last continental glacier, the Wisconsin glacial period, peaked 18,000 years ago, and the ice

disappeared from Vermont 10,000 years ago. Tremendous volumes of sand, gravel, and boulders were deposited by the glaciers as they moved over the land and then receded. Many lakes, ponds, and bogs were formed when valleys and former drainages were blocked or when buried ice chunks melted. Glacial scouring deepened and reshaped existing valleys and other features.

Vegetation. The predominant vegetation or natural community type through which the AT passes is birch-beech-maple forest. At higher elevations in the Green Mountains, generally above 2000 feet, the spruce-fir forest type occurs intermixed with birch-beech-maple or alone on the highest ridges as montane spruce-fir forest. Above 3800 feet, balsam fir (Abies balsamea) occurs as stunted, windblown and sometimes matted forests, called krummholz. Krummholz zones sometimes support rare alpine plant species, particularly where open ledge is found. Gray-cheeked thrushes (Catharus minimus) nest in upper elevation spruce-fir and krummholz. On steep lower slopes or north slopes where downslope movement of soil results in deep, rich colluvial deposits, a rich northern hardwood forest results. These forests are higher in species diversity than birch-beech-maple, and the understory, especially the ground flora, exhibit tremendous diversity. In ravines on north-facing slopes and on dry, thin-soiled west slopes, dense stands of eastern hemlock (Tsuga canadensis) and white pine (Pinus strobus) are occasionally

found.

Outcrops and cliffs occur throughout the Green Mountains, but are less common in the Piedmont. Acidic rock types, such as biotite schists and gneisses support a depauperate flora of lichens, ericaceous shrubs (e.g., Vaccinium angustifolium), red spruce (Picea rubens), and rock polypody (Polypodium vulgare). Where phyllites, carbonate schists, or marble outcrops occur, a richer flora can be found.

The eastern portion of the Piedmont region generally exhibits richer forests than in the mountains because of the carbonate-rich soils lying atop the Waits River Formation. South and west facing hills, because they are drier, lower and generally warmer have a greater proportion of red oak (Quercus rubra) and white oak (Q. alba) in the overstory. Oaks are more common in the Connecticut River valley and the hills along the tributaries owing to the probable advancement of oaks north during a warmer post-glacial period and the longer growing season.

Wetlands are common along the AT, particularly in the Green Mountains. Vast beaver-influenced wetland complexes display a variety of habitat types: open water, cattail marsh, sedge-grass-rush marsh, shrub swamp, and even lowland bog. Wildlife value of these complexes is high owing to the diversity of cover types, nesting substrate, and available foods. Uncommon sedges are sometimes found in these 'beaver flowages'. Small forested wetlands vegetated with eastern hemlock (Tsuga canadensis), red

maple (Acer rubrum), yellow birch (Betula allegheniensis), and sensitive fern (Onoclea sensibilis) dot the landscape. Vernal woodland pools occur in saddles or on side-slope terraces in the hills above the Connecticut River valley.

The Green Mountains influence local climate and have among the most severe weather in the state. Westerly winds are intercepted by the mountain range causing them to stall and release precipitation. Rain and snowfall are therefore highest in the mountains. The mountains also experience the coldest winter temperatures and shortest growing season, both of which decrease with increasing elevation.

VERMONT NONGAME & NATURAL HERITAGE PROGRAM DATA MANAGEMENT SYSTEM

The Vermont Natural Heritage Program (VNHP) began in 1983 as part of The Nature Conservancy's Vermont Field Office. The purpose of the Program was to inventory and catalog the best and rarest natural communities and the locations of the rarest and most threatened plant and animal species in Vermont. The Conservancy used that information to prioritize its land acquisition efforts. In 1987, the Program was moved to the Vermont Agency of Natural Resources to serve as Vermont's central repository of information on natural communities and the status of rare plants and animals. VNHP is now housed in the Vermont Fish and Wildlife Department as part of the Nongame & Natural Heritage Program (VNNHP).

Beginning in 1983, VNHP primarily collected existing data on occurrences of elements of concern, as obtained from publications, herbarium and museum records, and the knowledge of expert botanists, zoologists, ecologists, and naturalists. From this foundation, VNHP has focused its efforts on reverification of historic records and systematic inventories for the best occurrences of the priority elements.

The National Park Service contracted VNNHP in 1989 to inventory the Appalachian Trail in Vermont for rare or sensitive ecological features to aid in sensible Trail planning and wise use of land along the Trail corridor. This inventory is also

part of a Natural Heritage Program goal to complete a systematic statewide inventory of ecologically significant natural features.

The VNNHP database is used routinely by private consultants and state and federal agencies to evaluate development proposals, and to assist municipalities and state and federal agencies with land-use planning efforts.

Statewide and Global Ranking of Rare Species and Natural Communities.

The following ranks are used by Natural Heritage Programs, The Nature Conservancy, and their network cooperators. The primary criterion for ranking species is the number of known distinct occurrences. An occurrence represents a discreet subpopulation or group of individuals of a particular species, or another conservation unit, such as a distinct natural community.

A discreet subpopulation is judged as such by professional and amateur biologists familiar with the species. Boundaries of an individual occurrence include habitat and acreage necessary for reproduction, feeding, and/or roosting.

Other criteria considered in assigning a rank are: total number of individuals (or acres) in existence at each locality, trends in numbers of occurrences or individuals, the condition of the occurrences, the number of protected occurrences, fragility, and threats. However, the emphasis remains on the number of occurrences such that ranks primarily reflect biological rarity and secondarily reflect other factors such as trends, threats, and fragility. State and global ranks are as follows:

S1, G1 - Extremely rare. Typically 5 or fewer estimated occurrences in the state (S1) or world (G1). May be especially vulnerable to extirpation (state) or extinction (global).

S2, G2 - Very rare. Typically between 5 and 20 estimated occurrences in the state (S2) or world (G2), or with many individuals in fewer occurrences. Often susceptible to becoming extirpated (state) or extinct (global).

S3, G3 - Rare to uncommon. Typically between 20 and 100 estimated occurrences in the state (S3) or world (G3), or may have fewer occurrences but with a large number of individuals in some populations. May be susceptible to large-scale disturbances.

S4, G4 - Common; apparently secure under present conditions. Typically 100 or more estimated occurrences, but may be fewer with many large populations or may be restricted to only a portion of the state (S4) or globe (G4). Usually not susceptible to immediate threats.

S5, G5 - Very common; demonstrably secure under present conditions.

Ranking Rare Species and Natural Community Occurrences.

Natural Heritage Programs attempt to assign ranks to each occurrence of a rare plant, animal, or natural community (referred to as elements). Each occurrence rank represents a comparative evaluation of that particular occurrence against

other known occurrences of that same element. Several factors are considered when determining an occurrence rank:

- 1) Quality - how representative is the occurrence of this element.
- 2) Condition - degree of naturalness of the population or site.
- 3) Viability - what is the long-term prospect for continued existence of the element at the site.
- 4) Defensibility - extent to which the element can be protected from extrinsic human factors that might otherwise degrade or destroy it.

Element occurrence ranks are assigned as A, B, C, D, E, F, H, O, or X, with an A rank indicating that the element is virtually undisturbed, large, stable and existing in its natural habitat, and an X rank indicating that the element appears to have been extirpated from the site. Definitions of element occurrence ranks are as follows:

A = Excellent occurrence: all A-rank occurrences of a sensitive species or natural community merit quick, strong protection. An A-rank community is nearly undisturbed by humans, or has nearly recovered from early human disturbance; it is further distinguished by being an extensive, well-buffered, etc. occurrence. An A-rank population of a sensitive species is large in area and number of individuals, stable, if not growing, shows good reproduction, and exists in natural habitat.

B = Good occurrence: protection of the occurrence is important to the survival of the species or natural community in Vermont, especially if very few or no A-rank occurrences exist. A B-rank community is still recovering from early disturbance or recent light disturbance but eventually will reach A-rank, or it is nearly undisturbed or nearly recovered from disturbance but is less than A-rank because of significantly smaller size, poorer buffer, etc. A B-rank population of a sensitive species is at least stable, in a minimally disturbed habitat, and of moderate size and number.

C = Fair occurrence: protection of the occurrence helps conserve the diversity of a region's or county's biota and is important to state-wide conservation if no higher-ranked occurrences exist. A C-rank community is in an early stage of recovery from disturbance, or its structure and composition have been altered such that the original vegetation of the site will never rejuvenate, yet with management and time partial restoration of the community is possible. A C-rank population of a sensitive species is in a clearly disturbed habitat, small in size and/or number, and possibly declining.

D = Poor occurrence: protection of the occurrence may be worthwhile for historical reasons or only if no higher ranked occurrences exist. A D-rank community is severely disturbed, its structure and composition have been greatly altered, and recovery to original conditions, despite management and time, essentially

will not take place. A D-rank population of a sensitive species is very small with a high likelihood of dying out or being destroyed, and exists in a highly disturbed and vulnerable habitat.

METHODS

Background Information/Historical Data

The initial stage in the Appalachian Trail inventory involved searching the VNNHP historical and current records. Examination of herbarium and museum records was done early in the VNNHP's history and was not repeated for this inventory. Recent (1986) false-color infrared aerial photography was examined to determine locations of potential natural communities of ecological significance. Bedrock geology (Vermont Geological Survey, 1961) and National Wetlands Inventory maps were examined. Four reports - Henry (1971), Jenkins (1981), Jenkins (1989), and Jenkins and Zika (1985) - were consulted for potential natural areas. Finally, knowledgeable experts were consulted to identify areas of ecological significance that were known to them.

A total of approximately 170 sites were identified during the background phase of the inventory. Criteria used to determine whether a site warranted field inventory are as follows:

1. wetlands larger than 15 acres in size; or
2. smaller wetlands, but with some boggy vegetation (an uncommon community, and potential rare plant habitat); or
3. ponds larger than 15 acres; or
4. smaller ponds that show no signs of human disturbance; or
5. high-elevation spruce-fir forest; or

6. old growth forests of any type; or
7. significant areas of exposed bedrock or talus (potential rare plant habitat); or
8. steep hardwood slopes in combination with calcareous bedrock (these sites are mostly in the eastern part of the study area and are potential rare plant habitat); or
9. areas known to support rare plants or animals in the past (historical records); or
10. unusual geographic feature (such as a gorge); or
11. sites of known ecological significance for some other reason.

Aerial Survey

Low-altitude flights using a fixed-wing aircraft were planned to determine the condition and status of potential natural areas. Because of poor weather and scheduling problems, however, the flights were postponed until the spring of 1991.

Field Survey

Approximately 170 sites were initially identified and prioritized for field survey using the criteria listed above in consultation with Appalachian Trail Conference, Green Mountain Club, and U.S. Forest Service personnel. A total of 96 sites were field checked.

Field work began in early May, 1990, with surveys of vernal woodland pools, and ended in September, 1990. VNNHP site survey, rare plant, rare animal, and natural community field forms were

completed, where appropriate, to document the significant features of a site.

Data Analysis

Field information on all significant natural communities and rare plant and animal species was plotted on VNNHP maps, summarized on Element Occurrence Records (EOR's), and entered into the VNNHP computer database. All computer and manual files were updated with current information concerning element, land ownership, and land management priorities.

Maps

All 172 pre-identified sites were delineated on a set of 7.5 minute topographic maps which were deposited at the Northeast Regional Office of the Appalachian Trail Conference in Norwich, Vermont. A table specifying the feature of interest at the site, whether it was visited or not, and whether anything of significance was noted, is included with the maps.

RESULTS

Site Descriptions

Descriptions were prepared for each ecologically significant site found along the Appalachian Trail. Each site report lists the site name; location; list of elements, including element ranks, state and federal status, and element occurrence rank; site description and its significance; any threats to the elements; and recommendations for protecting or managing the elements at the site. Each site report is accompanied by a copy of the portion of the appropriate USGS topographic map, with the site outlined to facilitate locating the elements.

Pine Marten (*Martes americana*)

An extirpated species in Vermont, the pine marten, was reintroduced to parts of the Green Mountain National Forest in 1989 and 1990 under a cooperative effort of the Vermont Fish and Wildlife Department and the U.S. Forest Service. Pine martens are wide-ranging furbearers which feed on small rodents. In 1989, 40 martens were released in Wallingford and Mt. Tabor; in 1990, 29 matens were released in the Lye Brook Wilderness Area. All animals are wearing metal ear tags for identification, and a few were fitted with radio collars to facilitate relocating them. Martens may be encountered by hikers anywhere along the AT in southern Vermont. Sightings should be reported to U.S. Forest Service personnel or the Nongame & Natural Heritage Program.

Table 1. Summary of significant ecological features along the Appalachian Trail in Vermont.

<u>Site no. in Fig. 1</u>	<u>Page no. in report</u>	<u>Site name</u>	<u>Element Occurrences</u>
1		Lake Hancock	Rusty blackbird
2		Stamford Stream Wetland Complex	Long sedge Water sedge
3		Thendara Camp Fen	Medium fen Water sedge
4		Split Rock Blowdown	Summer sedge
5		Little Pond	Tuckerman's pondweed
6		Glastenbury Mountain	Small-flowered rush Gray-cheeked thrush
7		Stratton Mountain	Small-flowered rush Gray-cheeked thrush Bay-breasted warbler
8		Stratton Meadow Bog	Lowland bog Rusty blackbird
9		Little Mud Pond	Lowland bog Rusty blackbird
10		Downer Glen	Rich northern hardwood forest Goldie's fern
11		Griffith Lake	American shore-grass Michaux's sedge Long sedge Large-leaved avens Rusty blackbird
12		Lost Pond	Black spruce swamp Lowland bog
13		White Rocks	Large open talus Acidic/circumneutral cliff Spruce-fir forest Wild millet

Table 1 continued.

<u>Site no. in Fig. 1</u>	<u>Page no. in report</u>	<u>Site name</u>	<u>Element Occurrences</u>
14		Lottery Road Swamp	Red maple-tamarack peat swamp
15		Shrewsbury Peak	Spruce-fir forest Gray-cheeked thrush
16		Mendon Peak	Spruce-fir forest
17		Killington and Little Killington Peaks	Subalpine krummholz Small-flowered rush Northern mountain-ash Gray-cheeked thrush
18		Pico Peak	Subalpine krummholz Northern mountain-ash Wild millet Gray-cheeked thrush
19		Gifford Woods	Rich northern hardwood forest
20		The Continental Divide	Vernal woodland pool Goldie's fern
21		Dana Hill Pool	Vernal woodland pool
22		Cloudland Brook Pool	Vernal woodland pool
23		Totman Hill Fen	Medium fen
24		Thistle Hill	Rich northern hardwood forest Goldie's fern
25		Thistle Hill Pool	Vernal woodland pool
26		Handy Road Woods	American ginseng
27		West Hartford Seep	Riverside seep Sticky tofieldia Fringed gentian Few-flowered spikerush

Table 1 continued.

<u>Site no. in Fig. 1</u>	<u>Page no. in report</u>	<u>Site name</u>	<u>Element Occurrences</u>
28		Griggs Mountain	Leathery grape fern
29		Happy Hill Pool	Vernal woodland pool
30		Bragg Brook Hill	Leathery grape fern
31		Mosley Hill Pool	Vernal woodland pool
32		East Hill Pool	Vernal woodland pool

Table 2. Global and state ranks and federal and state status of significant ecological features along the Appalachian Trail in Vermont.

<u>Common name</u>	<u>Scientific name</u>	<u>Global rank</u>	<u>State rank</u>	<u>Federal status</u>	<u>State status</u>
Riverside seep community		G3	S1		
Rich northern hardwood forest		G5			
Spruce-fir forest		G5	S4		
Subalpine krummholz		G3G4	S2		
Large open talus		G?	S1		
Acidic/circumneutral cliff		G5	S4		
Lowland bog		G5S2			
Medium fen		G3G4			
Black spruce swamp		G4G5	S2		
Red maple-tamarack peat swamp		G3G4			
Vernal woodland pool		G5S3			
Leathery grape fern		G5	S3		
	<u>Botrychium multifidum</u>				
Goldie's fern		G4	S3		
	<u>Dryopteris goldiana</u>				
Wild millet		G5	S3		
	<u>Milium effusum</u>				
Michaux's sedge		G5	S3		
	<u>Carex michauxiana</u>				
Long sedge		G4G5	S3		
	<u>Carex folliculata</u>				
Water sedge		G5	S2 S3		
	<u>Carex aquatilis</u>				
Summer sedge		G4	S1		
	<u>Carex aestivalis</u>				
Few-flowered rush		G5	S1		T
	<u>Eleocharis pauciflora</u>				
Small-flowered rush		~~G4G5~~ G5	S1 S2		
	<u>Luzula parviflora</u>				
Sticky tofieldia		G5	S1		T
	<u>Tofieldia glutinosa</u>				
American shore-grass		G5	S2		SC
	<u>Littorella americana</u>				
Tuckerman's pondweed		~~G5~~ G364	~~S1S2~~ S2		SC
	<u>Potamogeton confervoides</u>				
Large-leaved avens		G5	S3		
	<u>Geum macrophyllum</u>				
American ginseng		G4	~~S3~~ S2 S3		SC
	<u>Panax quinquefolius</u>				
Northern mountain-ash		~~G5~~ G4 S65	S2 S3		
	<u>Sorbus decora</u>				
Fringed gentian		G4	~~S2~~ S3		
	<u>Gentianopsis crinita</u>				

Table 2 continued.

<u>Common name</u>	<u>Scientific name</u>	<u>Global rank</u>	<u>State rank</u>	<u>Federal status</u>	<u>State status</u>
Gray-cheeked thrush		G5	S2		
	<u>Catharus minimus</u>				
Bay-breasted warbler		G5	S2		
	<u>Dendroica castanea</u>				
Rusty blackbird		G5	S3		SC
	<u>Euphagus carolinus</u>				

CONCLUSIONS AND RECOMMENDATIONS

This inventory of the Appalachian Trail corridor in Vermont resulted in the identification of 60 element occurrences at 32 sites. Of these, 46 element occurrences and 23 sites were discovered during this inventory while 14 element occurrences and 9 sites had been previously documented. The most significant discovery was a riverside seep at West Hartford supporting a state-threatened plant species, sticky tofieldia.

Some elements known from historic records were not relocated. Vague locality information taken from herbarium or museum records made relocation of some element occurrences impossible. Long-tailed shrews (Sorex dispar) were not trapped for on Killington Peak due to uncertainty about the historic location.

Several sites in the Green Mountains are already under some form of protection by the U.S. Forest Service or Vermont Department of Forests, Parks and Recreation. However, identification as significant ecological features will hopefully result in a higher level of protection for some of these sites. Management of all sites identified in this inventory will involve a 'hands-off' approach; simply leaving the sites as is with no active management necessary. Periodic monitoring will be necessary to gauge the viability of element populations and to detect any threats to element populations or natural communities.

Furthermore, monitoring will provide clues to whether active management may be appropriate in the future at certain sites. VNNHP staff will make field visits with NPS, ATC, GMNF, GMC, and DOC personnel to point out locations of elements and to discuss protection/management.

Fixed-wing aircraft reconnaissance will be completed in late April or May of 1991 to evaluate low priority sites identified during the background phase of the inventory. If any unusual or outstanding natural communities are observed, they will be visited during the 1991 field season. Site reports will be prepared on any ecologically significant sites, and submitted by 30 November 1991.

Those who use this report for planning purposes should realize that other ecologically significant features may be discovered in the future along the AT. This inventory is not intended to serve as a final comprehensive documentation on important natural areas. If new element occurrences are found, the data will be incorporated into the VNNHP database and information will be provided to NPS, ATC, GMNF, and local trail clubs. These groups should contact VNNHP prior to any proposed activity which might affect the AT corridor or significant ecological features.

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Appendix I.
Federal and State Endangered Species Categories

Federal Status
U.S. Fish and Wildlife Service Categories of Endangered and
Threatened Plants and Animals

The following definitions are extracted from the September 27, 1985
U.S. Fish and Wildlife Service notice in the Federal Register:

LE - Taxa formally listed as endangered.

LT - Taxa formally listed as threatened.

PE - Taxa proposed to be formally listed as endangered.

PT - Taxa proposed to be formally listed as threatened.

S - Synonyms.

C1 - Taxa for which the Service currently has on file substantial
information on biological vulnerability and threat(s) to support the
appropriateness of proposing to list them as endangered or threatened
species.

C2 - Taxa for which information now in possession of the Service indicates
that proposing to list them as endangered or threatened species is possibly
appropriate, but for which substantial data on biological vulnerability and
threat(s) are not currently known or on file to support the immediate
preparation of rules.

C3 - Taxa that are no longer being considered for listing as threatened or
endangered species. Such taxa are further coded to indicate three
categories, depending on the reason(s) for removal from consideration.

3A - Taxa for which the Service has persuasive evidence of
extinction.

3B - Names that, on the basis of current taxonomic
understanding, usually as represented in published
revisions and monographs, do not represent taxa
meeting the Act's definition of "species".

3C - Taxa that have proven to be more abundant or
widespread than was previously believed and/or those
that are not subject to any identifiable threat.

Appendix I (continued).

State Status

E - Endangered - A species that normally occurs in Vermont and whose continued existence as a viable component of the State's wild fauna or flora is in jeopardy, or a species determined to be an endangered species under the Federal Endangered Species Act.

T - Threatened - A species whose numbers are significantly declining because of loss of habitat or human disturbance and unless protected will become an endangered species, or a species determined to be a threatened species under the Federal Endangered Species Act.

SC - Special Concern - Breeding populations which are thought to occur in very low numbers relative to other taxa in Vermont, and which appear to be vulnerable here, and/or whose status in the State is undetermined and in need of study. These species may be found in a restricted geographic area or occur sparsely over a wider area; they may even be found in good numbers in other portions of their range.

X - Extirpated - A species no longer occurring in the State.

Appendix II.
Historical Records of Species of Concern Along the Appalachian Trail

<u>Quad</u>	<u>Scientific Name</u>	<u>G-Rank</u>	<u>S-Rank</u>	<u>Federal Status</u>	<u>State Status</u>	<u>Last Seen</u>
Hanover	Alasmidonta heterodon	G1	S1	LE	T	ND
	Alasmidonta varicosa	G3	S1			ND
	Equisetum palustre	G5	S1			1910
	Lactuca hirsuta	G4?	S1			ND
	Cassia hebecarpa	G5	SH			ND
	Corydalis aurea	G5	S2			1889
	Ranunculus flabellaris	G5	S1			1884
1889	Eleocharis ovata		G?	S1		
	Arabis drummondii	G5	S1			1910
	Botrychium multifidum	G5	S3			1990
Quechee	Rhynchospora capillacea	G5	S1		T	1875
	Hypericum pyramidatum	G4	S2		T	1892
	Carex hitchcockiana	G5	S2			1875
Woodstock North	Asplenium viride	G5	S1		T	ND
	Dryopteris filix-mas	G5	S2		T	1906
	Botrychium multifidum	G5	S3			1990
	Botrychium lunaria	G5	SH		E	1918
	Helianthus strumosus	G5	S1		T	1922
	Hackelia americana	G?	S1		T	ND
	Carex foenea	G5	S1			1929
	Elymus wiegandii	G?	S1			ND
Delectable Mountain	Ranunculus longirostris	G5	S1			1897
Killington Peak	Sorex dispar	G5	S2	C2	SC	1934
	Catharus minimus	G5	S2			1990
	Luzula parviflora	G4G5	S1			1990
	Viburnum edule	G5	S1			1812
Rutland	Arabis drummondii	G5	S1			1892
Wallingford	Falco peregrinus	G3	S1	LE	E	1923
Stratton Mountain	Catharus minimus	G5	S2			1990
	Luzula parviflora	G4G5	S1			1990
Woodford	Carex aestivalis	G5	S1			1990

Appendix III.
Natural Communities of Vermont

Terrestrial System

- I. Open
 - a. Riverside
 - 1. Riverside Outcrop Community
 - 2. River Gravel Community
 - 3. Sandy Riverbank Community
 - 4. Erosional River Bluff Community
 - 5. Riverside Seep Community
 - 6. Rivershore Grassland
 - 7. River Mud Shore Community
 - 8. Alluvial Shrub Thicket
 - b. Lakeside
 - 1. Lakeside Outcrop
 - 2. Lakeside Cobble Shore
 - 3. Lake Sand Beach
 - 4. Lake Dune
 - 5. Lakeshore Grass/Sedge/Rush Meadow
 - 6. Outwash Plain Pondshore
 - 7. Lakeshore Shrub Thicket
 - c. Other
 - 1. Outcrops
 - a. Calcareous Outcrop Community
 - b. Cold Acidic/Circumneutral Outcrop Community
 - d. Serpentine Outcrop Community
 - c. Warm Acidic/Circumneutral Outcrop Community
 - d. Serpentine Outcrop Community
 - 2. Cliffs
 - a. Cold Calcareous Cliff Community
 - b. Warm Calcareous Cliff Community
 - c. Acidic/Circumneutral Cliff Community
 - 3. Alpine Tundra Community
 - 4. Subalpine Krummholz Community
 - 5. Talus
 - a. Large Open Talus
 - b. Small Open Talus
- II. Forested
 - a. Floodplain Forest
 - b. Spruce-Fir Forest
 - c. Beech-Birch-Maple Forest
 - d. White Pine-Northern Hardwood Forest
 - e. Rich Northern Hardwood Forest