

A Natural Heritage Inventory of the Appalachian Trail Corridor in Maryland

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Appalachian Trail Conference
and
Appalachian Trail Park Office
National Park Service
Harper's Ferry, West Virginia

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INFORMATION AND MAPPED LOCATIONS OF RARE SPECIES
CONTAINED IN THIS REPORT IS SENSITIVE
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Summary

An inventory of endangered, threatened and rare plants and exemplary natural communities was conducted in 2000 along the Maryland portion of the Appalachian Trail corridor. During this study, 32 occurrences of rare plant populations from 17 taxa were recorded at 8 Natural Heritage sites. Two of the plants recorded during the 2000 survey are globally rare, the Halberd-leaved rose mallow (*Hibiscus laevis*) and Snowy campion (*Silene nivea*). None of the plants found are listed as federally threatened or endangered. There were two natural communities regarded as exemplary in the corridor and several areas noted for high potential as habitat for rare animal species.

Many rare plant populations inventoried in this study are under threat from competition by non-native invasive plants and trampling by recreationalists. Follow up inventories are recommended, as is continued monitoring and management to reduce threats. Trail managers need to be kept very aware of the location of rare plants as many of them occur adjacent to the trail.

Introduction

This report documents the results of an inventory of rare, threatened and endangered (RT&E) vascular plants and exemplary examples of vegetative communities along the Appalachian Trail (A.T.) in Maryland. The survey was conducted using the Natural Heritage methodology, using the state standard forms and approaches. Background information was compiled from historical records for plant occurrences, aerial photographs, soil surveys, and consultation with experts on the flora of the region. The goals of the 2000 botanical survey were to 1) locate and document RT&E plant populations and exemplary natural communities within the A.T. Corridor¹ and 2) document threats and potential threats to botanical resources and develop management recommendations for each site to provide trail managers with current, accurate botanical data to be used in land use and trail routing planning.

Rare plant species are defined as those plants listed by the Maryland Department of Natural Resources (DNR) Natural Heritage Program (November 1, 1994 list) as endangered (E), threatened (T), or in need of conservation (watch list) (W). According to

¹ A.T. Corridor is defined as lands purchased by the National Park Service for the A.T. in Maryland (1458 acres) and for all other public land, the corridor is 500 feet either side of the Trail.

the Maryland Non-game and Endangered Species Conservation Act, endangered plants are those whose continued existence as a viable component of the State's flora is determined to be in jeopardy; threatened plants are those species which appear likely, in the foreseeable future, to become endangered in the State; plants in need of conservation or "watch list" are those species whose population is limited or declining in the State, such that it may become threatened in the foreseeable future if current trends or conditions persist.

For this study, the inventory was focused on vascular plant species that are globally ranked as G1, G2, or G3 and state ranked as either S1, S2, S3, SX, SH, or SU (these designations are defined in the Methods section).

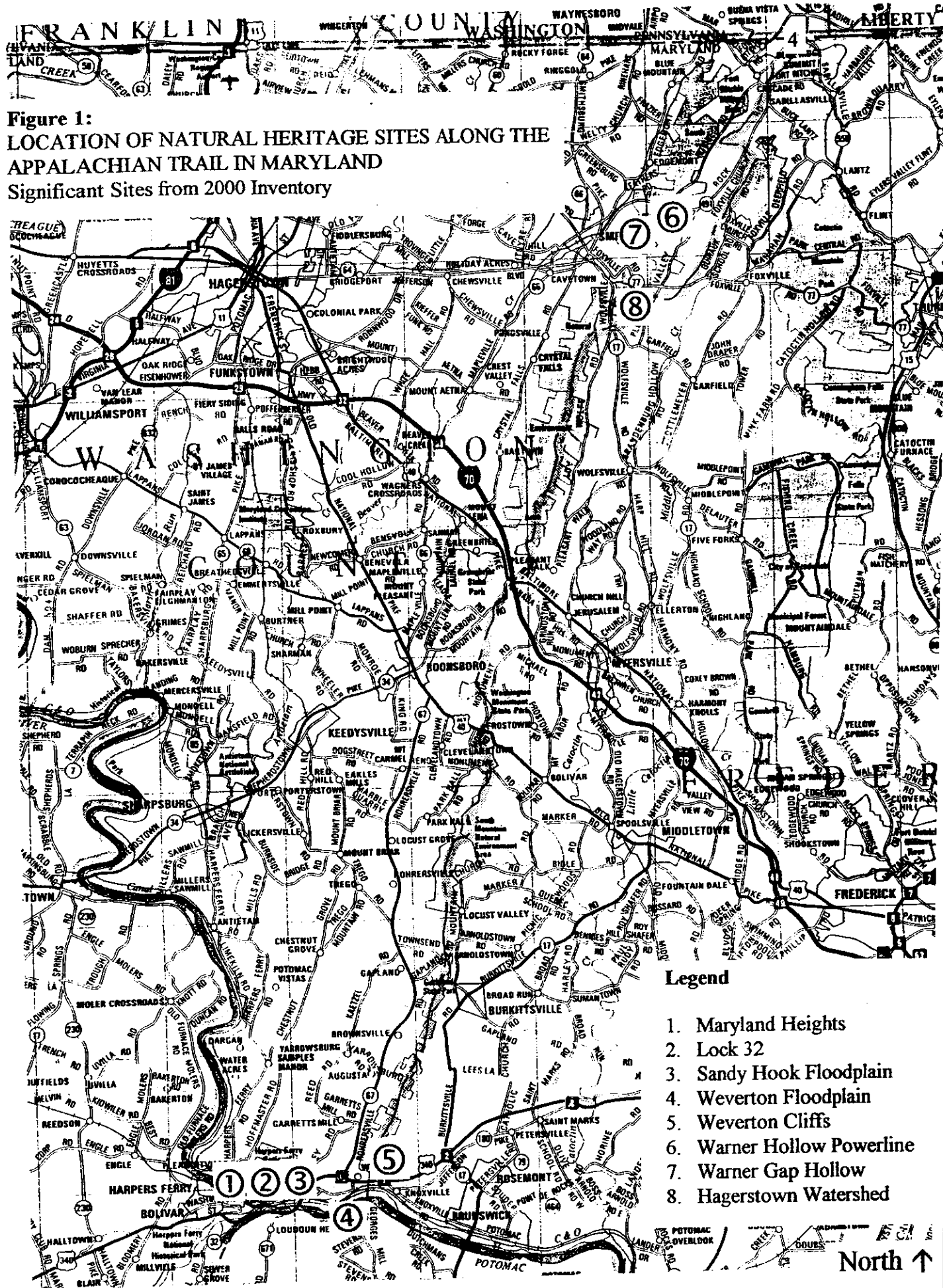
Field surveys along the Maryland A.T. were conducted between mid-May and early November, 2000. Rare plants and communities were the focus of the survey, but information gathered on potential habitat for rare birds, mammals and insects/invertebrates was also noted. This survey contributes to the National Park Service's and Appalachian Trail Conference's natural heritage inventory of the entire A.T. The purpose of the A.T. inventory program is to guide future land management decisions and to educate the Trail community about the ecological significance of Trail lands (Schwarzkopf & Buchanan, 1999).

According to the State of Maryland Natural Heritage program, the A.T. has been largely under-surveyed in Maryland. Vegetative communities have not been classified for the Trail corridor. This survey, then, is an important step to describing the significant areas of biodiversity to affect the long-term management goals and trail design for the future.

General Site Description

The entire Appalachian Trail (A.T.) Corridor in Maryland extends approximately 39 miles from the Trail's border with West Virginia north to its border with Pennsylvania. The A.T. occurs in Frederick and Washington Counties in Maryland and occasionally forms the boundary between the two counties, following a series of ridges known generally as South Mountain, from the Pennsylvania border south to the Potomac River (Figure 1).

The A.T. in Maryland occurs within the Blue Ridge physiographic province. This region is characterized by a narrow chain of mountain peaks dominated by a canopy of oaks and hickories, interrupted by pockets of mesic forest with tulip poplar, maples and American beech. The dominant understory includes mountain laurel, flowering dogwood, spicebush and blueberries. Since most of the Trail follows ridgelines, conditions are lower in moisture with fewer ground layer species than in bottomland woods.



Trail elevations range from 220 feet at the Potomac River to about 1,880 feet at Quirauk Mountain on the South Mountain ridge (PATC, 1995). Most of the Maryland A.T. is just over 1000 feet above sea level.

Climate is average relative to the rest of the State of Maryland, the Trail roughly bisecting the middle to the state. Mean maximum temperature in July is 88 degrees and mean minimum temperature in January is 26 degrees. Mean precipitation is 38-40 inches annually (Robbins, 1996).

Geology and Soils

The Blue Ridge physiographic province is composed of complexly folded and faulted igneous (granitic) and metamorphic rocks. These rocks date to the Precambrian and Paleozoic and represent parts of the basement rock of the North American continent. Today, the general surface of the Blue Ridge lies at about 1500 feet above sea level in Maryland and 3000 feet south of Maryland in Virginia.

A generalized geologic map of Maryland along the A.T. is found in Figures 2, 3, & 4. The A.T. generally follows along South Mountain, a ridge with acidic, poor soils and exposed rock ledges, underlain mostly by quartzite. The age of this rock is Cambrian to Precambrian and includes sandstone, shale, and phyllite. Most of the ridge trail is over Maryland Heights and Buzzard Knob formations. A minor component on the trail is the Loudoun formation of quartzite weather to sand, which forms a very well drained soil.

Of particular interest along the Maryland A.T., is a basalt lava formation originating from mountain faults, forming extensive sheets of black rock, which weathers to greenstone, a dark gray-green rock. These old lava flows lie under the A.T. at Buzzard Knob, Foxville Road, and from Washington Monument State Park to Turners Gap. Between Wolfsville Road and Raven Rock Road is a short section underlain by red volcanic rock, indicating a more explosive volcano (Chew, 1995). Greenstone metabasalt, part of the Catoclin formation, consists of metamorphosed basalt, breccia, and metarhyolite marble derived from Precambrian lava flows. The greenstone has concentrations of iron, calcium and magnesium and generally weathers to produce a circumneutral, nutrient-rich soil (Chew, 1995). Where there is greenstone there is the potential for great botanical diversity.

North of Raven Rock Road (Rt. 491), there are several boulder fields that make up unique geologic features. Devil's Racecourse, a "rock stream" was shaped by ice forming under greenstone rocks, which slowly move downslope as a result. Vegetation does not readily establish in these boulder fields.

Generally, the soils of South Mountain are silty, shaley, stony soils derived from igneous and metamorphic rocks. Soils are more fertile and circumneutral in pH when originating from greenstone compared to the acidic, sandy soils originating from quartzite.

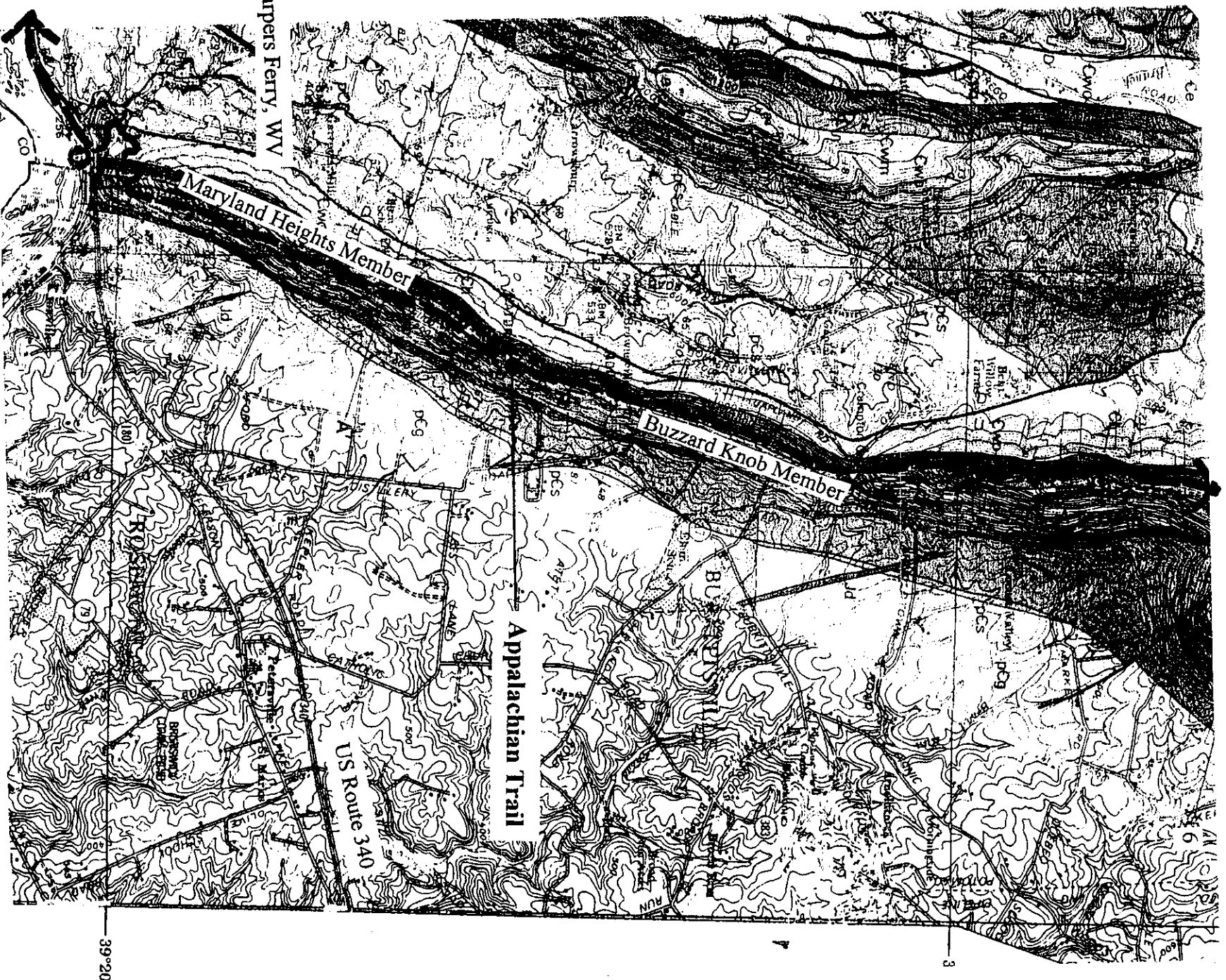


Figure 2:
GEOLOGY OF THE APPALACHIAN TRAIL IN MARYLAND (Map 1 of 3)
 Source: Generalized Geologic Map of Maryland, 1967
 Scale 1:62,500

North ↑

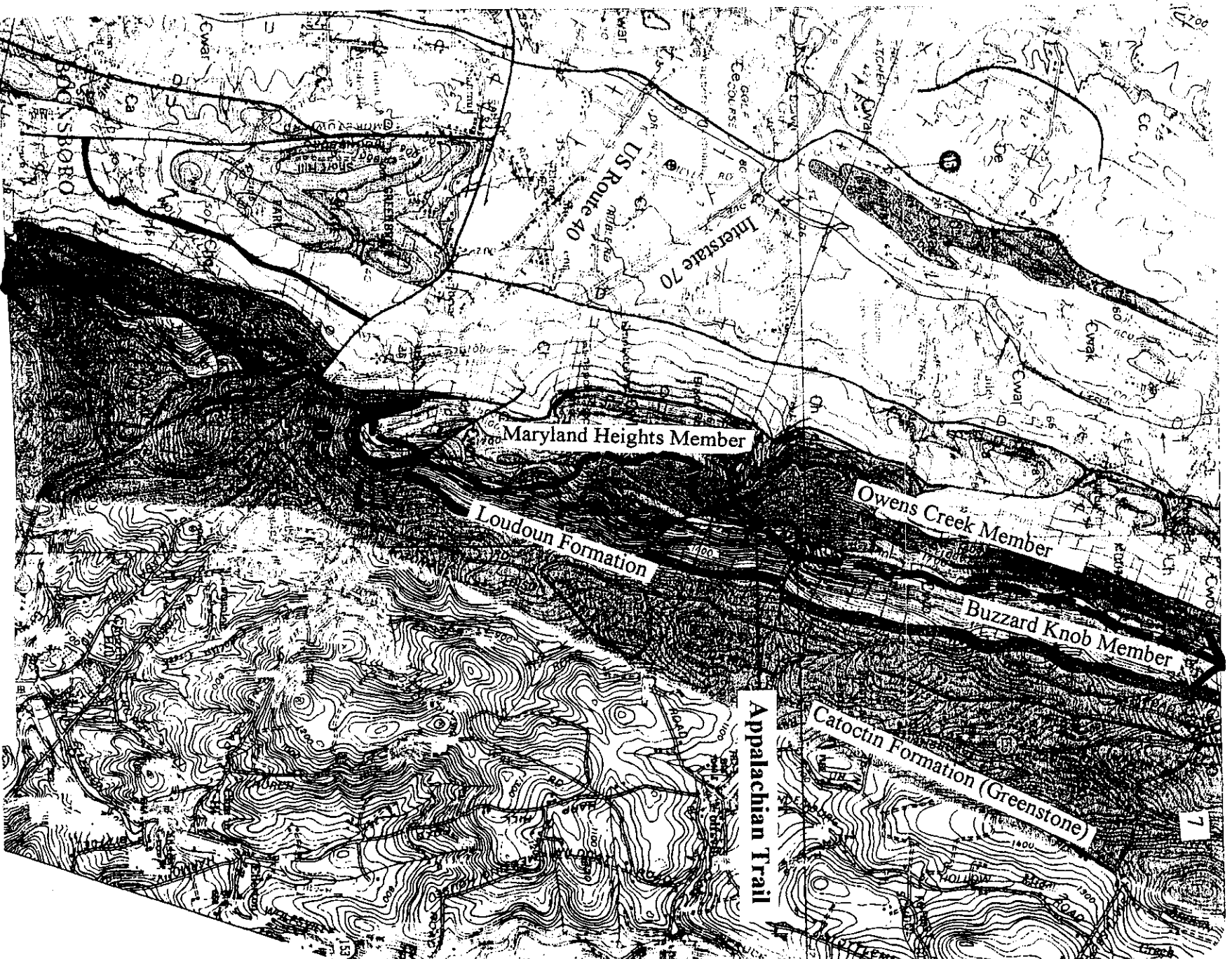


Figure 3:

GEOLOGY OF THE APPALACHIAN TRAIL IN MARYLAND (Map 2 of 3)

Source: Generalized Geologic Map of Maryland, 1967

Scale 1:62,500

North ↑

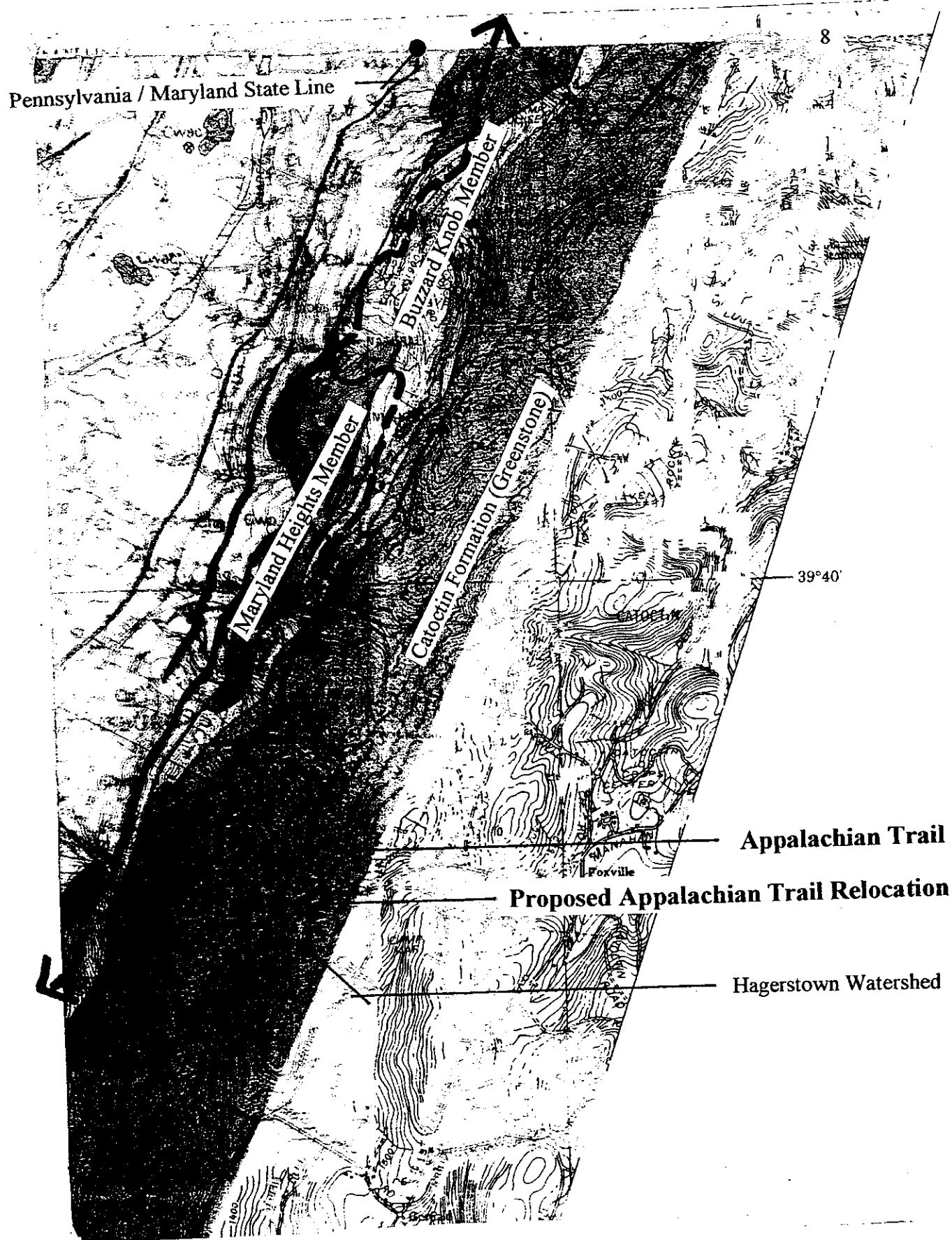


Figure 4:
GEOLOGY OF THE APPALACHIAN TRAIL IN MARYLAND (Map 3 of 3)
 Source: Generalized Geologic Map of Maryland, 1967
 Scale 1:62,500

North

Natural Communities

The State of Maryland Natural Heritage Program has a list of all plant community alliances that occur in the state, but they do not have ranks on their relative importance or rarity. A community alliance is a basic unit of vegetation based on dominant cover type and the classification follows the National Classification developed by The Nature Conservancy.

The A.T. corridor in Maryland passes through a variety of community alliances. The major communities are:

Hickory – White Ash – Oak Forest

Carya – Fraxinus americana – Quercus Forest

This is a dry, upland forest typical of western slopes and ridge tops. It is the most abundant community type along the A.T. and well-represented throughout Maryland. Co-dominant in the canopy is chestnut oak (*Quercus prinus*), red oak (*Q. rubra*), white oak (*Q. alba*), sassafras (*Sassafras albidum*), and red maple (*Acer rubrum*). The shrub layer contains mountain laurel (*Kalmia latifolia*), viburnum (*Viburnum* sp.), dogwood (*Cornus florida*), spice bush (*Lindera benzoin*) and vines. Dominant understory includes blueberries (*Vaccinium vacillans* and *V. atrococcum*), grasses, squaw root (*Conopholis americana*), path rush (*Juncus tenuis*), Christmas fern (*Polystichum acrostichoides*), hay-scented fern (*Dennstaedtia punctilobula*), rattlesnake plantain (*Goodyera pubescens*) and spotted wintergreen (*Chimaphila maculata*). In general, the South Mountain ridgeline in Maryland is low in diversity and there is low potential for rare plant species.

Sugar Maple - Yellow birch - American Basswood Forest

Acer saccharum – Betula lutea – Fagus grandifolia Forest

This mesophytic forest community on moist, nutrient-rich soils underlain by greenstone is the most floristically diverse and has the highest potential for rare species occurrences along the A.T. in Maryland. The major co-dominants to the association include tulip poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), and red maple (*Acer rubrum*). The shrub layer includes red elder (*Sambucus pubens*), paw paw (*Asimina triloba*), spicebush (*Lindera benzoin*), wild hydrangea (*Hydrangea arborescens*), bladder-nut (*Staphylea trifolia*), and red maple seedlings. The understory includes Jack-in-the-pulpit (*Arisaema triphyllum*), honewort (*Cryptotaenia canadensis*), sweet cicely (*Osmunda longistylis*), false Solomon's seal (*Smilacina racemosa*), bloodroot (*Sanguinaria canadense*), clearweed (*Pilea pumila*), mayapple (*Podophyllum peltatum*), dolls eyes (*Actaea pachypoda*), one-flowered cancer root (*Orobancha uniflora*), rattlesnake fern (*Botrychium virginianum*) and bedstraw (*Galium* sp.). This community suffers from the presence of a host of non-native, invasive species such as Japanese honeysuckle (*Lonicera japonica*), multiflora rose (*Rosa multiflora*), tree-of-heaven (*Ailanthus altissima*), garlic mustard (*Alliaria petiolata*), and Oriental stilt grass (*Microstegium vimineum* var. *imberbe*).

Hemlock – Sugar Maple – Yellow Birch Forest

***Tsuga canadensis* – *Acer saccharum* – *Betula lutea* Forest**

Mixed hardwood-hemlock forests on limestone soils are found on cooler, north-facing slopes and on moister ravines. Co-dominants in the canopy include tulip tree (*Liriodendron tulipifera*), American beech (*Fagus grandifolia*), yellow birch (*Betula lutea*) and hemlock (*Tsuga canadensis*). The shrub layer includes spicebush (*Lindera benzoin*), and wild raspberry or blackberry (*Rubus* sp.). The understory includes Jack-in-the-Pulpit (*Arisaema triphyllum*), wild sarsaparilla (*Aralia nudicaulis*), partridge-berry (*Mitchella repens*), enchanter's nightshade (*Circaea quadrisulcata*), bishop's cap (*Mitella diphylla*), wild ginger (*Asarum canadense*), sweet cicely (*Osmorhiza claytonii*), mayapple (*Podophyllum peltatum*), bugbane (*Cimicifuga americana*), club moss (*Lycopodium* sp.) and Indian cucumber root (*Medeola virginiana*). Currently, the hemlocks are weakened and dying from infestations of the woolly adelgid, changing the community make-up.

Silver Maple Wetland Forest

***Acer saccharinum* Wetland Forest**

This type of floodplain forest, found on the extensive stretch along the Potomac River, is a mature forest dominated by sycamore (*Platanus occidentalis*), silver maple (*Acer saccharinum*) and boxelder (*Acer negundo*). The substrate here is sand, silt and gravel. The understory is very diverse and includes narrow-leaved boneset (*Eupatorium serotinum*), jewelweed (*Impatiens pallida*), poison ivy (*Toxicodendron radicans*), stinging nettle (*Urtica dioica*), Joe-Pye-weed (*Eupatorium maculatum*), mistflower (*Eupatorium coelestinum*), river oats (*Chasmanthia latifolium*), great blue lobelia (*Lobelia siphilitica*) and cardinal flower (*Lobelia cardinalis*). Non-native invasive species are dominant in most places, including garlic mustard (*Alliaria petiolata*), Japanese hops (*Humulus japonicus*) and Oriental stilt grass (*Microstegium vimineum* var. *imberbe*).

Shrub-Scrub wetland

Non-forested wetlands along the A.T. are limited to narrow streamside areas and seepages and surrounding springs. Sometimes surrounded by a thicket of raspberry, multiflora rose and spice bush, these are very diverse pockets of ferns and wetland emergent plants, including jewelweed (*Impatiens pallida*), cinnamon fern (*Osmunda cinnamomea*), poison ivy (*Toxicodendron radicans*), bottlebrush grass (*Hystrix patula*), straw-colored cyperus (*Cyperus strigosus*), and sedges (*Carex* sp.).

Rock ledges

Rock ledges form cool microhabitats that are favored by some rare species of plants and animals. Some of the plants that grow out of niches in the rock are early saxifrage (*Saxifraga virginensis*), blueberry (*Vaccinium* sp.), hawkweed (*Hieracium* sp.), small sunflower (*Helianthus divaricatus*), little bluestem (*Schizachyrium scoparius*), hairy lip fern (*Cheilanthes lanosa*), ebony spleenwort (*Asplenium platyneuron*) and the rare lobed spleenwort (*Asplenium pinnatifidum*). State-listed animals that require this habitat include the timber rattlesnake and Allegheny woodrat. Typically, there is not as great an invasive weed problem in these communities as in the others listed.

Open communities

These communities are maintained grasslands, such as old fields, roadsides, pastureland and powerline rights-of-way. The more common species of open areas are foxtail grass (*Setaria glauca*), red fescue (*Festuca rubra*), pigweed (*Amaranthus hybridus*), yellow rocket (*Barbarea vulgaris*), asters (*Aster* sp.) and goldenrods (*Solidago* sp.). This community contains a large proportion of non-native species.

Potential Rare Plant Species

The portion of the Maryland A.T. that has been most extensively surveyed in the past is along the C&O canal, since the Potomac River is an area of high potential for rare species and due to studies commissioned for the C&O Canal National Historical Park and Harpers Ferry National Historical Park.

According to Maryland Natural Heritage records, there are a handful of historic records from the vicinity of the A.T. I attempted to relocate all mapped historic occurrences which are noted in the site descriptions of this report.

Potential Rare Animal Species

Mammals and Birds

Rock outcrops and exposed ridgelines along the A.T. present the appropriate habitat for the Allegheny woodrat (*Neotoma magister*) G3G4 S1, a state endangered mammal.

Open communities provide breeding habitat for the state endangered loggerhead shrike (*Lanis ludovicianus*) G4 S1B. According to Heritage records from the last ten years, a loggerhead shrike has been sited in the area of Fox Road and Bethel Road, near the central portion of the A.T.

Reptiles

Rock ledges and woodlands along ridges are habitat to the state watch list species, timber rattlesnake (*Crotalus horridus*) G5 S3. A local expert, Wm. H. Martin, is knowledgeable about the locations of rattlesnake dens along the Trail. The timber rattlesnake populations have become important as they increasingly are widely dispersed and den sites have become degraded in Maryland.

Crustaceans and Planarians

The A.T. crosses many small seeps and drainages in Maryland. Shelters are sited near springs for a water source. These groundwater springs have habitat for microscopic subterranean fauna, such as,

Price's cave isopod (*Caecidotea pricei*)

Aldriche's spring snail (*Fontigens aldrichi*)

A planarian (*Tricladida* sp.)

Shenandoah cave amphipod (*Stygobromus gracilipes*)

Allegheny cave amphipod (*Stygobromus allegheniensis*)

Insects

The following butterflies have been reported in the vicinity of the southern portion of the Maryland A.T. These uncommon Lepidoptera species should be conserved wherever possible:

Giant swallowtail (*Papilio cresphontes*)

Pepper and salt skipper (*Amblyscirtes hegon*)

Olympia marble (*Euchloe olympia*)

Silvery blue (*Glaucopsyche lygdamus*)

Early hairstreak (*Erora laeta*)

Although animal species were not surveyed as part of this study, any potential habitat, particularly for the Allegheny woodrat, was noted on field maps. A separate inventory is recommended.

Methods

A Natural Heritage methodology was used to inventory the Maryland A.T. The procedure involves: 1). Background investigations of topographic maps, soil surveys, aerial photos, and other records to determine areas of high potential for rare species. 2). Gather existing information from the Maryland Heritage program and local knowledgeable people. Experts knowledgeable about the area, including Richard Wiegand and Bob Johnsson, were consulted during the study. 3). Conduct field survey, beginning with areas that have the highest potential for rare species within the Trail corridor.

Because the presence of greenstone formations were important, I overlaid the geology map with the Trail alignment to locate the natural communities with significant geology. This aided in developing the priority areas to survey first.

The entire A.T. was surveyed by walking the trail alignment and walking meandering transects over public land visible in the foreground from the Trail (at least 100 feet on either side of the Trail). Surveys were made of the main Trail (white blazed) corridor and every side trail (blue blazed) that leads to designated A.T. campsites, shelters, privies and springs. Trail access points, parking areas, casual resting places and popular trail short cuts were also surveyed in detail. All NPS lands located away from the trail were surveyed when they contained high quality habitat.

Where habitat looked interesting or promising for plant species, the survey was extended up to 500 feet away from the Trail. Major dominant species and community types were noted for the length of the Trail. Prime plant habitat and potential areas for animal habitat were recorded. Typically, about 3 miles of Trail was covered in the period of 5 - 7 hours.

All rare plant information was transcribed onto standardized Natural Heritage Rare Plant Survey and Site Survey Summary forms (see Appendix for copies of original forms). Species references follow those currently used by the Maryland Heritage program.

Species Ranks

The Nature Conservancy's State Ranking classification of S1, S2, S3, S4, SX, SH, SU, etc. plant species and Global Ranking classification of G1, G2, G3 and G4, etc. is used by Maryland DNR. Complete explanations of the global and state species ranks are found in the Appendices.

Results

A total of 32 occurrences of rare plant populations from 17 taxa were recorded at 8 Natural Heritage sites along the Appalachian Trail in Maryland during the 2000 study. Three of the historic element occurrences could not be relocated. All of the Natural Heritage sites are recommended for protection.

Rare species occurrences are concentrated in two general areas along the Trail corridor. These priority areas were visited repeatedly and at different times during the growing season. Special effort was made to gain permission to survey the Hagerstown Watershed property, between Wolfsville Road (Route 17) and Raven Rock Hollow (Route 491), since this area supports one of the richest habitats along the entire A.T. in Maryland. The other area of greatest significance is the Potomac River floodplain where the Trail coincides with the C&O Canal tow path.

No rare plants were found in a large stretch of the Trail underlain by Maryland Heights geology. The ridge contains many areas of rock outcrops and occasional springs that could yield rare animals, and uncommon plants, but not plants listed as rare, threatened or endangered. Much of the ridge is dry oak woods which does not have great potential for listed species.

Botanical Results

A total of 32 RT&E plant element occurrences representing 17 taxa have been documented at 8 Natural Heritage sites located along the Appalachian Trail corridor in Maryland. Table 1 lists each plant element identified and its rarity status.

Other natural heritage resources of importance include wildflowers decreasing in number, such as pink ladyslipper (*Cypripedium acaule*).

Due to the late spring start date (May 11), observations of early spring ephemeral species were probably missed on some locations of the A.T. corridor, such as the state threatened spring wildflower, white trout lily (*Erythronium albidum*) and the endangered Short's rockcress (*Arabis shortii*).

Exemplary Natural Communities and Areas of Natural Diversity ("Biodiversity Hot Spots")

The most important areas for rare plants and outstanding natural communities were:

- rich tulip tree-yellow birch--dominated forests underlain by greenstone. These were large enough to support forest interior dwelling species (FIDS) habitat.
- wet seeps over greenstone (habitat for spring amphipods)
- floodplain forest coinciding with the C&O Canal National Historical Park
- rock ledges and outcrops (habitat for timber rattlesnake and Allegheny woodrat and rare cliff plants)

Table 1 Summary of element occurrences from survey of Maryland portion of the Appalachian Trail corridor.

Summary Table

Federally listed plant species

None

Globally rare plant species

2

State rare (watch list), threatened or endangered plant species

17

Common Name	Scientific Name	Global and State Ranks	State Listing	Number of occurrences
Nodding trillium	<i>Trillium cernuum</i>	G5 S3	Watch List	4
Starry false Solomon's-seal	<i>Maianthemum stellatum</i> (<i>Smilacina stellata</i>)	G5 S1	Endangered	2
Halberd-leaved rose-mallow	<i>Hibiscus laevis</i>	G3G5 S3	Watch List	4
Rustling wild-petunia	<i>Ruellia strepens</i>	G4G5 S1	Endangered	2
Yellow passionflower	<i>Passiflora lutea</i>	G5 S3	Watch List	3
Scarlet ammannia	<i>Ammannia coccinea</i>	G5 SU	Watch list	1
Snowy campion	<i>Silene nivea</i>	G3G4 S1	Endangered	1 (1995)
Honeyvine	<i>Cynanchum laeve</i>	G5 S3	Watch List	2
Slender dayflower	<i>Commelina erecta</i> var. <i>angustifolia</i>	G5 S3	Watch List	1
Lobed spleenwort	<i>Asplenium pinnatifidum</i>	G4 S1	Endangered	3
Spring forget-me-not	<i>Myosotis verna</i>	G5 S3	Watch List	2
Spring avens	<i>Geum verum</i>	G5 S3	Watch List	1
Downy alumroot	<i>Heuchera pubescens</i>	G4? S3	Watch List	2
Ellisia	<i>Ellisia nyctelea</i>	G5 S3	Watch List	1
Pale green orchid	<i>Platanthera flava</i>	G4 S1	Threatened	1 (1988)
Fringe-tip closed gentian	<i>Gentiana andrewsii</i>	G4 S2	Threatened	1 (1947)
Steele's Meadow Rue	<i>Thalictrum steeleanum</i>	G5 S3?	Pending	1

Introduction to Natural Heritage Site Descriptions

To organize the findings of this inventory, site descriptions follow for each of the eight identified sites. Protection boundaries have been drawn around units that include one or more heritage element occurrences, prime habitat and a buffer area needed for long term protection. The Natural Heritage Site Reports, which follow, are arranged in order from South to North along the Trail. Photocopied sections of Maryland A.T. Segment Maps are used as base maps to locate the site and the exact location of rare plant occurrences. Heritage field forms contain more specific information regarding assessment of rare plant occurrences and can be found in the Appendix.

Site Number and Name: The number corresponds to the site number on key map in this report. If a site name has been assigned by the Maryland Natural Heritage Program, it is used in its exact form. If a site name has not been assigned, it is given a name that generally reflects a geographic locality or landscape feature found on the USGS quad. map.

USGS Quad: The name of the USGS 7.5' quadrangle that includes the natural heritage site.

A.T. Segment Map: The code number used on tract maps (1" = 600') of the A.T. Land Acquisition Field Office. Segment map numbers in Maryland are between 399 – 408, from north to south.

Size: Size of protection area, in acres.

Ownership: Name of owner of land where natural heritage site occurs.

Location: The general access to site from known A.T. points or major road crossings.

Natural Heritage Resource Summary Table: A summary of the rare plant occurrences, global and state ranks, and occurrence ranks. The definition of ranks is found in the Appendix.

Site Description: A description of the natural heritage site and its land use, significant elements, communities, and dominant vegetation cover.

Rare Occurrences: Detailed description of the rare plant elements; including the population size, evidence of reproduction, associated community, habitat requirements, and relative quality of occurrence.

Boundary Justification: A preliminary preservation boundary is delineated around each site which contains all known occurrences of rare elements and adjacent habitat determined to be important for their long-term survival. This section explains the factors considered for the boundary shown on the site maps.

Threats: Threats to the site and the individual rare species populations are described. These include currently perceived and potential threats posed by land use practices.

Management and Protection Recommendations: The major issues with regard to management of the A.T. and their affect on the rare occurrences or site are discussed here. General recommendations are provided based on the potential short-term and long-term threats to the site.

Site Map: Each rare species location is shown on a separate map in the context of the site preservation boundary.

Site 1: MARYLAND HEIGHTS

(From C. Fleming Survey, 1999 and R. Bartgis Survey, 1996)

USGS Quad: Harpers Ferry, WV-MD-VA**A.T. Segment Map #'s:** 408**Size:** Approx. 80 acres**Ownership:** National Park Service (Harper's Ferry NHP)

Location: This site is part of the southeastern portion of a tract of Harpers Ferry National Historical Park comprising the north cliffs over a promontory at the confluence of the Shenandoah and Potomac Rivers just east of Harpers Ferry, WV. The Maryland Heights Trail is a popular side trail to the A.T. which takes hikers to a cliff overlook with panoramic views of the valley. The Appalachian Trail coincides with the C&O Canal National Historic Park on the floodplain terrace directly below this site. The Maryland Heights site is more than 100 feet from the A.T. but is included here since it is widely used by A.T. recreationalists.

Natural Heritage Resource Summary

Common name	Scientific Name	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Lobed spleenwort	<i>Asplenium pinnatifidum</i>	G4 S1	Endangered	1999
Ellisia	<i>Ellisia nyctelea</i>	G5 S3	Watch list	1999
Downy alumroot	<i>Heuchera pubescens</i>	G4? S3	Watch list	1999
Spring avens	<i>Geum vernum</i>	G5 S3	Watch list	1999
Allegheny woodrat	<i>Neotoma floridana</i>	G3G4 S1	Endangered	D/1991

Site Description: This site is along the steep slopes above the north bank of the Potomac River, not including the floodplain terrace where the A.T. is situated. The cliffs have a southern and western exposure in dry woodlands. The dominant overstory includes oaks and some mesic woods, especially in small ravines. The canopy includes red oak (*Quercus rubra*), tulip poplar (*Liriodendron tulipifera*), chestnut oak (*Quercus prinus*), black birch (*Betula lenta*), green ash (*Fraxinus pensylvanica*), basswood (*Tilia americana*) and slippery elm (*Ulmus rubra*). Post oak (*Q. stellata*) and blackjack oak (*Q. marilandica*) are locally common; some are stunted from exposure.

Rare Occurrences: The large rock outcrops at the site support a population of the lobed spleenwort, a small fern which occurs on steep, south-facing slope east of the Maryland Heights cliff. About 11 fruiting clumps of the lobed spleenwort occur under a canopy of red oak, chestnut oak, black birch, tulip poplar and sassafras (*Sassafras albidum*). The colony appears robust and healthy. The lobed spleenwort is known from about ten sites in Maryland, two of which are in Harpers Ferry National Historical Park.

The rock outcrops and ledges also support the downy alumroot on the Maryland Watch list, a perennial herb that grows on calcareous rock ledges mostly in western Maryland and at higher elevations to the south. It is found near the lobed spleenwort population.

Two other watch list plants, having spotty distribution in the mid-Atlantic, were noted at the site: a small colony of spring avens and a large colony of *Ellisia*. These once fairly common species generally grow in moist, shaded bottoms and open fields. A mesic forest west and below the cliffs, with grass understory provides appropriate habitat.

Sign of the Allegheny woodrat was found in 1991 (Bartgis, 1991) but has not been found since. Woodrats may abandon rock outcrops as human presence increases around them.

A rare butterfly in Maryland, the Giant Swallowtail butterfly (*Papilio cresphontes*), was found during a survey in 1985. It has not been reported since, but butterfly or insect surveys are not known to have occurred in recent years. The caterpillar hosts of the giant swallowtail include the local hop tree (*Ptelea trifoliata*), while adult food sources include common non-native landscape plants like azalea, and Japanese honeysuckle.

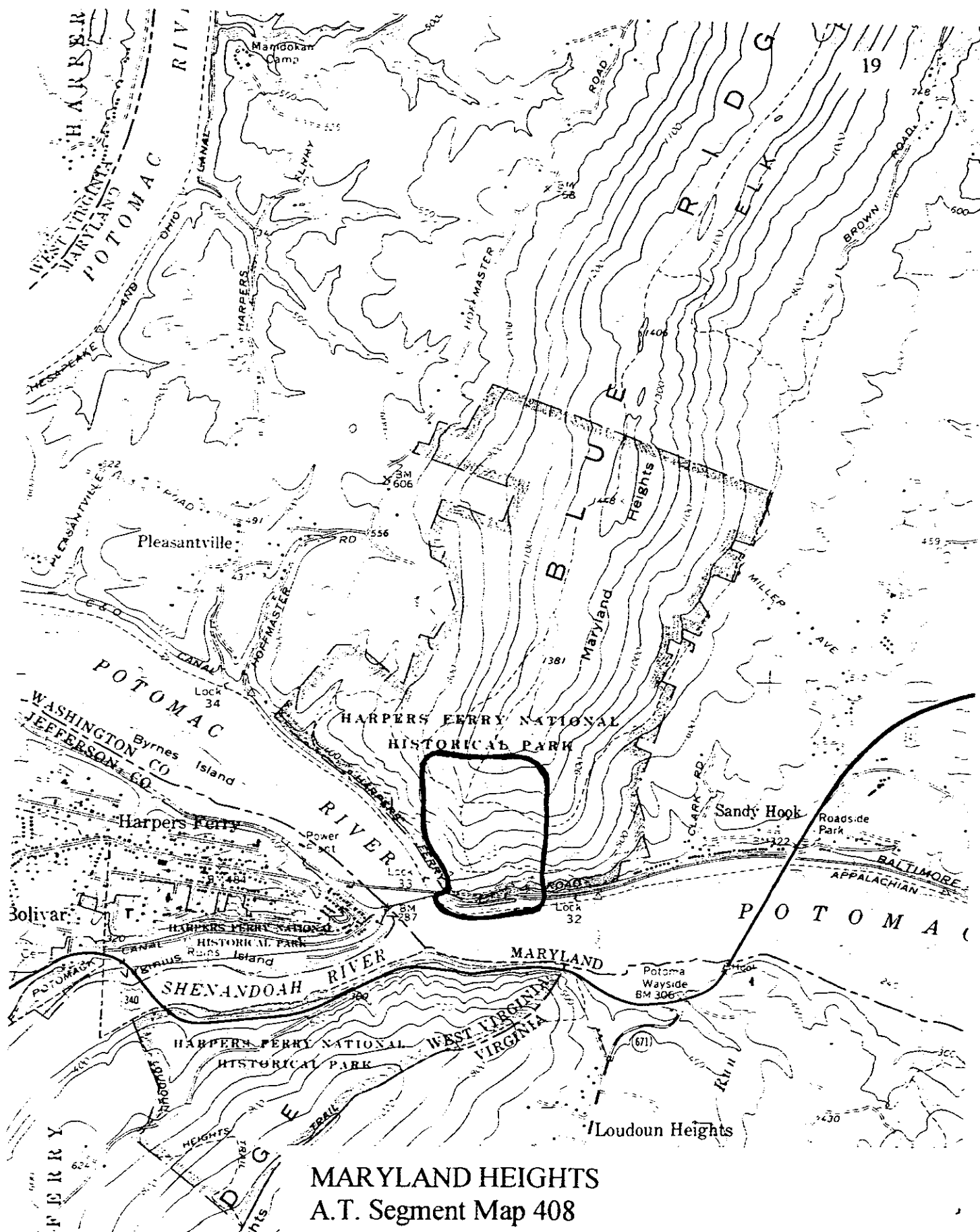
Boundary Justification: The site boundaries were originally designated by Bartgis (1996) as part of a Harpers Ferry National Historical Park survey.

Threats: The area has been heavily cleared and impacted since the Civil War. The Maryland Heights trail is popular with day hikers and as a side trail destination for A.T. hikers. Trails and old roads cross the site including trampling in the ravine. Human recreational use is one of the greatest potential impacts to rare species habitat because it promotes the expansion of non-native plants.

Invasive weeds currently threaten the lobed spleenwort, especially Japanese honeysuckle. Trampling affects the populations of downy alumroot located along unofficial hiking trails. The spring avens and *Ellisia* are relatively secure in their habitat, unless more aggressive non-natives eventually become established there.

The structure of the clifftop woods has been altered due the mortality of oaks from gypsy moth. The opening of the canopy may affect the lobed spleenwort in the long-term.

Management and Protection Recommendations: Structure and composition changes in the open community on the clifftop have occurred and should be monitored. The current condition of the community should be quantified as a baseline for the future. Where invasive weeds currently threaten the lobed spleenwort, they should be immediately controlled. There should be more inventory searches for other rare plants, including *Carex rugosperma* and *Ranunculus micranthus*.



MARYLAND HEIGHTS

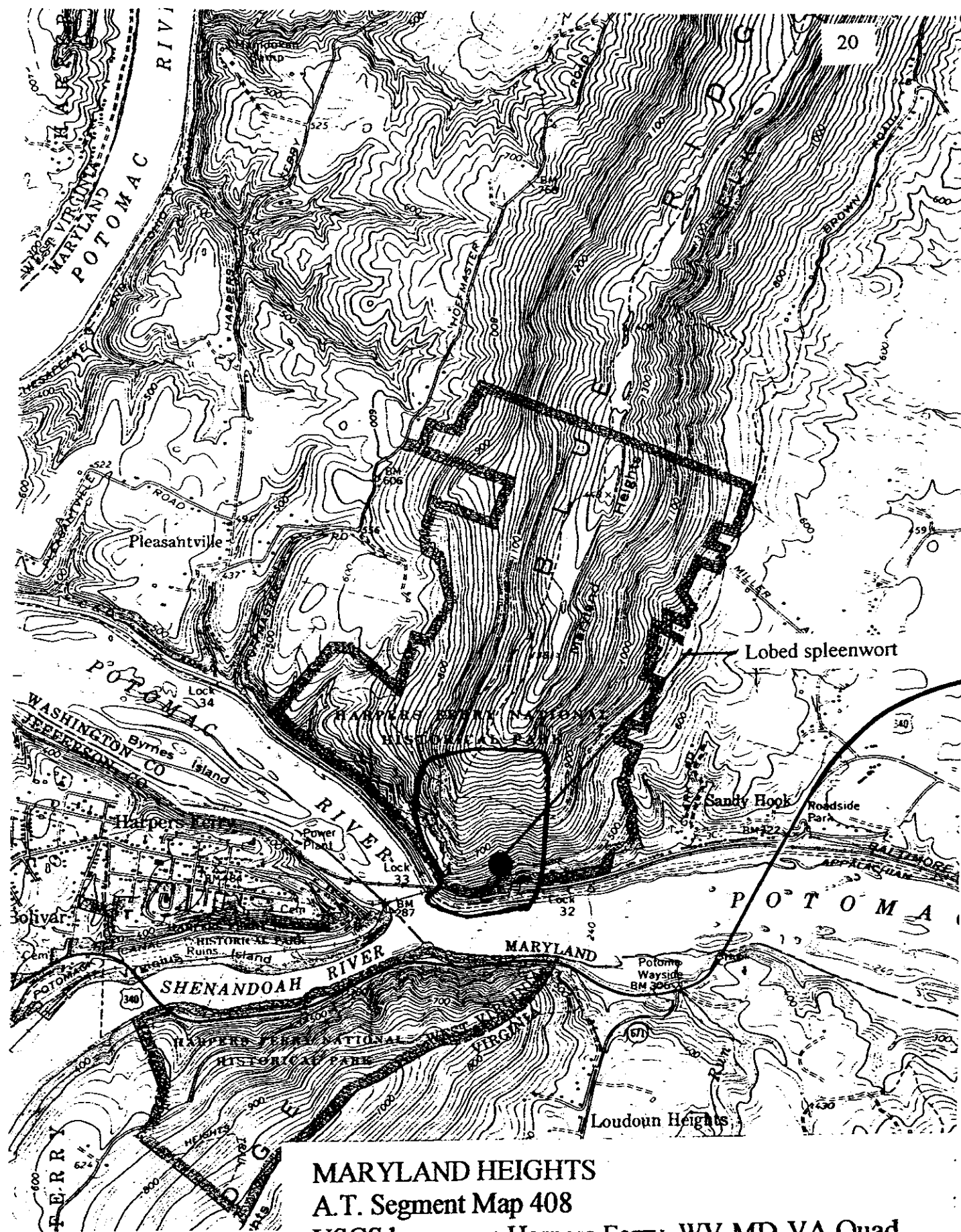
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑



MARYLAND HEIGHTS

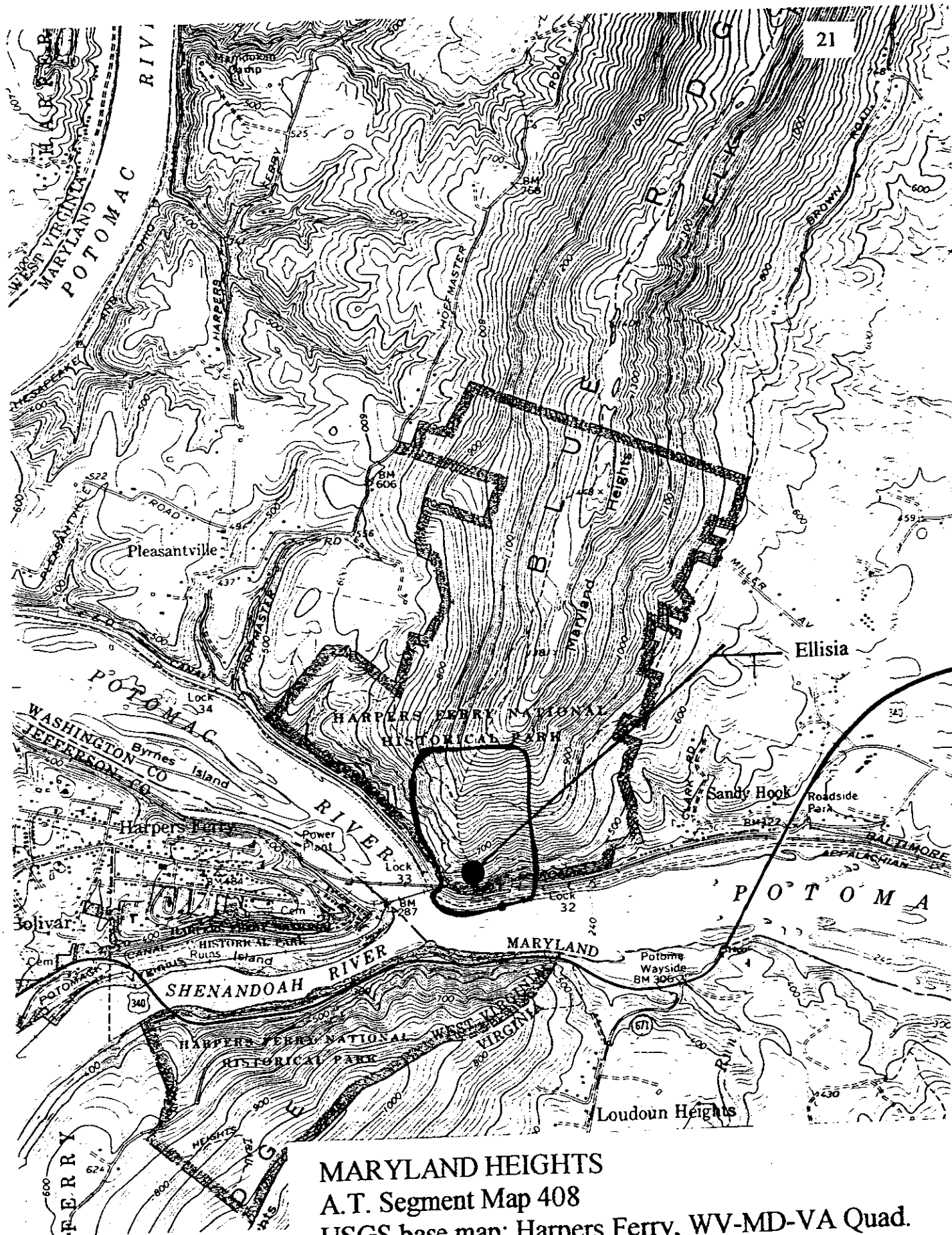
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑



MARYLAND HEIGHTS

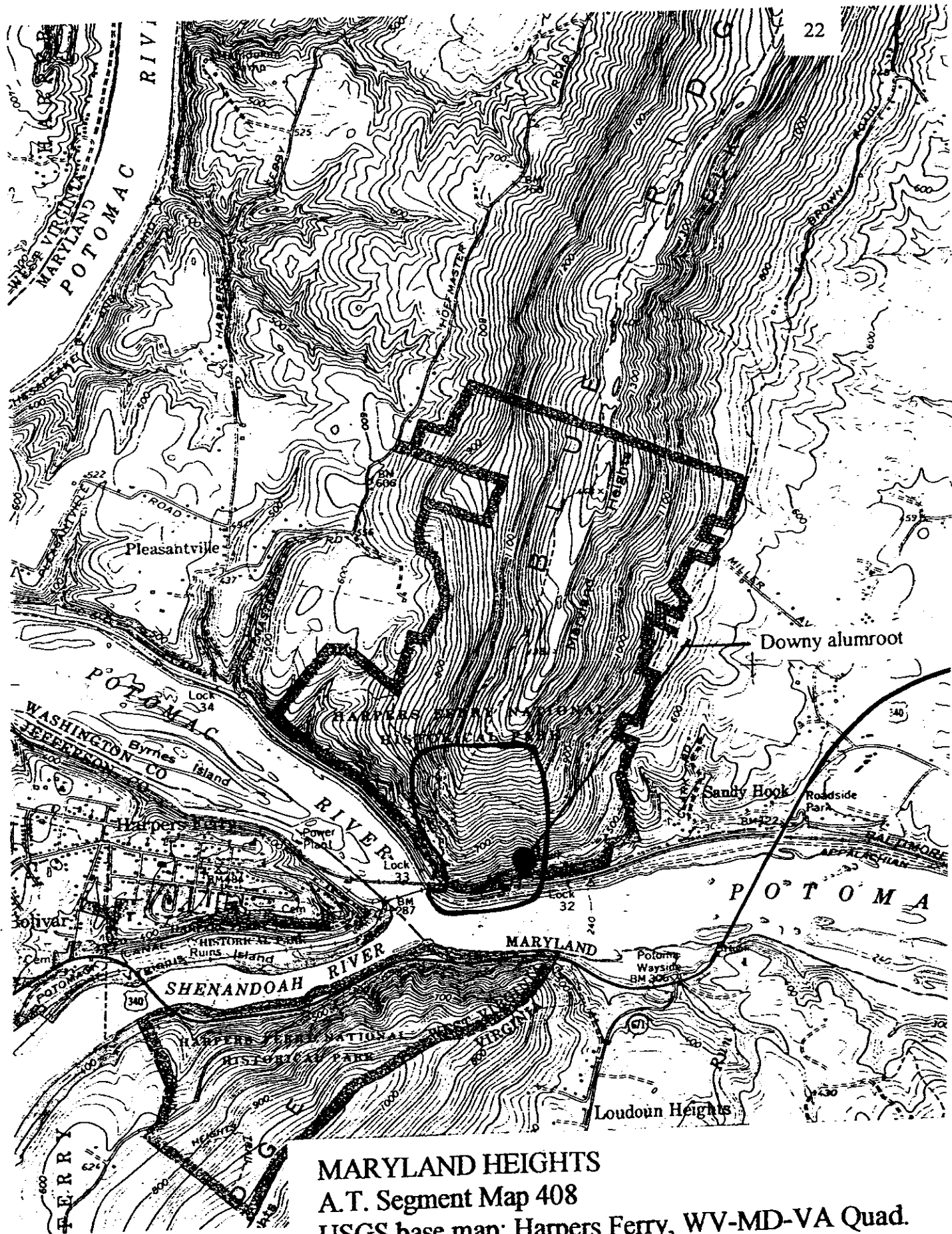
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑



MARYLAND HEIGHTS

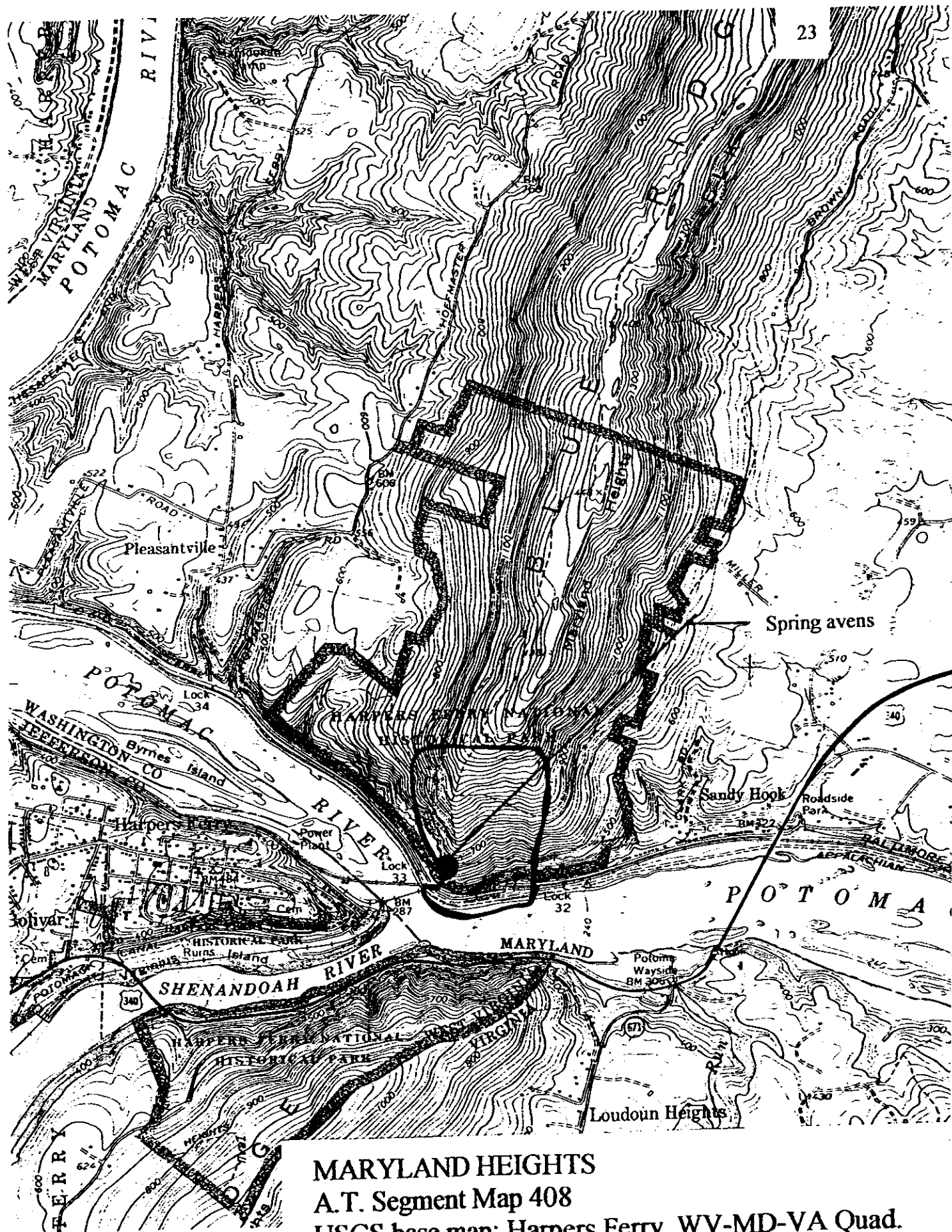
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑



MARYLAND HEIGHTS

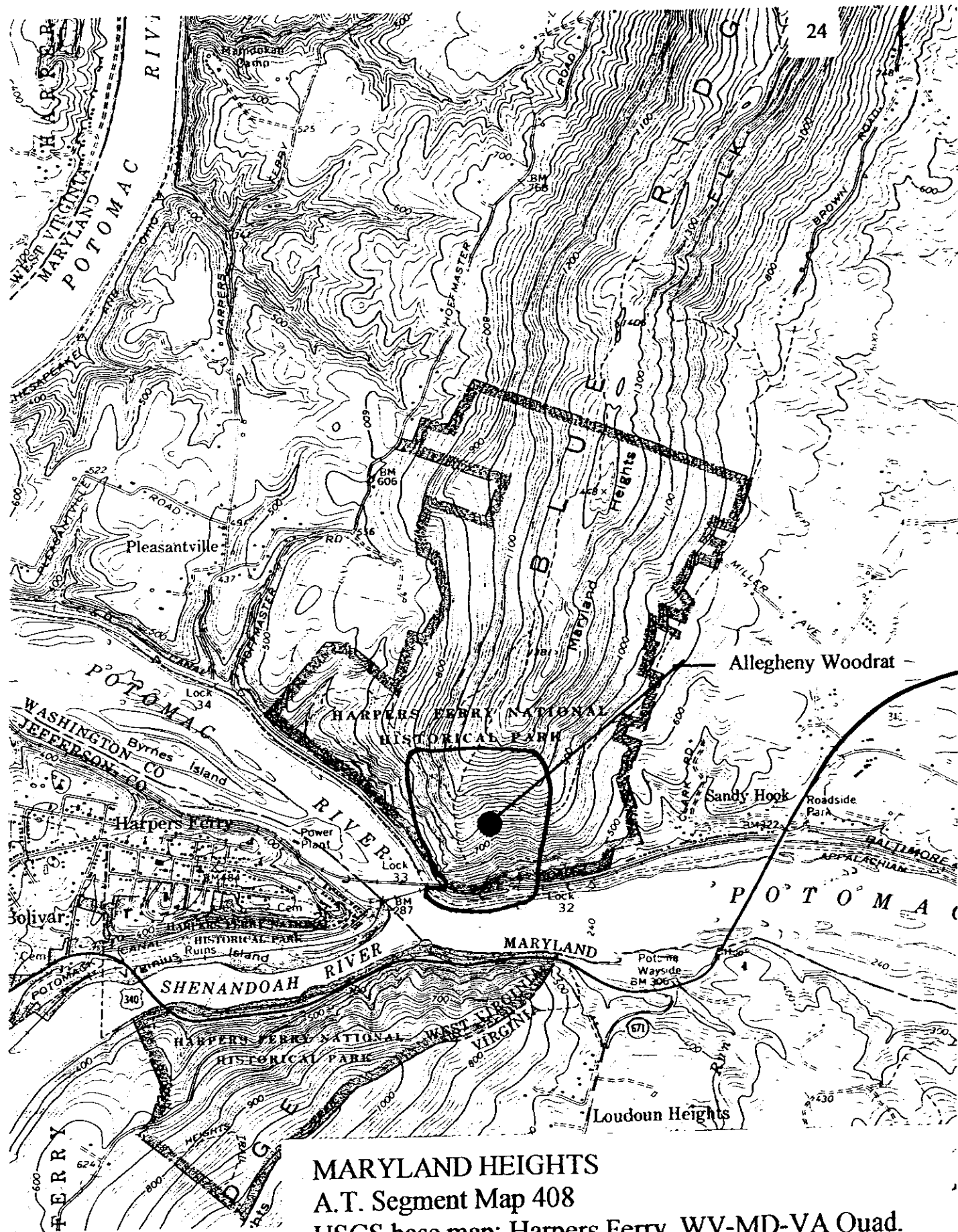
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑



MARYLAND HEIGHTS

A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑

Site 2: LOCK THIRTY-TWO

(From C. Fleming Survey, 1999)

USGS Quad: Harpers Ferry, WV-MD-VA**A.T. Segment Map #'s:** 408**Size:** Approx. 90 acres**Ownership:** National Park Service (Harper's Ferry NHP)

Location: The site is on the uplands adjacent to the C&O Canal towpath and A.T. and is part of the Harpers Ferry National Historical Park Maryland Heights tract. It is roughly centered over the eastern portion of the tract above Potomac River Lock 32.

Natural Heritage Resource Summary

Common name	Scientific Name	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Lobed spleenwort	<i>Asplenium pinnatifidum</i>	G4 S1	Endangered	1999
Downy alumroot	<i>Heuchera pubescens</i>	G4? S3	Watch list	1999
Spring forget-me-not	<i>Myosotis verna</i>	G5 S3	Watch list	1999
Slender day flower	<i>Commelina erecta</i> <i>var. angustifolia</i>	G5 S3	Watch list	1999

Site Description: This site is along the uplands of the Potomac River between Sandy Hook and Maryland Heights. Some areas have large sandstone outcroppings and slopes with southern and western rock exposures. This site does not include the floodplain from the footbridge – east. The dominant overstory includes chestnut oak (*Quercus prinus*), black oak (*Q. velutina*), Virginia pine (*Pinus virginiana*), shagbark hickory (*Carya ovata*), and white ash (*Fraxinus americana*). Mesic woods are found in richer soil pockets, but the site is generally dominated by oaks.

Rare Occurrences: A very small colony of the state endangered fern, lobed spleenwort, grows on a south-facing rock outcrop under an oak overstory east of the main Maryland Heights cliff at this site. Although five clumps were counted in 1999, the plants are much smaller than normal and do not seem to be fruiting or reproducing vegetatively. The lobed spleenwort is known from about ten sites in Maryland, two of which are in Harpers Ferry National Historical Park.

The watch list species, downy alumroot, grows on the same rock outcrop and seems quite sparse at the site and showed signs of insect damage. It is not a high quality occurrence.

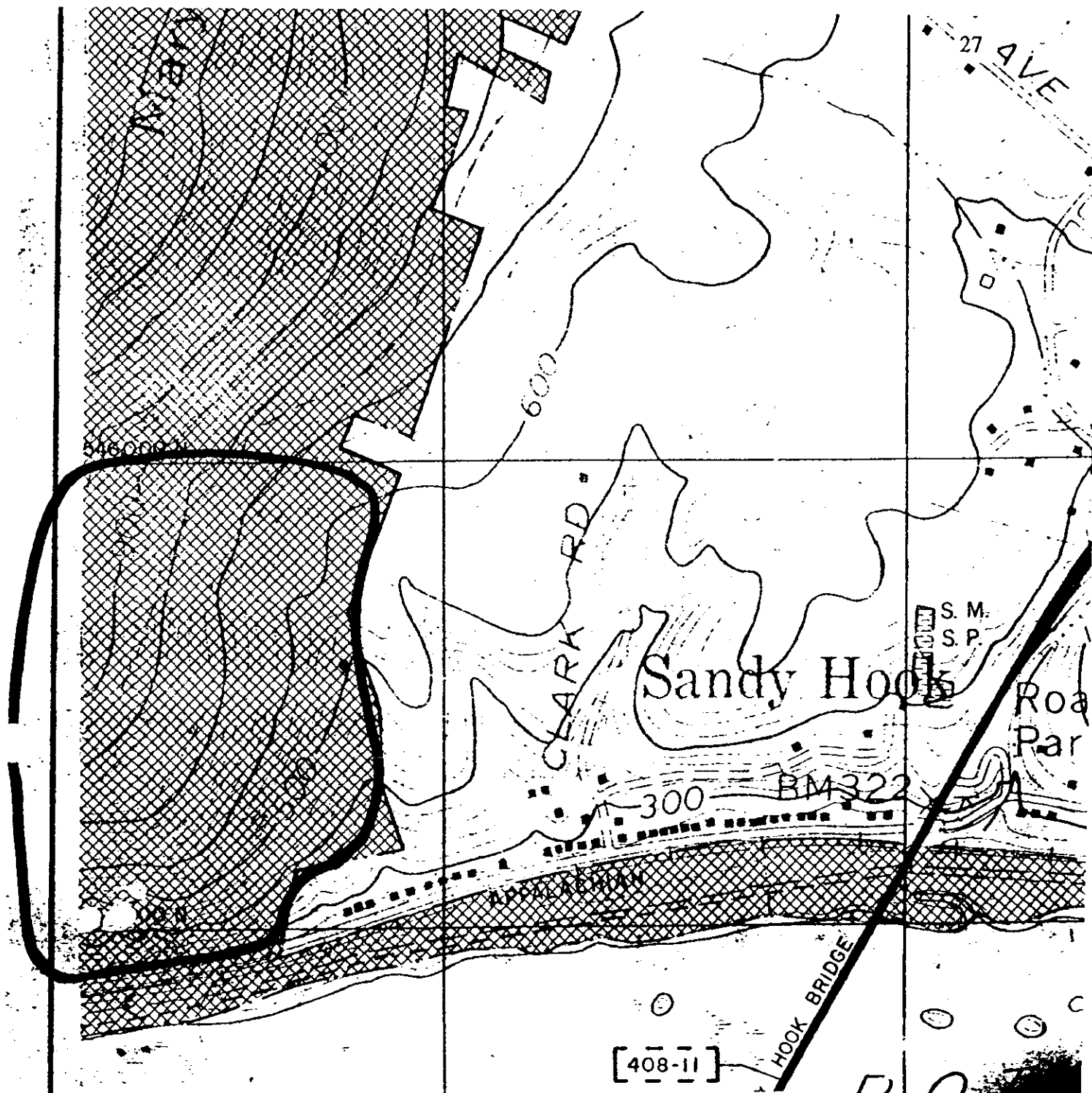
A small occurrence of spring forget-me-not was found during the 1999 survey. More information is not available from the source report on its location.

The slender day flower was found at the site by Wiegand growing in steep sloped woodland in an area of dry oak forest. The species is at the northern end of its range and uncommon in Washington County.

Boundary Justification: The site boundaries were designated by Bartgis (1996) and confirmed by Fleming (1999) as part of a Harpers Ferry National Historical Park study.

Threats: The site has a long history of heavy use, especially during the Civil war and in more recent times when feral goats grazed the vegetation. A railroad, canal and road run along the length of the river, providing an edge environment that promotes the establishment and expansion of non-native invasive species into the upland portion of the park. Invasive species, especially Japanese honeysuckle, threaten the lobed spleenwort.

Management and Protection Recommendations: Monitoring programs are recommended and should coordinate with the other Park personnel. The long range trend of the lobed spleenwort population needs to be assessed given the non-native weed expansion and recreational use of the area. Given the sparse populations of the other 3 watch list plants, monitoring should determine if they are viable.



LOCK 32

A.T. Segment Map 408

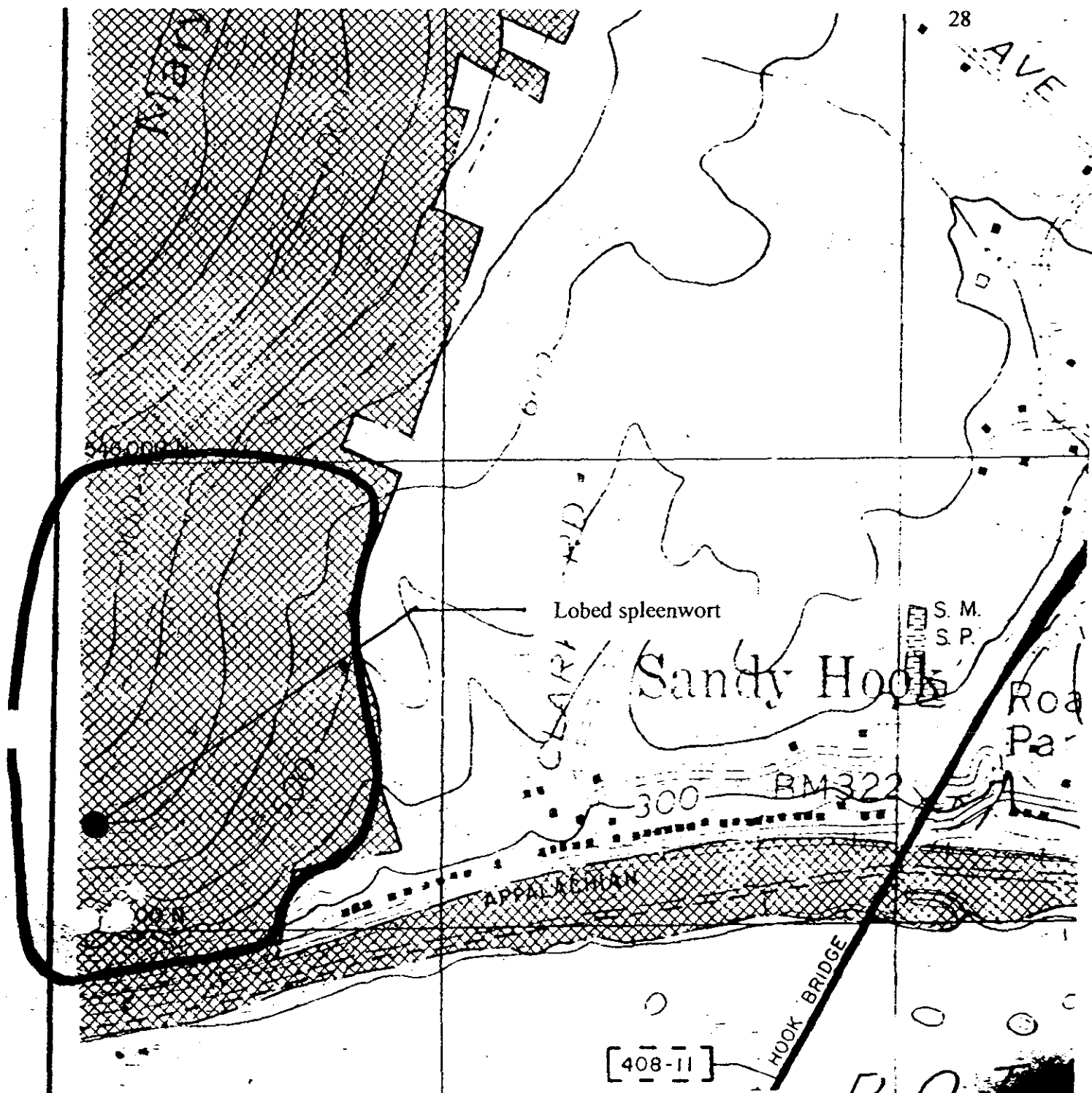
USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑

408 - 09



LOCK 32

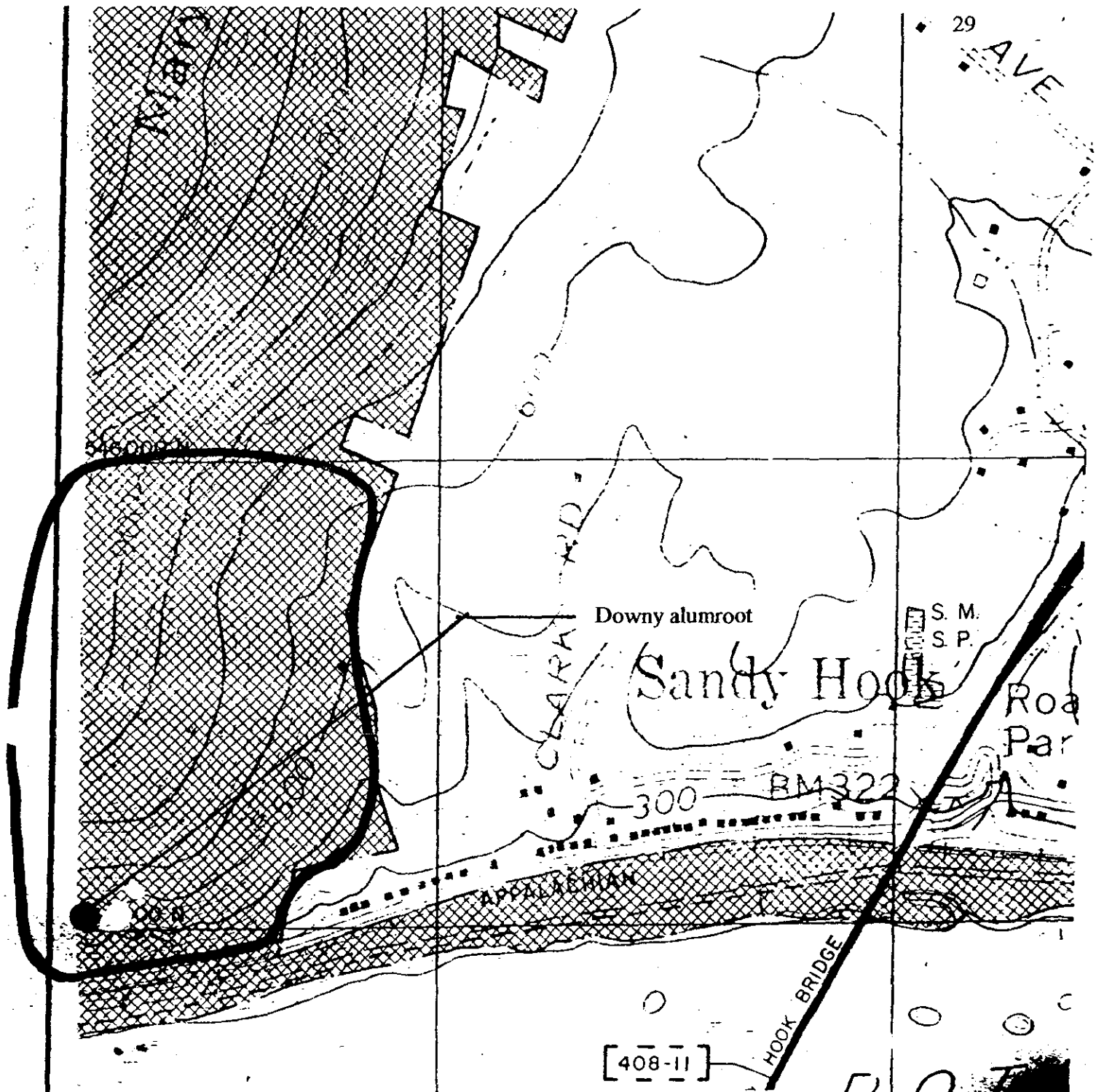
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



LOCK 32

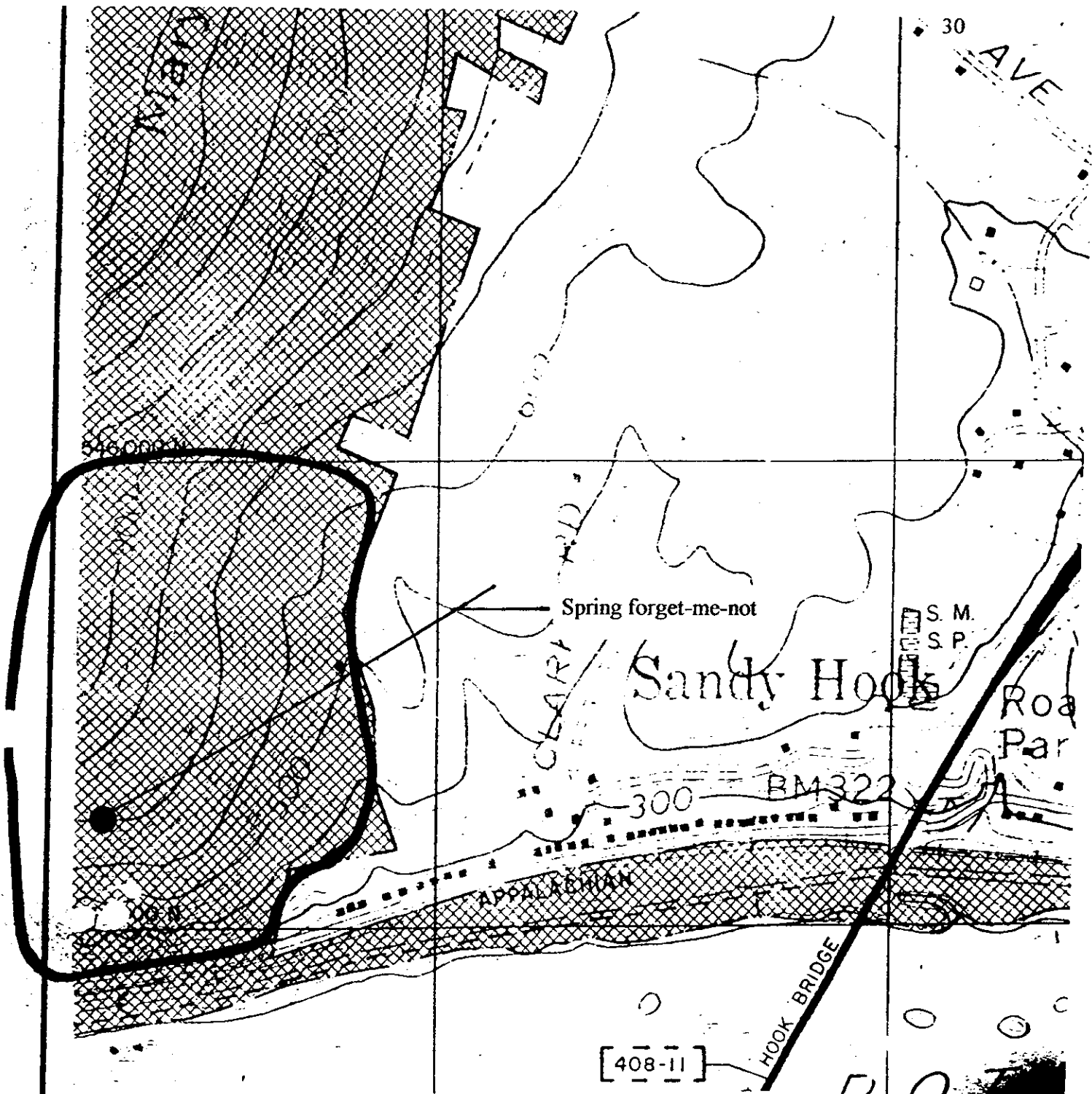
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



LOCK 32

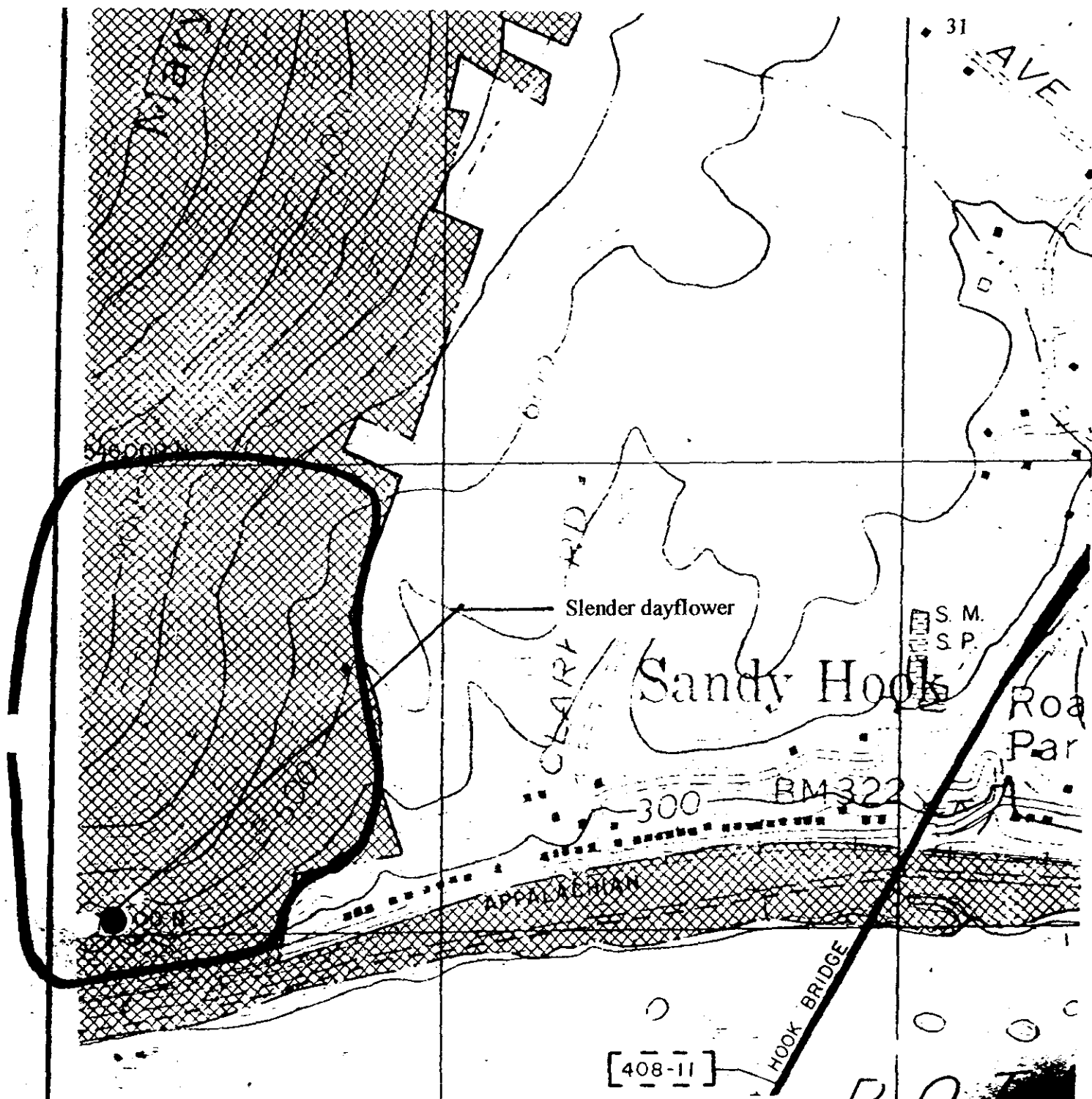
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



LOCK 32

A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑

408 - 09

Site 3: SANDY HOOK FLOODPLAIN

(Part From R. Wiegand Surveys, 1995)

USGS Quad: Harpers Ferry – VA, MD, WV**A.T. Segment Map #s:** 408**Size:** 25 acres**Ownership:** National Park Service (C&O Canal National Historical Park)

Location: This site begins at the east where the foot bridge / railroad bridge from Harpers Ferry WV crosses over the Potomac River and leads to the C&O Canal towpath and the Maryland portion of the A.T. begins. At this point, the Appalachian Trail coincides with the C&O Canal National Historic Park and the Harpers Ferry National Historical Park. From the western-most edge of Maryland Heights to the Sandy Hook Bridge (Route 340 over Potomac R.) this linear site follows the C&O canal towpath and includes all the Potomac River floodplain. Sandy Hook Road forms the northern boundary of the site.

Natural Heritage Resource Summary

Common name	Scientific Name	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Starry false Solomon's seal	<i>Maianthemum stellatum</i> (<i>Smilacina stellata</i>)	G5 S1	Endangered	C/2000
Rustling wild petunia	<i>Ruellia strepens</i>	G4G5 S1	Endangered	C/2000
Snowy campion	<i>Silene nivea</i>	G3G4 S1	Endangered	D/1995
Yellow passion flower	<i>Passiflora lutea</i>	G5 S3	Watch List	C/2000
Floodplain wetland	<i>Silver maple-cottonwood Wetland Forest</i>	Exemplary Natural Community		AB/2000

Site Description: The site contains high quality cottonwood and silver maple wetland forest stands. The canopy layer is co-dominated by sycamore, silver maple, box elder. The mid-story layer has spice bush (*Lindera benzoin*), silky dogwood (*Cornus amomum*), and grapevine (*Vitis sp.*). A rich herbaceous layer includes stands of jewelweed (*Impatiens biflora*), Joe-pye weed (*Eupatorium maculatum*), and river oats (*Chasmanthium latifolium*) on the lower terrace and vines closer to the trail on the upper terrace, moon seed vine (*Menispermum canadense*), wild yam vine (*Discorea villosa*), yellow passion flower (*Passiflora lutea*), and poison ivy. In broader portions of the floodplain the understory includes cut-leaved water horehound (*Lycopus americana*), great lobelia (*Lobelia siphilitica*), and poison ivy (*Toxicodendron radicans*).

Rare Occurrences: The floodplain narrows compared to the width at the Weverton floodplain site (site description following pages). In places, the Trail is directly adjacent to the Potomac River, with no floodplain. Where the floodplain is wider, the condition of the silver maple-cottonwood wetland forest is above average to excellent. The overstory trees form a continuous, mature canopy and the community is very diverse. In places, the quality of the community becomes average primarily because complete stratification is lacking, possibly due to past land use, grazing and a long history of forest clearing. The floodplain forest community structure lacks the sub-canopy layer (small trees and young trees) in places.

The state endangered starry false Solomon's seal was found growing just off the river-side of the A.T. in small colonies of a dozen plants or less where light gaps were provided in the canopy. The plant colonizes by rhizomes and can spread on sandy, alluvial silt substrates where openings are available. Most records for this species in Maryland occur in the vicinity of Harpers Ferry along the Potomac River floodplain.

The rustling wild petunia, a state endangered plant, is found in small numbers on the lower floodplain near fishing access trails. This plant favors rich alluvial soils and is rare along the coastal plain in the mid-Atlantic.

The state watch list species, yellow passion flower vine, is found on scattered along both sides of the A.T. attached to sapling boxelder trees. The vine is growing both in the interior of the floodplain and immediately adjacent the Trail. This plant is found infrequently on moist, river floodplains on the coastal plain of the mid-Atlantic.

Snowy campion is a state endangered plant occurring in a few places along the Potomac River in West Virginia and Maryland. At this site, about 10 plants were found in an area close the A.T. interspersed with the common (and similar appearing) *Lychnis alba*. The snowy campion population was impacted by the floods of 1996 and has not been seen since 1995. It is typically found on sandy, silty, floodplain habitat, which is often susceptible to invasive non-natives as well as flood events. The biological requirements of the species are not understood, so its reappearance in the future can not be predicted.

Boundary Justification: The protection area boundary includes all that is necessary to encompass rare species populations and potential habitat. The National Park Service owned floodplain forest community and scour bars essentially make up the potential habitat. The higher quality forest is mostly south of the A.T., but all of the northern forest is included as buffer.

Threats: Threats at this site include a high amount of human activities. Trail visitor trampling, recreational river users and trail maintenance are the most immediate threats. Indirect threats include natural flooding and non-native invasive species, particularly garlic mustard (*Alliaria petiolata*), Japanese hops, (*Humulus japonicus*) and Oriental stilt grass (*Microstegium vimineum* var. *imberbe*). In some places at the site, the non-native cover is 90%, and seems like an overwhelming management challenge.

Starry false Solomon's seal and rustling wild petunia are especially susceptible to impacts from trampling and invasive species competition. Since these state-endangered plants grow close to the fishing access paths they may need to be monitored closely.

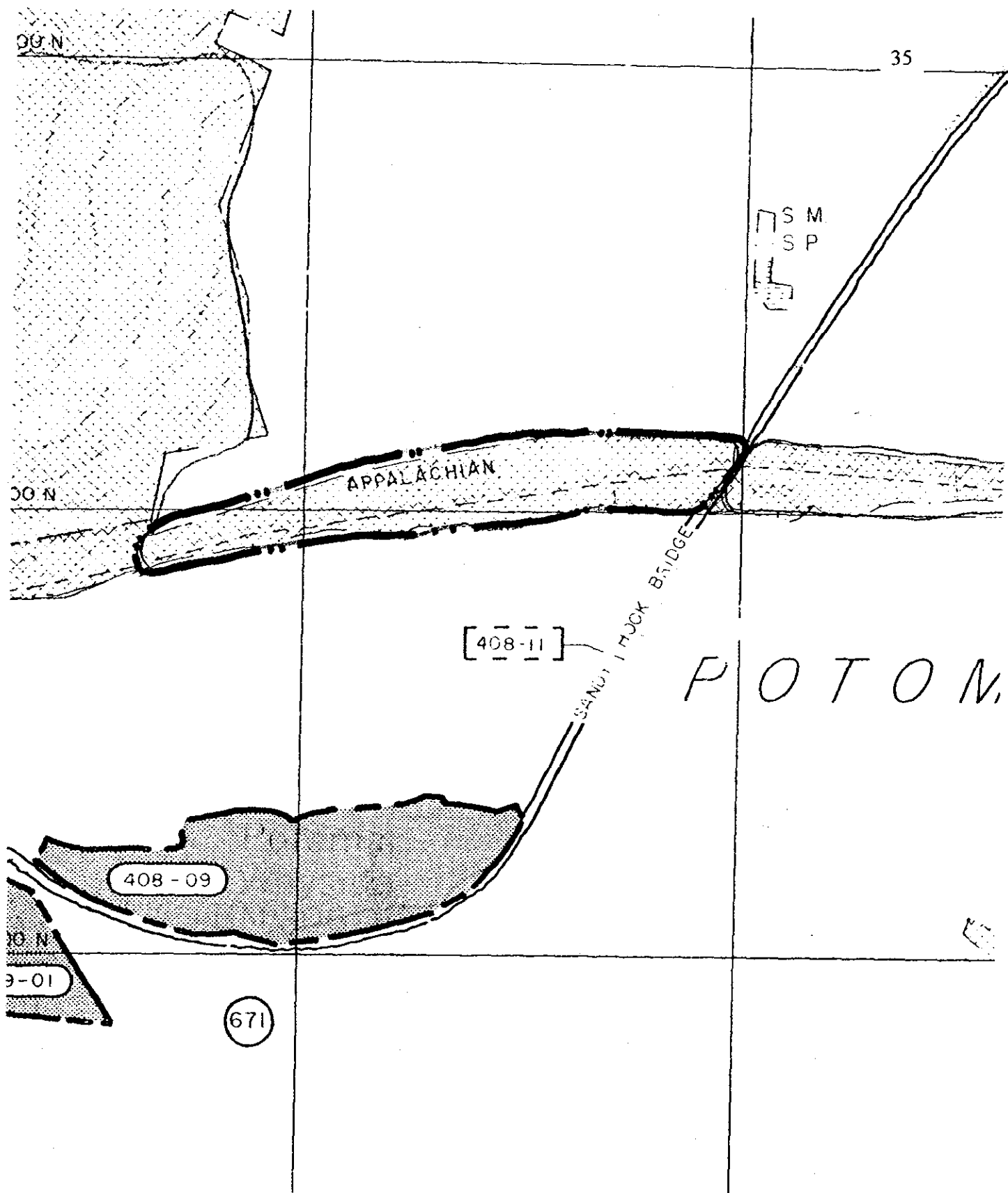
The vine, yellow passion flower is not threatened in the same way as the herbaceous rare plants are. Unless fishing paths are trimmed and opened up, cutting the vines, they are secure.

The Sandy Hook bridge is very immediately adjacent to the plants at this site. Bridge work or replacement could impact the plants with direct removal or with indirect effects, such as erosion.

Management and Protection Recommendations: Most of the rare plant populations at this site occur close to unofficial fishing paths. It would be of interest to monitor the effect these fishing paths have on the rare plant populations. Plant species that could be affected by fishing trails are: the rustling wild petunia (*Ruellia strepens*), honey vine (*Cynanchum laeve*), and yellow passion flower (*Passiflora lutea*).

Trail maintainers should be aware of the locations of the following plant species that occur within 5 feet of the A.T.: starry false Solomon's seal (*Maianthemum stellatum*), and honey vine, (*Cynanchum laeve*). The snowy campion (*Silene nivea*) was also originally located within 5 feet of the Trail, but since it has not been seen in several years, it is not under immediate threat by trail maintainers.

Site work, such as trail brushing and removing hazard trees, should be coordinated with a National Park Service resource specialist and a knowledgeable botanist so that inadvertent damage to rare plants can be avoided. It appears that light trimming of plants along the trail is typically done along the A.T. where it coincides with the C&O Canal towpath. This activity is not as great a threat as concentrated trampling. If plant removal along the towpath remains at current levels and is not increased, the rare species should not be affected.



SANDY HOOK FLOODPLAIN

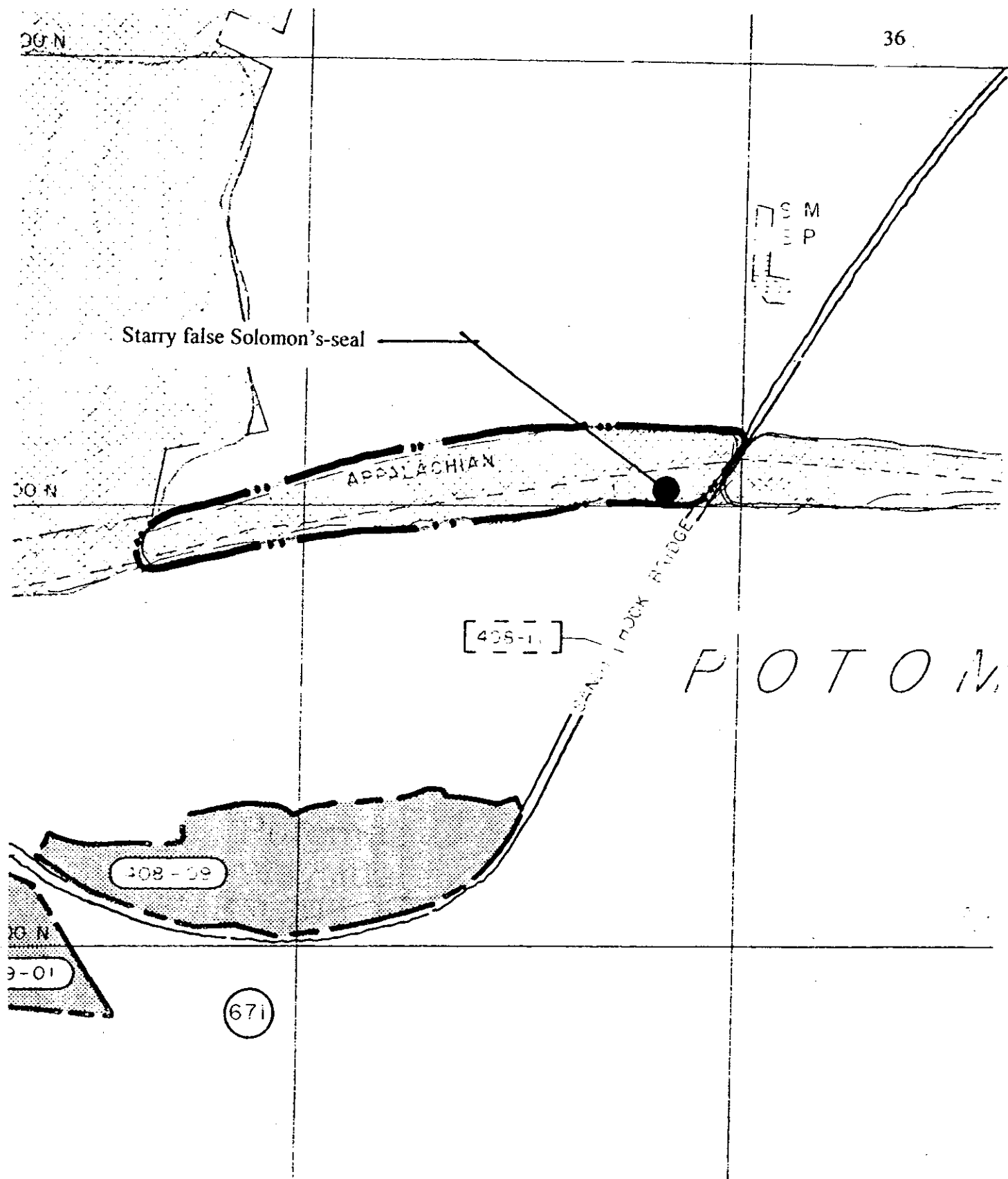
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



SANDY HOOK FLOODPLAIN

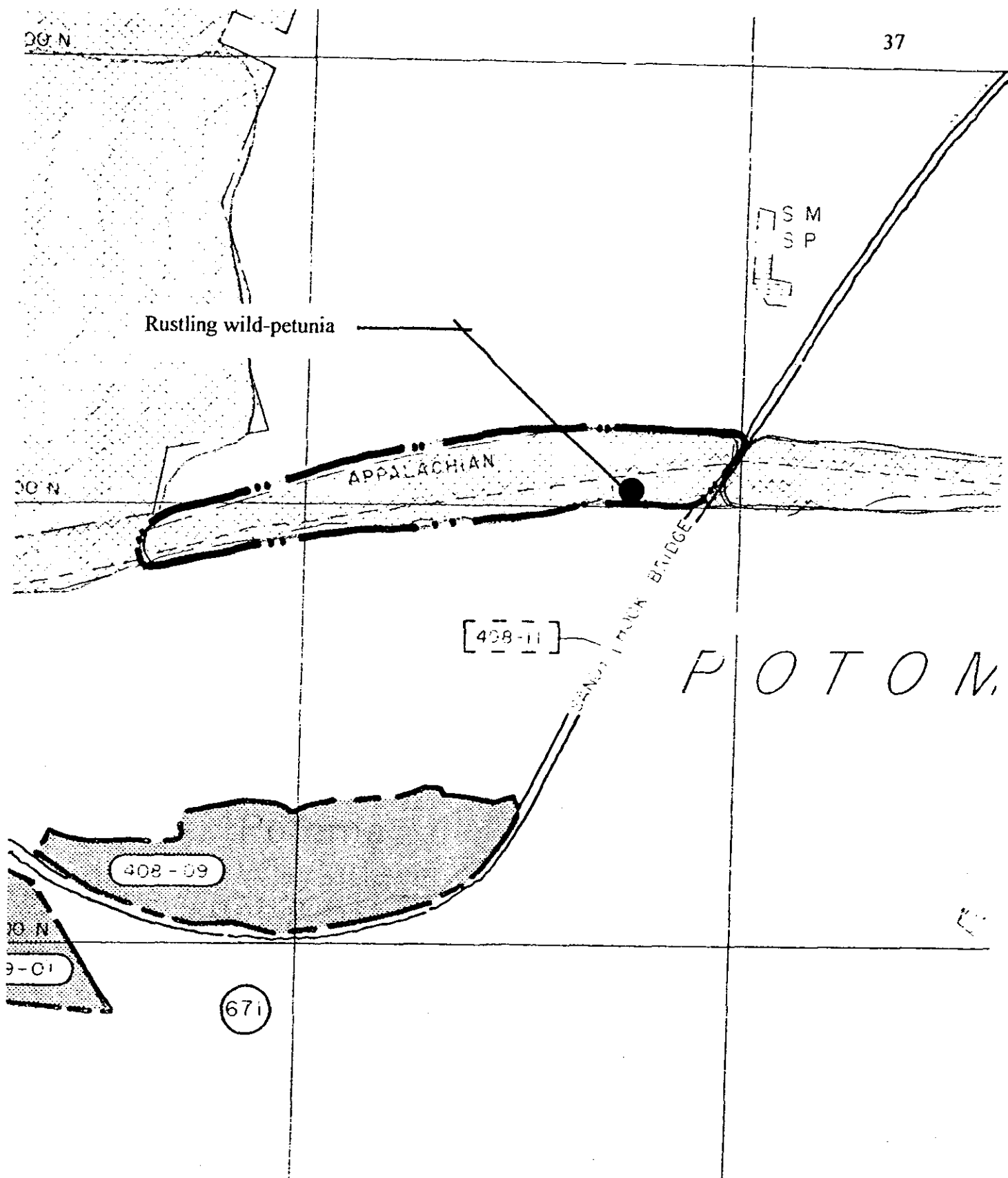
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

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SANDY HOOK FLOODPLAIN

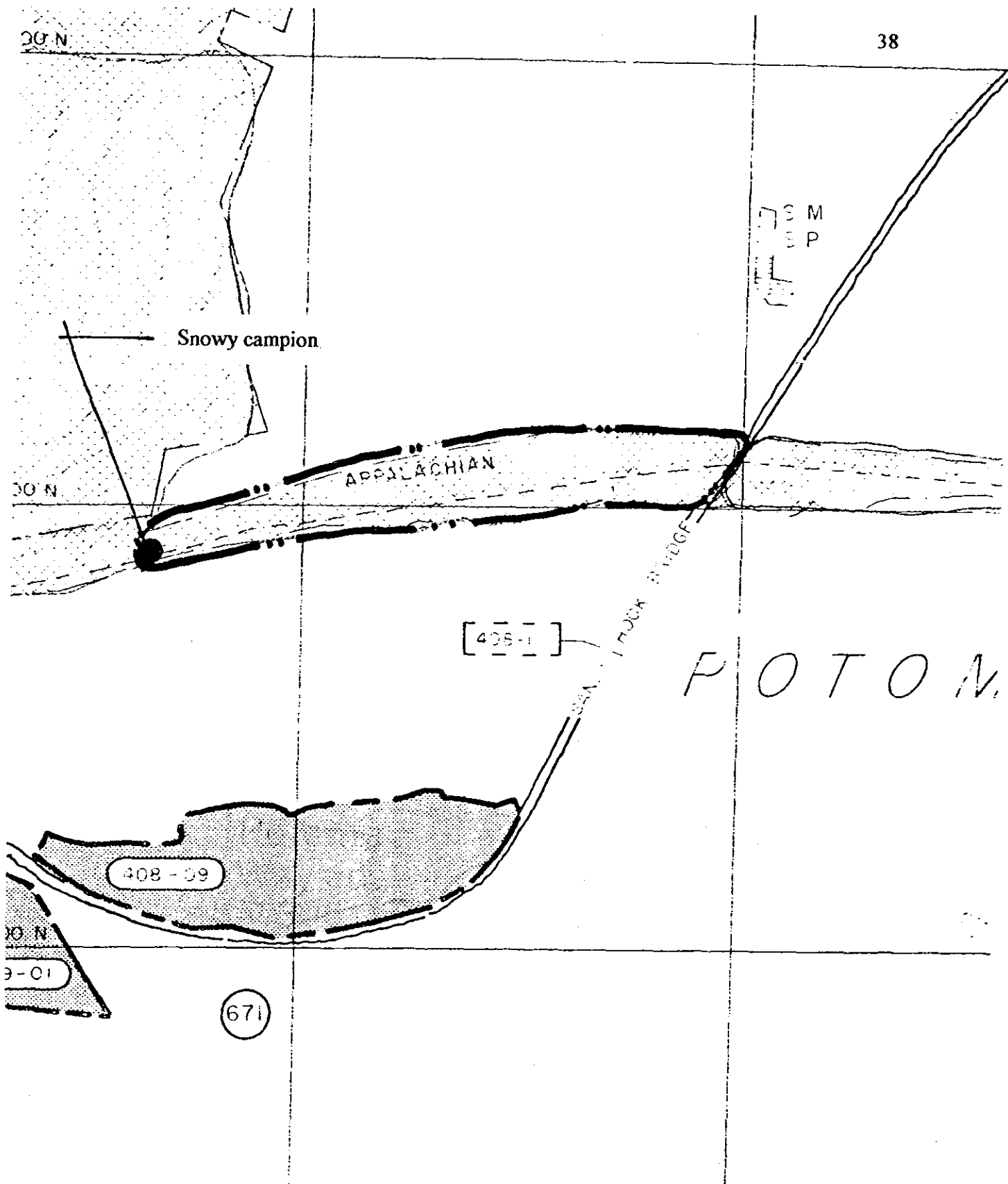
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



SANDY HOOK FLOODPLAIN

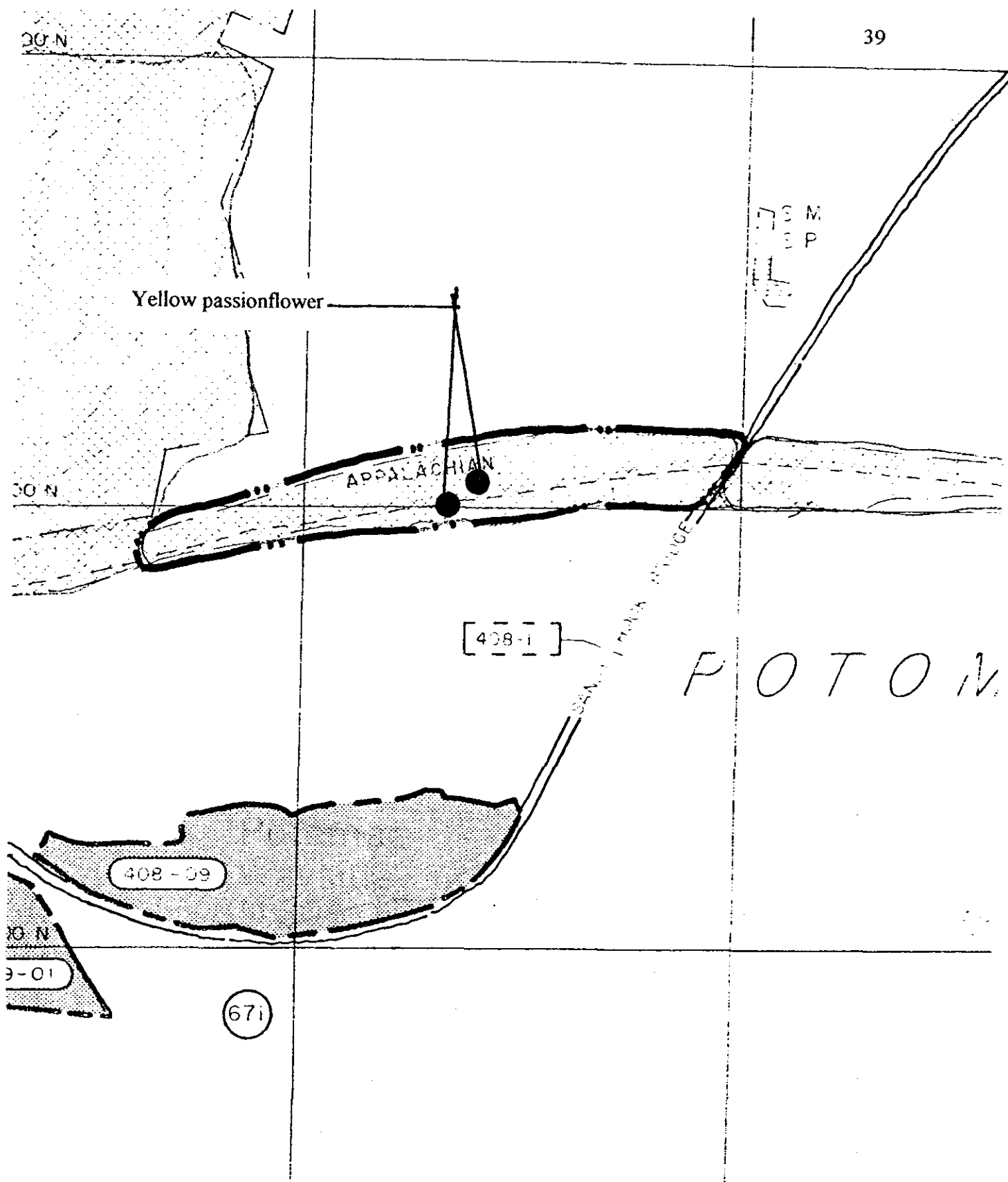
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



SANDY HOOK FLOODPLAIN

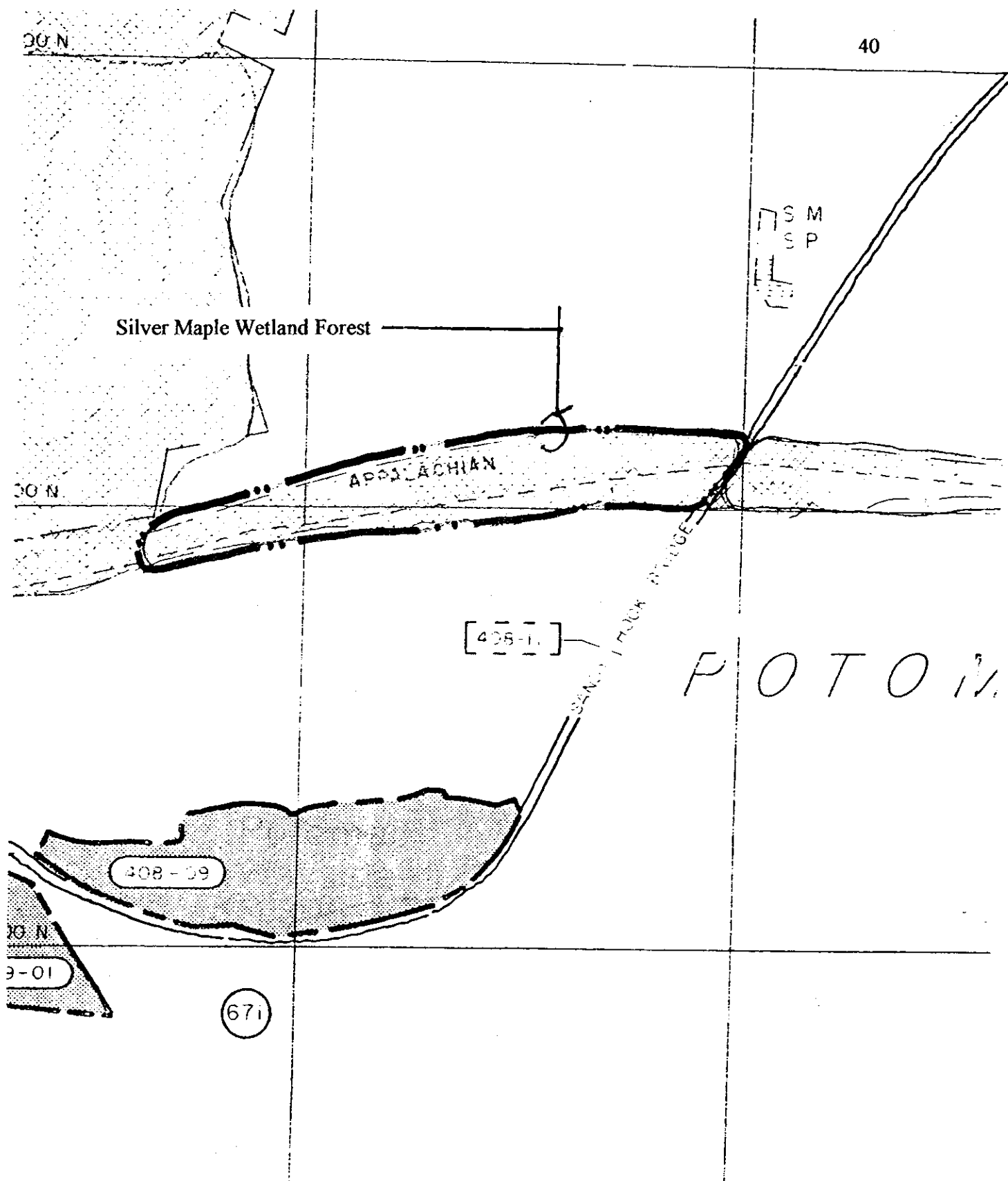
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USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



SANDY HOOK FLOODPLAIN

A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑

Site 4: WEVERTON FLOODPLAIN

(Part From R. Wiegand Surveys, 1999)

USGS Quad: Harpers Ferry – VA, MD, WV**A.T. Segment Map #:** 408**Size:** 90 acres**Ownership:** National Park Service (C&O Canal National Historical Park)

Location: This is a large site including all of the A.T. corridor where it coincides with the National Park Service C&O Canal National Historical Park's tow path from the Sandy Hook Bridge (Route 340 over Potomac R.) to Weverton at the Washington and Frederick Counties border. The B& O railroad forms the northern boundary. The designated A.T. campsite, Weverton Camp, is located on the floodplain terrace between the Potomac River and the A.T. near the western end of this Heritage site. The entire site is composed of a floodplain terrace, scour bars and lowland forest.

Natural Heritage Resource Summary

Common name	Scientific Name	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Starry false Solomon's-seal	<i>Maianthemum stellatum</i> (<i>Smilacina stellata</i>)	G5 S1	Endangered	C/2000 BC/1999
Halberd-leaved rose-mallow	<i>Hibiscus laevis</i>	G3G5 S3	Watch	B/2000
Rustling wild-petunia	<i>Ruellia strepens</i>	G4G5 S1	Endangered	CD/2000
Yellow passionflower	<i>Passiflora lutea</i>	G5 S3	Watch	B/2000
Scarlet ammannia	<i>Ammannia coccinea</i>	G5 SU	Watch	CD/2000
Honeyvine	<i>Cynanchum laeve</i>	G5 S3	Watch	B/2000
Potomac River Floodplain	<i>Silver Maple Wetland Forest</i>	Exemplary Natural Community		B/2000

Site Description: This section of the Potomac River supports one of the most extensive and diverse areas of floodplain forest and scour bar habitats in Maryland. Sand and gravel deposition has built a lower terrace where many state rare species are located. The Trail is above a secondary terrace. The dominant overstory canopy species are sycamore (*Platanus occidentalis*), silver maple (*Acer saccharinum*) and box elder (*Acer negundo*). A less developed sub-canopy layer includes young box elder (*Acer negundo*), pawpaw (*Asimina triloba*), and black cherry (*Prunus serotina*). Shrub layer is dominated by spice bush (*Lindera benzoin*) and viburnums (*Viburnum sp.*). Woody vines dominate the shrub understory, including poison ivy (*Toxicodendron radicans*), Virginia creeper

(*Parthenocissus quinquefolia*). The herbaceous layer includes false Solomon's seal (*Smilacina racemosa*), Solomons' seal (*Polygonum biflora*), river oats (*Chasmanthium latifolium*), Joe Pye weed (*Eupatorium fistulosum*), green coneflower (*Rudbeckia laciniata*), jewelweed (*Impatiens biflora*), wingstem (*Verbesina alternifolia*), cow parsnip (*Heracleum lanatum*), late eupatorium (*Eupatorium serotinum*), short stem monkeyflower (*Mimulus ringens*), jimsonweed (*Datura stramonium*), swamp milkweed (*Asclepias incarnata*), 3-seeded mercury (*Acalypha rhomboidea*) and pokeweed (*Phytolacca americana*).

The side trail (blue-blazed) to Weverton campsite is used by A.T. hikers, C & O Canal tow path hikers, waders, rafters, boaters, and walk-in fishermen. The landing at the terminus of the blue-blazed Trail is a popular spot to view the river, and the trampled area is relatively wide.

Rare Occurrences: The Silver Maple Wetland Forest community is a very fine example of the Potomac River floodplain dominated by very large silver maples and cottonwoods. This type of wetland forest is not as common as that which occurs at the adjacent Lock 32 site.

Immediately west of the blue-blazed side trail leading to the A.T. Weverton campsite are about 100 individuals of starry false solomon's seal (*Maianthemum stellatum*). A few plants are trampled where visitors have stepped off the main path. Much of the floodplain forest is afforded protection from trampling by the presence of thick stands of poison ivy. Further down slope from the main campsite are spotty populations of honeyvine (*Cynanchum laeve*) and Halberd-leaved rose-mallow (*Hibiscus laevis*). Near the Potomac River bank, the terrace levels out to a flat sandbar where visitors have established a landing for fishing and wading. The sparse populations of scarlet ammannia (*Ammannia coccinea*) are found on this moist sand/gravel of the scour bar. West of the campsite are 3 more individual plants of Halberd-leaved rose-mallow and 2 groups of scattered individuals of the honeyvine (*Cynanchum laeve*) and yellow passionflower (*Passiflora lutea*) close to the Trail. The rare vines and halberd-leaved rose-mallow occurred over an area approximately 1,500 feet (east-west) by 100 feet. Along a fishermen's access trail near the Sandy Hook Bridge (Rt. 340) is a small group of rustling wild-petunia (*Ruellia strepens*).

All of the watch list species are geographically distributed on the southeastern coastal plain and are found in Maryland only along the Potomac River. The river shore is very susceptible to non-native invasive weeds and it is believed that many of these species will decline as weeds increase. The Halberd-leaved rose mallow and honeyvine can be found on disturbed floodplains, and may have better ability to co-exist with invasive species.

In 1999, 3 other sub-populations of starry false Solomon's seal were found along a ¼ mile of floodplain terrace, along the A.T. corridor, and extensive searches could not relocate them (they are the eastern most sub-populations on the map on page 45). The relative rank of the quality of populations appears to have declined (Richard Wiegand, pers. comm., 2000). This decline in the quality of the occurrence could be due, in part, to

the negative influence invasive weeds have had on the habitat. The new sub-population was found at the Weverton Campsite for the first time in 2000.

The state endangered sweet-scented Indian plantain (*Hasteola suaveolens*, Syn. *Synosma suaveolens*, *Cacalia suaveolens*)) was discovered just east of this site (just outside the A.T. corridor), near the Frederick County border on river scour bars in 1986. It is possible that this species could be found on other scour bars at this site.

Boundary Justification: The protection area boundary includes all that is necessary to encompass rare species populations and potential habitat. The National Park Service owned floodplain forest community and scour bars essentially make up the potential habitat. The higher quality forest occurs to the south of the A.T.

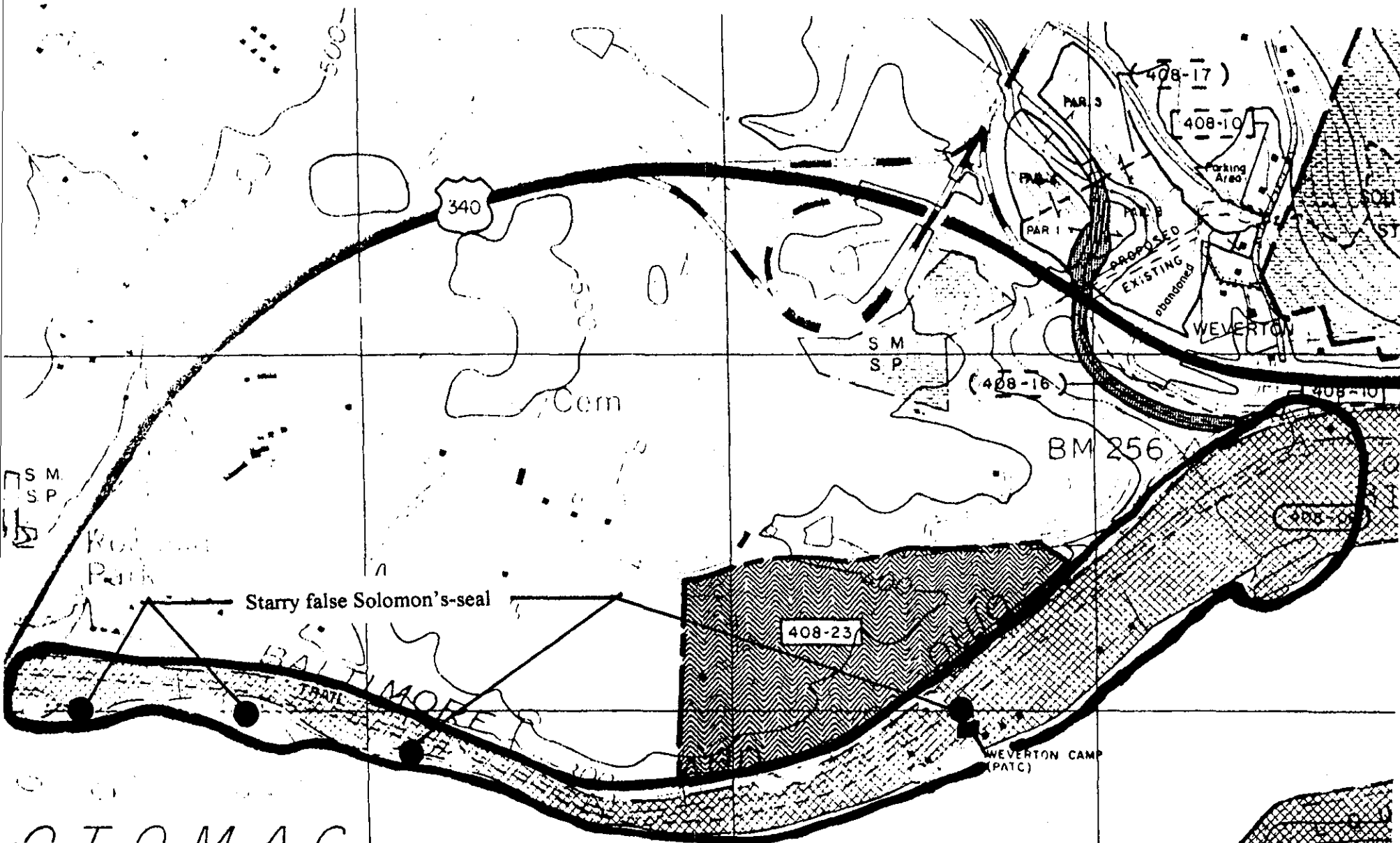
Threats: Threats at this site include a high amount of human activities. Trail visitor trampling, recreational river users are the most immediate threats to all the plant occurrences. Natural flooding and non-native invasive species, particularly garlic mustard (*Alliaria petiolata*) and Japanese hops, (*Humulus japonicus*) also pose a threat to plant and community occurrences of rustling wild petunia and starry false Solomon's seal. The water edge species, ammannia is most subjected to fisherman trampling and flooding.

Trail maintenance activities would only threaten plant populations within 5 feet of the Trail, not the fishing access trails. The plant species that could be affected by maintenance are starry false Solomon's seal, honeyvine, and yellow passionflower. The ammannia is not along the Trail, but it is along the water's edge where A.T. overnight campers would gain access to the river.

Management and Protection Recommendations: The rare plant populations of starry false Solomon's seal along the Trail and ammannia near the waters edge at the Weverton Campsite should be monitored. These plants are especially close to the trail and campsite activities. Site work, such as trail brushing and removing hazard trees, should be coordinated with a National Park Service resource specialist and a knowledgeable botanist so that inadvertent damage to rare plants can be avoided. Perhaps the casual fisherman's landing could be better defined to contain human activity and avoid trampling the scour bar community.

The floodplain community is susceptible to natural flooding and invasion of non-native weeds. Efforts should be made to eradicate invasives from the highest quality community first.

No specific management information is available for the rare floodplain plants, yellow passion flower and honeyvine or the shrubby halberd-leaved rose mallow. However, these floodplain species could be impacted by hydrologic changes resulting from restoration of the structures along the C&O Canal.



WEVERTON FLOODPLAIN

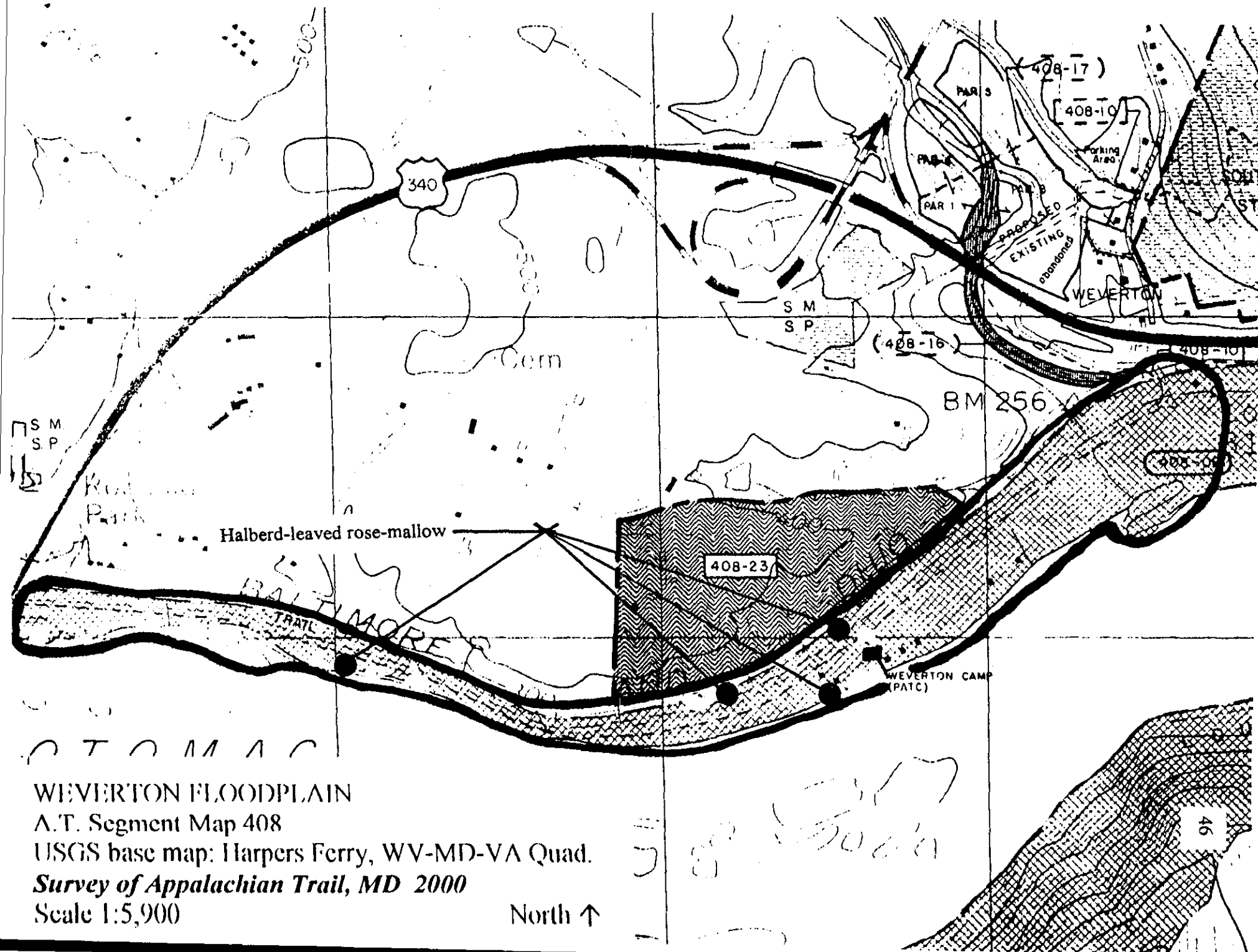
A.T. Segment Map 408

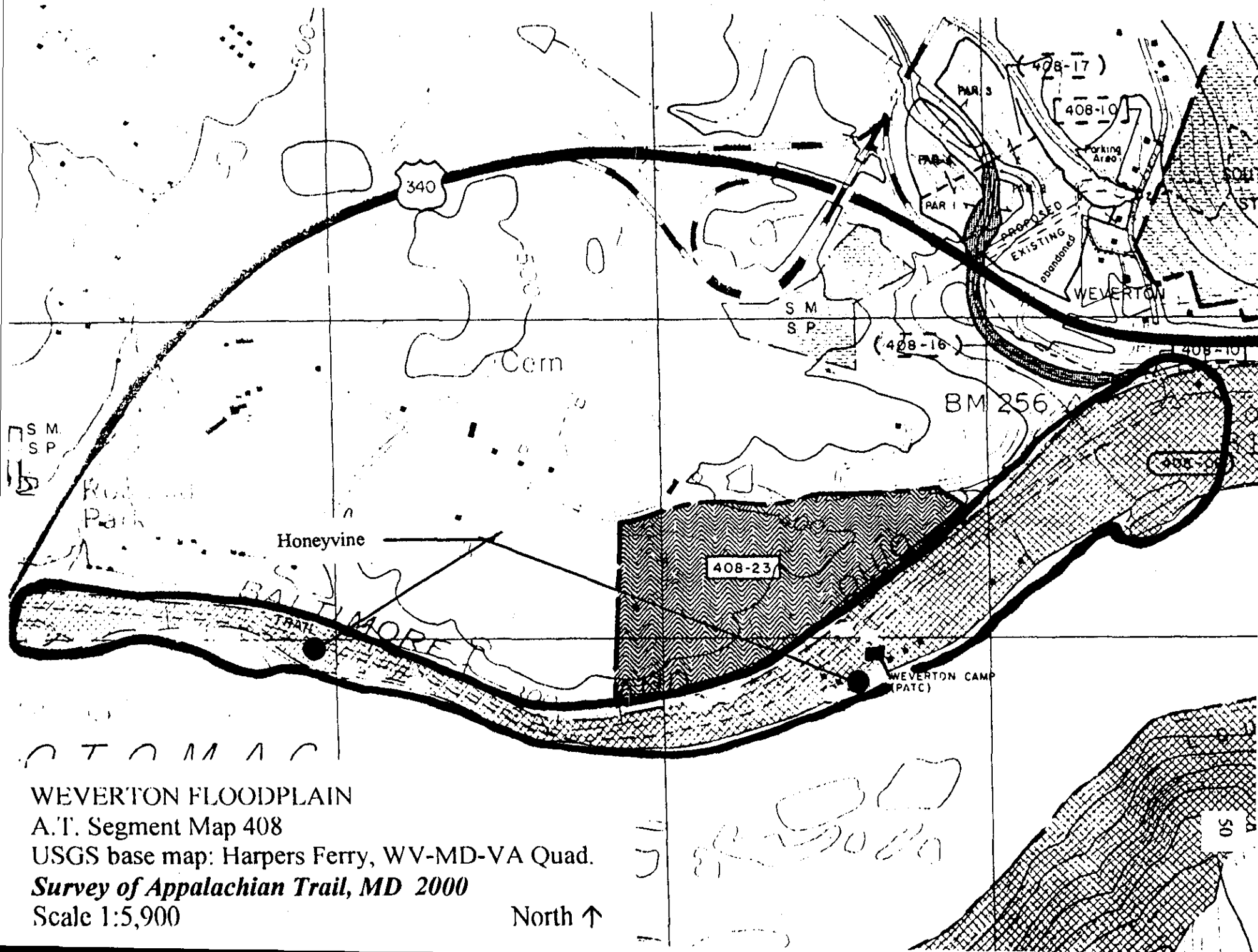
USGS base map: Harpers Ferry, WV-MD-VA Quad.

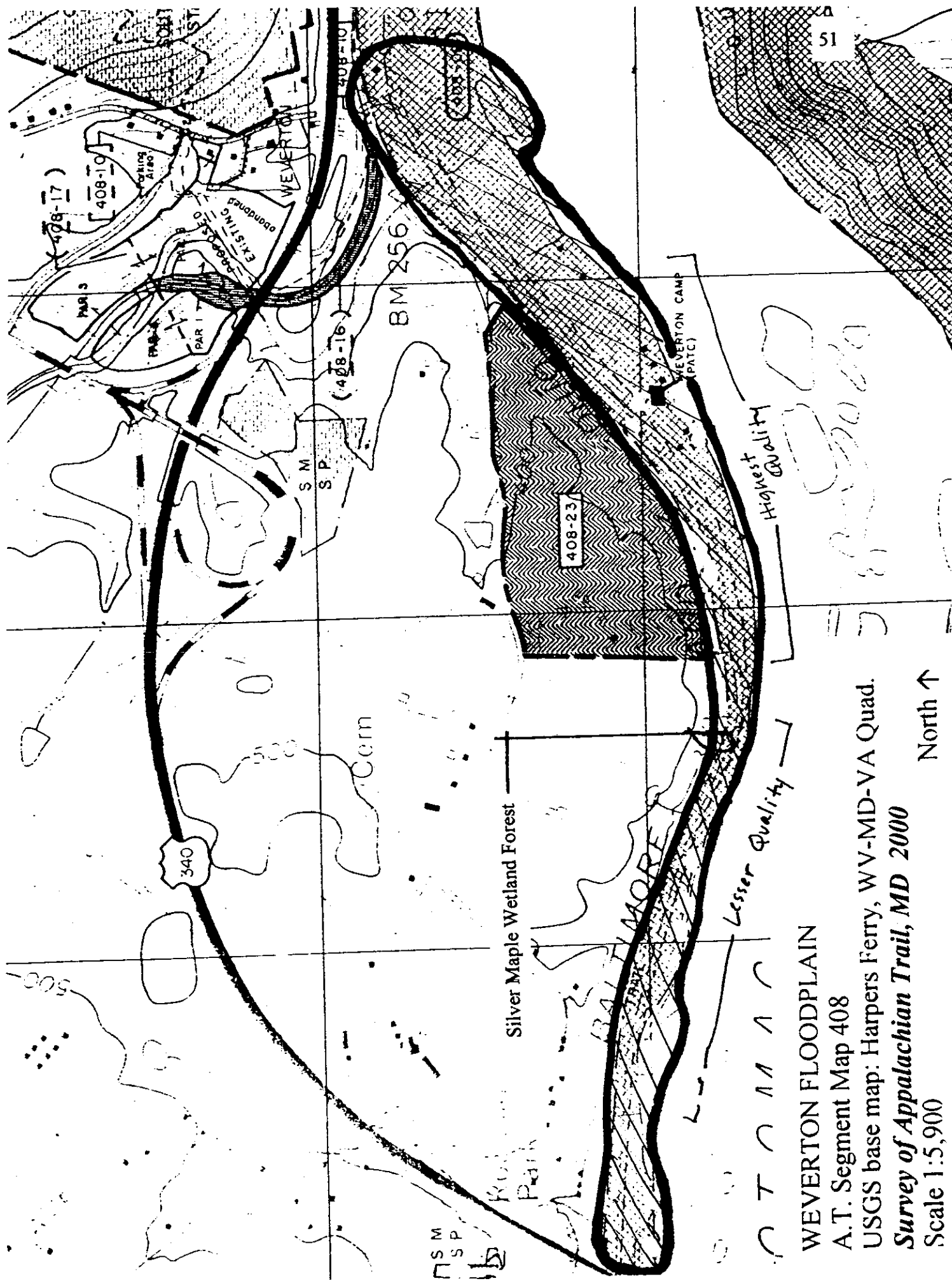
Survey of Appalachian Trail, MD 2000

Scale 1:5,900

North ↑







WEVERTON FLOODPLAIN

A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:5,900

North ↑

Site 5: WEVERTON CLIFFS
USGS Quad: Harpers Ferry, WV-MD-VA

A.T. Segment Map #'s: 408

Size: 30 acres

Ownership: State of Maryland (South Mountain State Park)

Location: South end of South Mountain. From the A.T., a side trail (blue blazes) to an overlook point above Weverton cliffs leads to the site. The site includes all the rock outcrops and cliff face of Weverton cliff overlook.

Natural Heritage Resource Summary

Common name	Scientific Name	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Lobed spleenwort	<i>Asplenium pinnatifidum</i>	G4 S1	Endangered	D/2000

Site Description: The site consists of a rocky portion of the A.T., the side trail to Weverton Cliff and a series of unofficial paths that lead down and around to the base of the cliff. The smaller ledges to the west of the main cliffs are southwest facing vertical rocks where the lobed spleenwort is barely present. The site is composed of quartzite cliff with scattered oaks and Virginia pines. A talus of large boulders is at the base of the cliff. Associated herbaceous plants include mosses, woodland goldenrod (*Solidago caesia*), and Ebony spleenwort (*Asplenium platyneuron*).

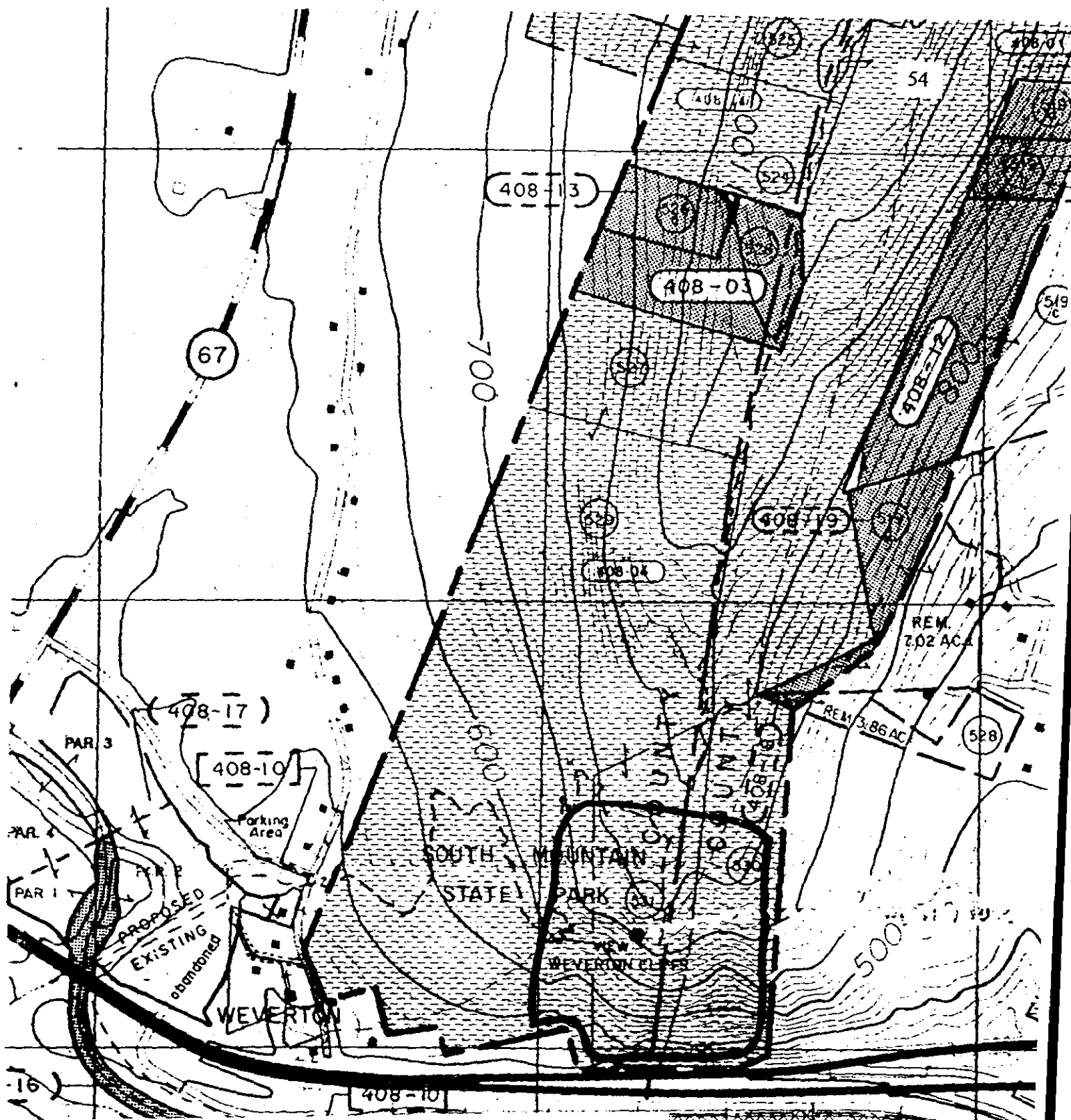
Rare Occurrences: The endangered lobed spleenwort was first located by R. Bartgis in 1986, when he found two smallish plants. During the 2000 survey, one very small plant was found on a rock ledge growing in filtered light. This endangered fern is found only in a few places in Maryland and is declining at other sites.

The rock outcrops are likely habitat for both timber rattlesnake and Allegheny woodrat here. In 2000, searches for sign of Allegheny woodrat were made, but none was found.

Boundary Justification: The south-facing cliff is included in its entirety as is a buffer area to the north of the plant site. The area includes sources of erosion for the site upslope and access downslope.

Threats: The area is heavily used by hikers and increase of invasive weeds, such as Japanese honeysuckle and Japanese barberry has been noted in recent years. The invasive weeds are not affecting the lobed spleenwort directly, however, since it is growing in a rock crevice. There are many unofficial footpaths through the site and it is believed that trampling and rock climbing may have affected the lobed spleenwort.

Management and Protection Recommendations: The lobed spleenwort is a relict population that is probably on its way out. Protection options are limited at this point, but rocks and cliffs should be protected in general as animal habitat.



WEVERTON CLIFFS

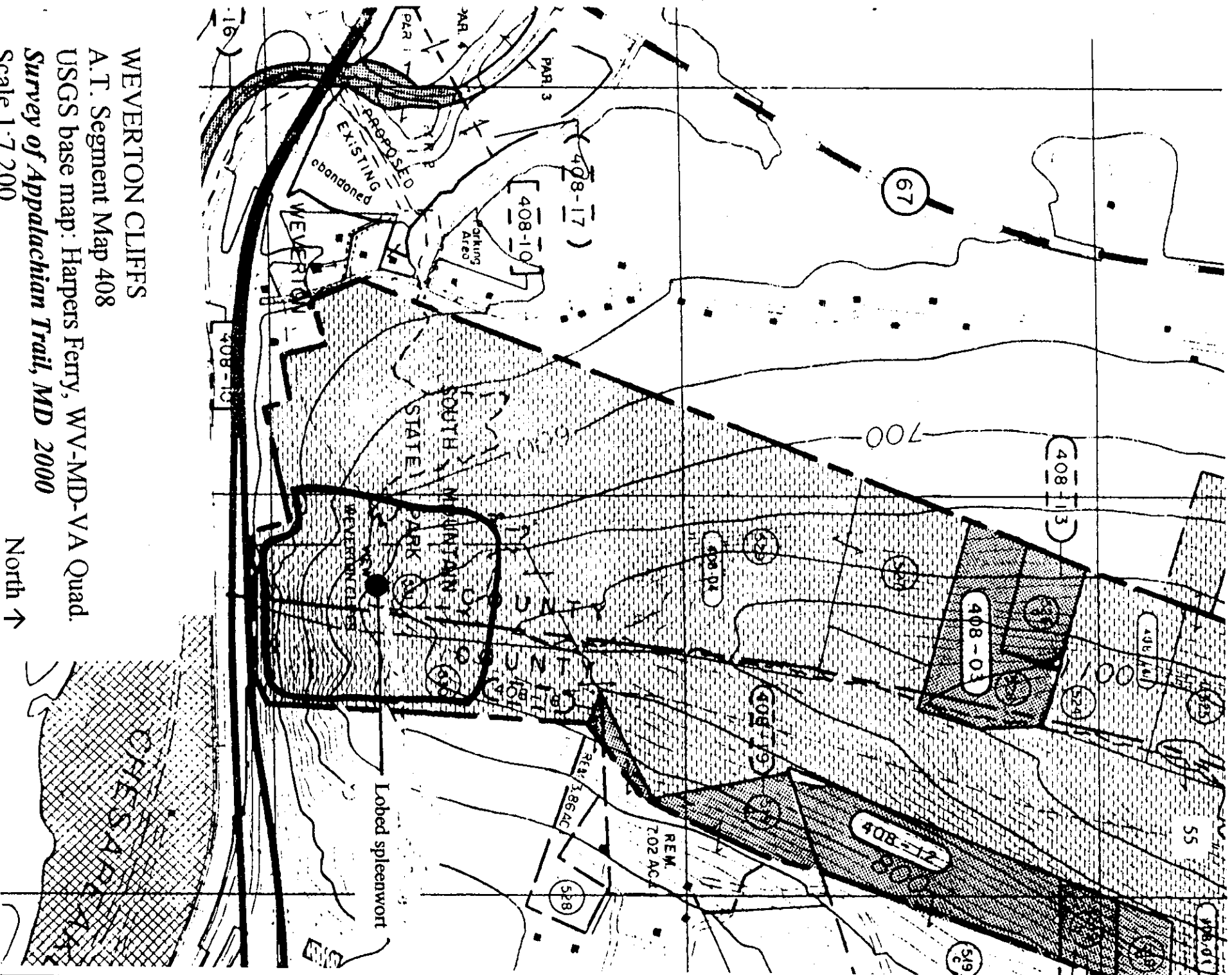
A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑



WEVERTON CLIFFS

A.T. Segment Map 408

USGS base map: Harpers Ferry, WV-MD-VA Quad.

Survey of Appalachian Trail, MD 2000

Scale 1:7,200

North ↑

Site 6: WARNER HOLLOW POWERLINE

(From R. Bartgis Survey, 1988)

USGS Quad: Smithsburg, MD **A.T. Segment Map #'s:** 400**Size:** 10 acres**Ownership:** City of Hagerstown (Watershed) and Private**Location:** The powerline site is located 600 feet west of the A.T. along the power line just south of Warner Hollow Road.**Natural Heritage Resource Summary**

Common name	Scientific Name	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Pale green orchid	<i>Platanthera flava</i>	G4 S1	Threatened	D/1988

Site Description: This site is part of an open, maintained community under a powerline in a seepy area enhanced by four-wheel drive tracks. Common associates include: blunt spike rush (*Eleocharis obtusa*), sweet vernal grass (*Anthoxanthum odoratum*), Jack-in-the-pulpit (*Arisaema triphyllum*), Canada lily (*Lilium canadense*), Adder's tongue (*Ophioglossum vulgatum*), ragweed (*Ambrosia artemisiifolia*), mouse-ear chickweed (*Cerastium* sp.), field cress (*Lepidium campestris*), sensitive fern (*Onoclea sensibilis*), early meadow rue (*Thalictrum dioicum*) and yellow rocket (*Barbarea sensibilis*). On the drier portions under the powerline are bracken fern (*Pteridium aquilinum*), whorled loosestrife (*Lysimachia quadrifolia*), Indian cucumber-root (*Medeola virginiana*), goldenrods (*Solidago* sp.) and asters.

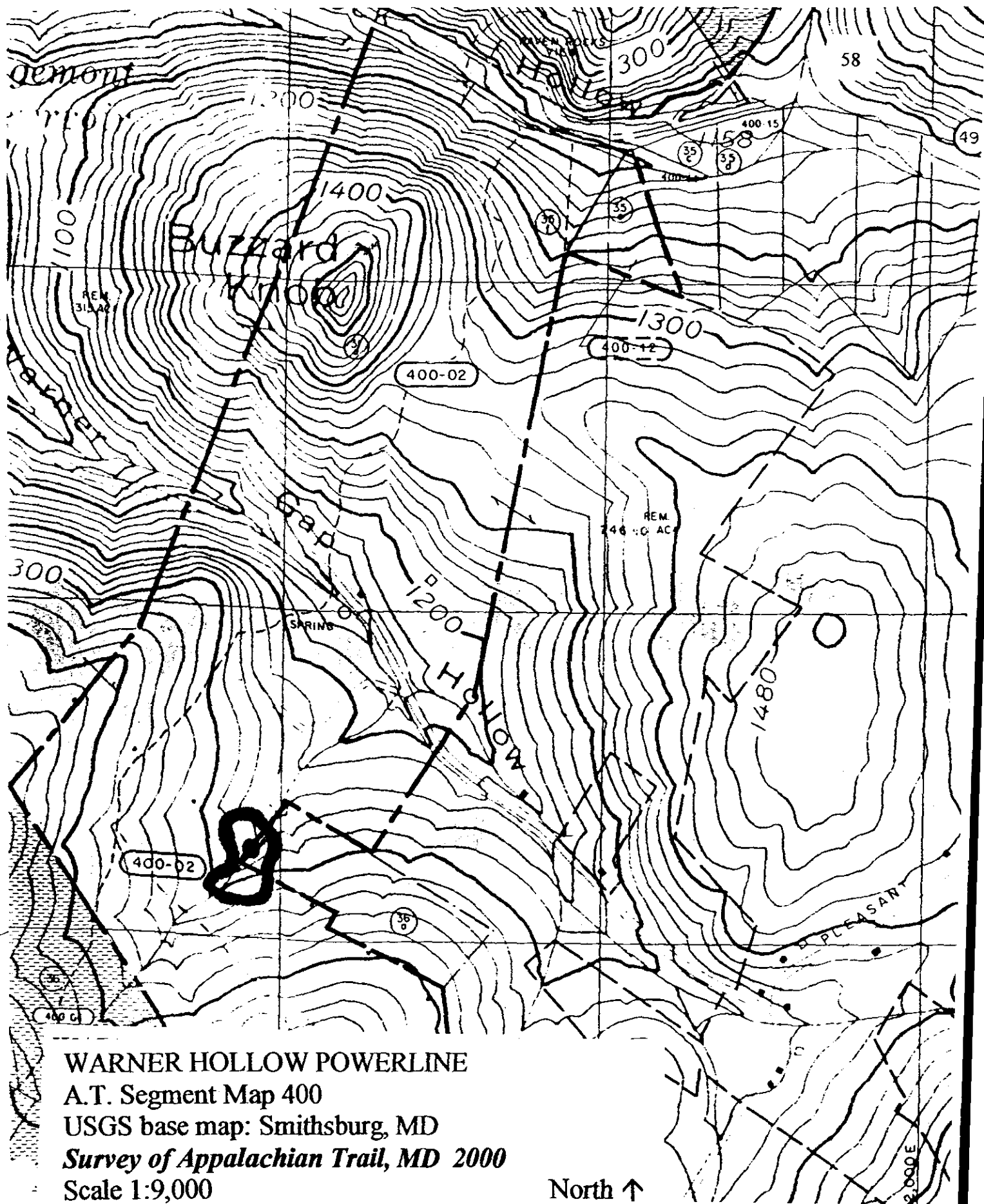
Rare Occurrences: When first discovered in 1988, the moderately small population (25 individuals) was vulnerable to power line spraying maintenance and habitat succession. The population area was within 20 square yards and mostly occurring in the seepy rut of 12-inch four-wheel drive tracks 10 feet from the regular jeep road. The population could not be re-located in the 2000 survey. Searches for the orchid population were done by Wiegand (pers. comm.) in the early 1990's and as part of this survey during 2000.

Boundary Justification: This site has been filed as a separate site in the State Heritage database but should now be considered part of the Warner Gap Hollow site (which is described on the following pages).

Threats: There was evidence of disturbance to the plant made by the four-wheel drive tracks for access to transmission line and clearing of vegetation for powerline. These

same disturbances actually created the conditions that the orchid requires so there was a delicate disturbance regime at work. If periodic disturbances did not occur at the site succession of the open, wet community would result in competition and eliminate the orchid. It appears that too much use of the four-wheel drive road or possibly spraying for powerline maintenance was responsible for the extirpation of the plant.

Management and Protection Recommendations: Continue to monitor for the orchid along this and other open seeps in the corridor. Work with the power company to maintain the open community without herbicides.



WARNER HOLLOW POWERLINE

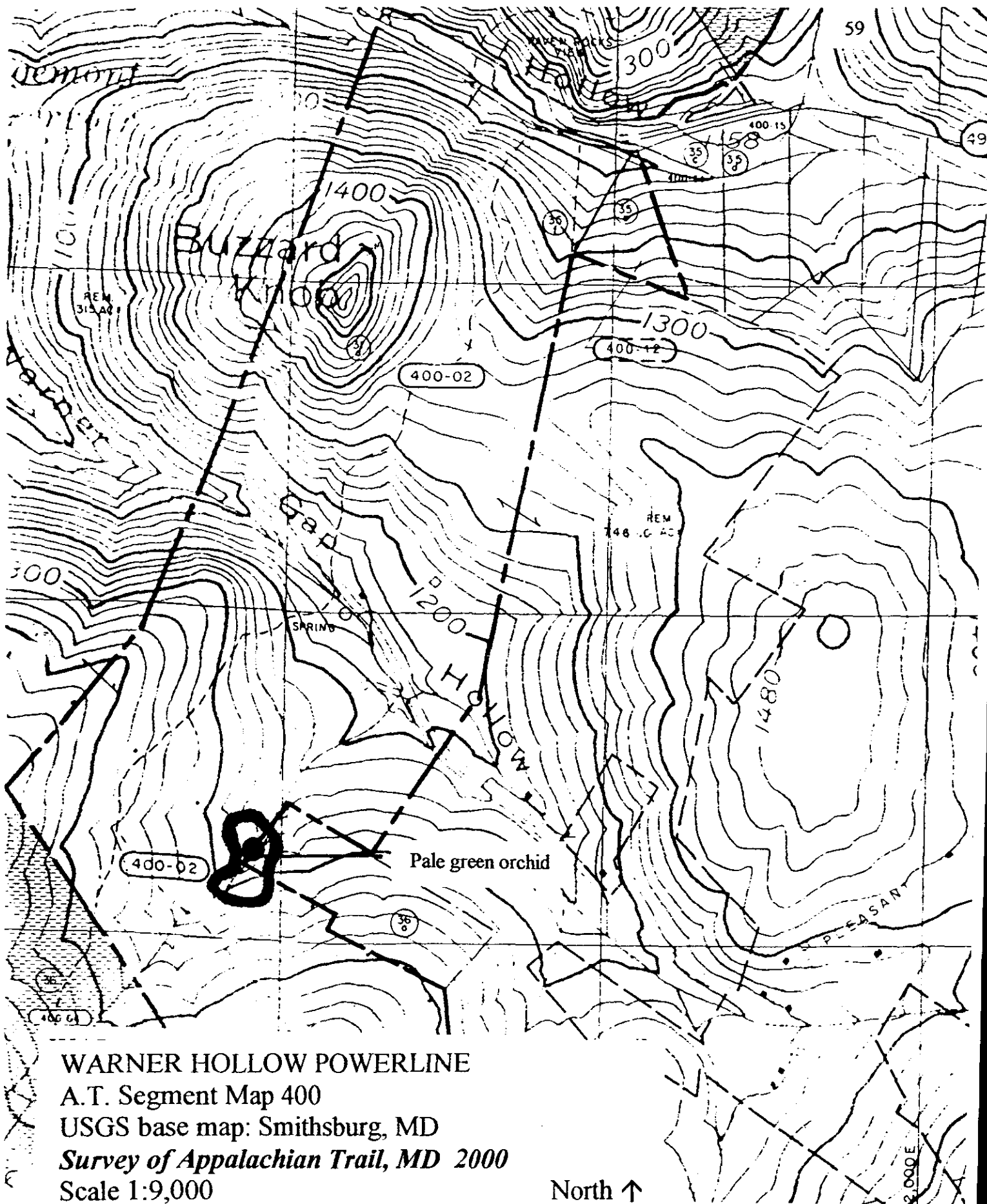
A.T. Segment Map 400

USGS base map: Smithsburg, MD

Survey of Appalachian Trail, MD 2000

Scale 1:9,000

North ↑



Site 7: WARNER GAP HOLLOW
USGS Quad: Smithsburg, MD **A.T. Segment Map #'s:** 400, 401

Size: 1,165 acres

Ownership: National Park Service, City of Hagerstown (Watershed), State of Maryland (South Mountain State Park) and Private

Location: The site is between two roads, Foxville Rd. (Route 77) to the south and Raven Rock Road (Route 491) to the north. It encompasses the upper end of the Little Antietam Creek watershed. Warner Hollow Rd. runs east-west through the middle of the site.

Natural Heritage Resource Summary

Common name	Scientific Name Or Community Association	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Nodding trillium	<i>Trillium cernuum</i>	G5 S3	Watch	BC/2000
Mesophytic forest	Sugar Maple – Yellow Birch – American Basswood Forest	Exemplary Natural Community		B/2000
Hemlock Glade Wetland	Hemlock – Sugar Maple – Yellow Birch Forest	Exemplary Natural Community		C/2000

Site Description: The mesophytic forest community is a good example of a rich area with a diversity of plant species and springs and lateral seeps underlain by Catocin greenstone formation. The combination of moist, well-developed rich soils and greenstone is responsible for supporting this floristically diverse site. The large, unbroken forest provides important habitat for forest interior dwelling species (FIDS), such as nesting song birds that require interior sites. The dominant trees and shrubs in this community include: tulip poplar (*Liriodendron tulipifera*), black locust (*Robinia pseudoacacia*), hackberry (*Celtis occidentalis*), sugar maple (*Acer saccharum*), yellow birch (*Betula lutea*), American beech (*Fagus grandifolia*) and hemlock (*Tsuga canadensis*). The understory shrub layer includes raspberries (*Rubus* sp.), witch hazel (*Hamamelis virginiana*), gooseberries (*Ribes* sp.) and spicebush (*Lindera benzoin*). Vines dominate the midstory in light gaps such as grapevine (*Vitis* sp.), moonseed vine (*Menispermum canadense*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*). The herbaceous layer includes Jack-in-the-pulpit (*Arisaema triphyllum*), wild sarsaparilla (*Aralia nudicaulis*), partridge-berry (*Mitchella repens*), enchanter's nightshade (*Circaea quadrisulcata*), honewort (*Cryptotaenia canadensis*), wild ginger (*Asarum canadense*), sweet cicely (*Osmorhiza claytoni* and *O. longistylis*), mayapple (*Podophyllum peltatum*), Canada mayflower (*Maianthemum canadense*), Indian pipe (*Monotropa uniflora*), Christmas fern (*Polystichum*

acrostichoides), spinulose shield fern (*Dryopteris spinulosa*), rattlesnake fern (*Botrychium virginianum*), maidenhair fern (*Adiantum pedatum*), bloodroot (*Sanguinaria canadensis*), bedstraws (*Galium* sp.), geranium (*Geranium* sp.), white lettuce (*Prenanthes alba*), spotted joe-pye-weed (*Eupatorium maculatum*), smartweed (*Polygonum* sp.), common rue (*Ruta graveolens*), bugbane (*Cimicifuga racemosa*) and Indian cucumber root (*Medeola virginiana*).

Rare Occurrences: Nodding trillium (*Trillium cernuum*) is a state rare plant (Watch list) at the southern limits of its range and found in small numbers in Virginia, West Virginia and Maryland. It is found in moist, rich woods in the Midland and Mountain sections of Maryland. Nodding trillium is concentrated along both sides of the A.T. in sub-populations (groups of about 20 - 40 plants in each sub-population) in four distinct areas. Common herbaceous associates are jewelweed (*Impatiens biflora*), moonseed vine (*Menispermum canadense*), false solomon's seal (*Smilicina racemosa*), honewort (*Cryptotaenia canadensis*), sweet cicely (*Osmorhiza claytoni*), mayapple (*Podophyllum peltatum*), bellwort (*Uvularia perfoliata*), Jack-in-the-pulpit (*Arisaema triphyllum*), multiflora rose (*Rosa multiflora*), and spicebush (*Lindera benzoin*). The population was mature and stable with normal to vigorous growth. Some leaves were predated and some leaves seemed damaged from being so close to the trail.

The natural community, Sugar Maple - Yellow Birch - American Basswood Forest is a good example of appropriate size, structure and composition for this type of community. It is exemplary in the state for these qualities. The presence of certain infrequently seen indicator species, such as Jacob's ladder (*Polemonium reptans*) and pyrola (*Pyrola rotundifolia* var. *americana*) help support the judgement of this mesic community ranking as good quality.

The Hemlock - Sugar Maple - Yellow Birch Forest community is smaller, but very diverse. Every hemlock tree inspected at the site was infested with the woolly adelgid and this will affect the community as a whole.

Boundary Justification: The boundary for this site includes most of the Hagerstown Watershed area between Foxville Rd. (Route 77) to the south and Raven Rock Road to the north. This habitat has potential for rare species in wetlands and rich mesophytic forest over greenstone. The portion of the site that was surveyed is indicated on the first general site map.

Threats: Non-native invasive species are just beginning to get a foothold at this site. Patches of multiflora rose (*Rosa multiflora*) appear to have recently expanded, but do not pose a serious threat yet. A young stand of tree-of-heaven (*Ailanthus altissima*) has invaded a recent site of deforestation (perhaps from gypsy moth killing overstory trees) adjacent to the trillium population. The tree-of-heaven infestation is certainly a threat to the mesophytic forest community if not directly to the trillium population. Garlic mustard (*Alliaria petiolata*) and Japanese honeysuckle (*Lonicera japonica*) are distinct threats to nodding trillium while it is developing in early spring. Since both the garlic mustard and the nodding trillium favor the light gap provided by the trail, competition

from the earlier maturing garlic mustard could threaten vigorous development of the nodding trillium. It is not known whether the pollinator is a limiting factor for the nodding trillium.

Trail maintenance is a significant threat to the nodding trillium populations closer to the trail. Some plants were within inches of the trail and could be vulnerable to brushing activities.

Collection of the trillium is a secondary threat. The access to this site is very easy from the closest road. Evidence of feeding gypsy moth caterpillars was noted. Increased die-off of overstory trees could open new light gaps for tree-of-heaven to become established.

Management and Protection Recommendations: The Trail tread is fairly narrow in the area of the nodding trillium. It would be important to maintain this width since individuals of the trillium are immediately adjacent to the current trail. Trail maintainers for this section should be informed of the rare species. There were no trampled plants seen during the survey, but this could change during a time of heavier visitor use. The best time to brush back the trail would be between November and March. In the late fall the fruits have fallen from trillium. Efforts should be made to avoid management activities in the area during the season of flowering and fruiting for the nodding trillium. Even cutting back woody material could cause the trillium to be trampled.

One population occurs next to a downed log along the edge of the Trail, with much of the trillium growing close to the log. The log could become an attractive resting spot for trail users and lead to trampling damage of the nodding trillium. It is not recommended that the log be moved or disturbed. Strategic management of the log should discourage using it as a rest spot, such as leaving branches on top of the log and around it.

Control of non-native invasive species should be undertaken with close monitoring of the responses of rare plants to the management. The most important species to control would be multiflora rose, Japanese honeysuckle and garlic mustard.

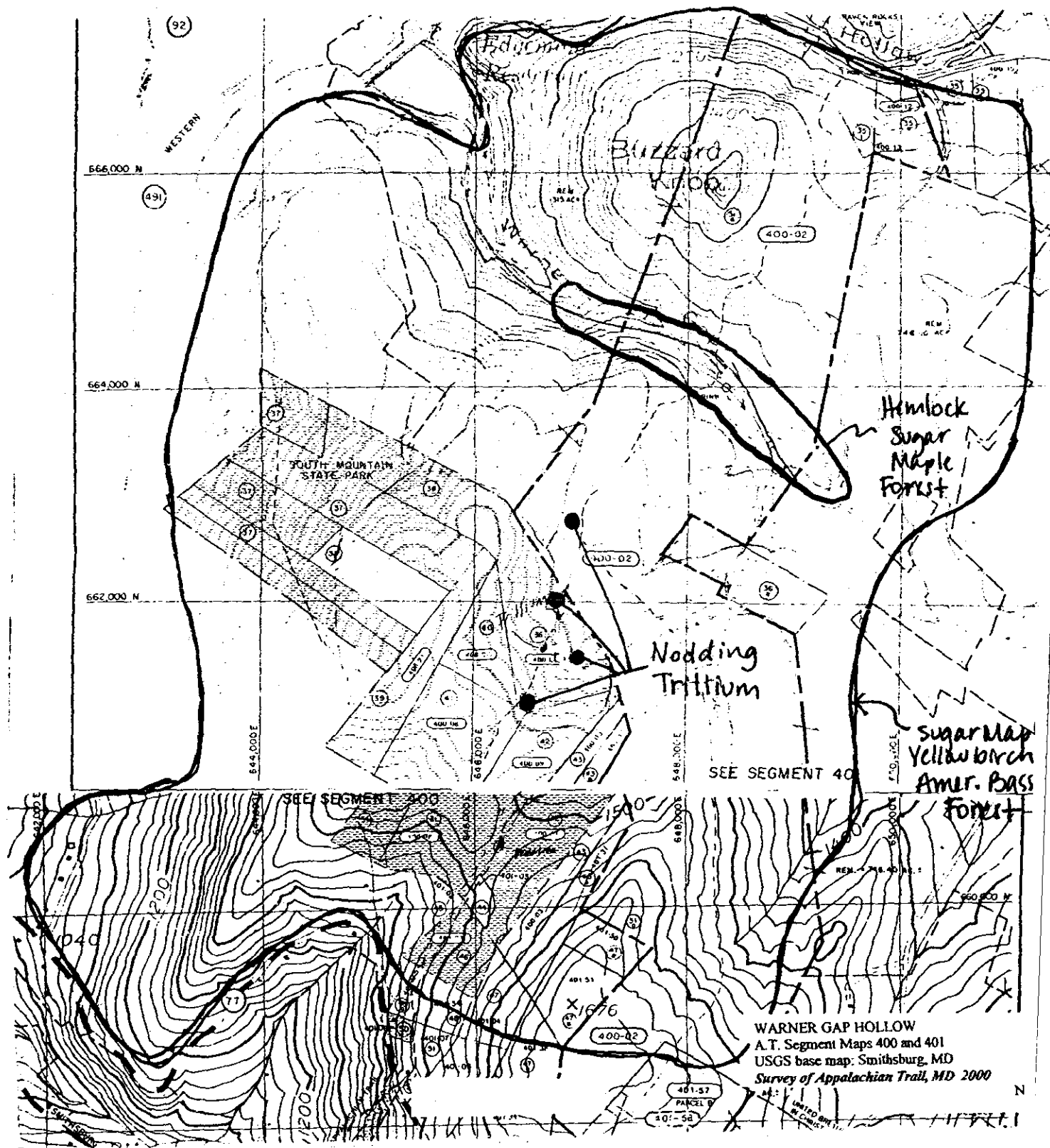
The Trail is planned for a re-location through this rich woodland. A new Trail through prime habitat to the east of the current Trail could cut across rare plant sites. It is important that surveys be conducted during the process of marking the new Trail alignment. Diversity of the flora of the proposed Trail relocation area is very high and this will be compromised with the routing of a new trail. The result of a newly blazed trail not only is the clearing of a swath of natural vegetation, but the creation of new areas of non-native invasive species. Recent observations in the Catoctin mountains, just to the west, have revealed that Oriental stilt grass (*Microstegium*) will quickly invade newly disturbed soils (D. Wiegand, Pers. Comm.).

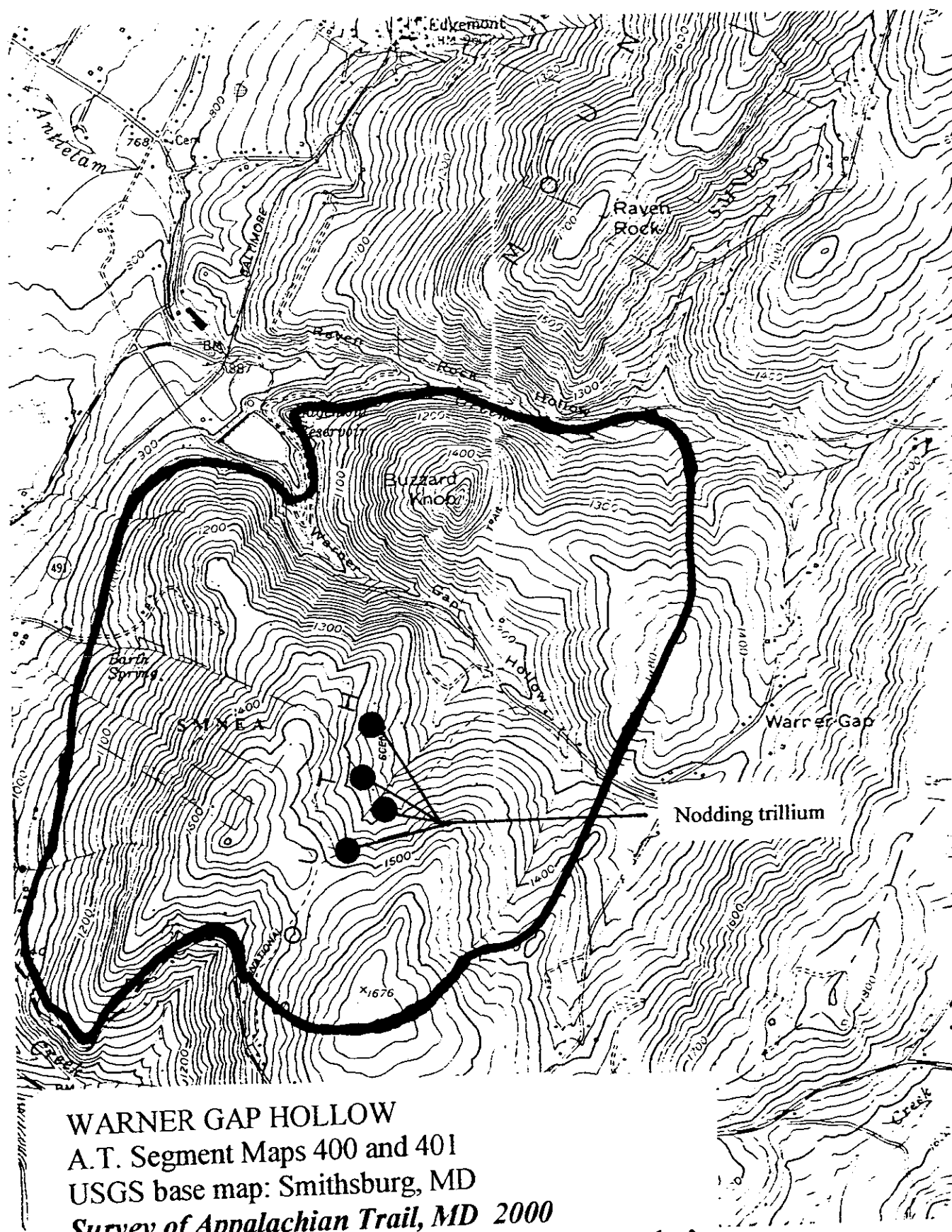
Along the current Trail, the invasive weeds are concentrated at the edges of the trail but are not found 100 feet inland from the Trail. Disturbing the canopy and soils for a new trail ensures the invasion of the prime habitat with non-native invasive species. A linear

edge habitat created with new trails interrupts the forest interior habitat for birds and other species for which this interior is important.

Rare, subterranean amphipods are highly likely to be present in the springs occurring at this site. The springs should be surveyed since habitat in this forest appears ideal.

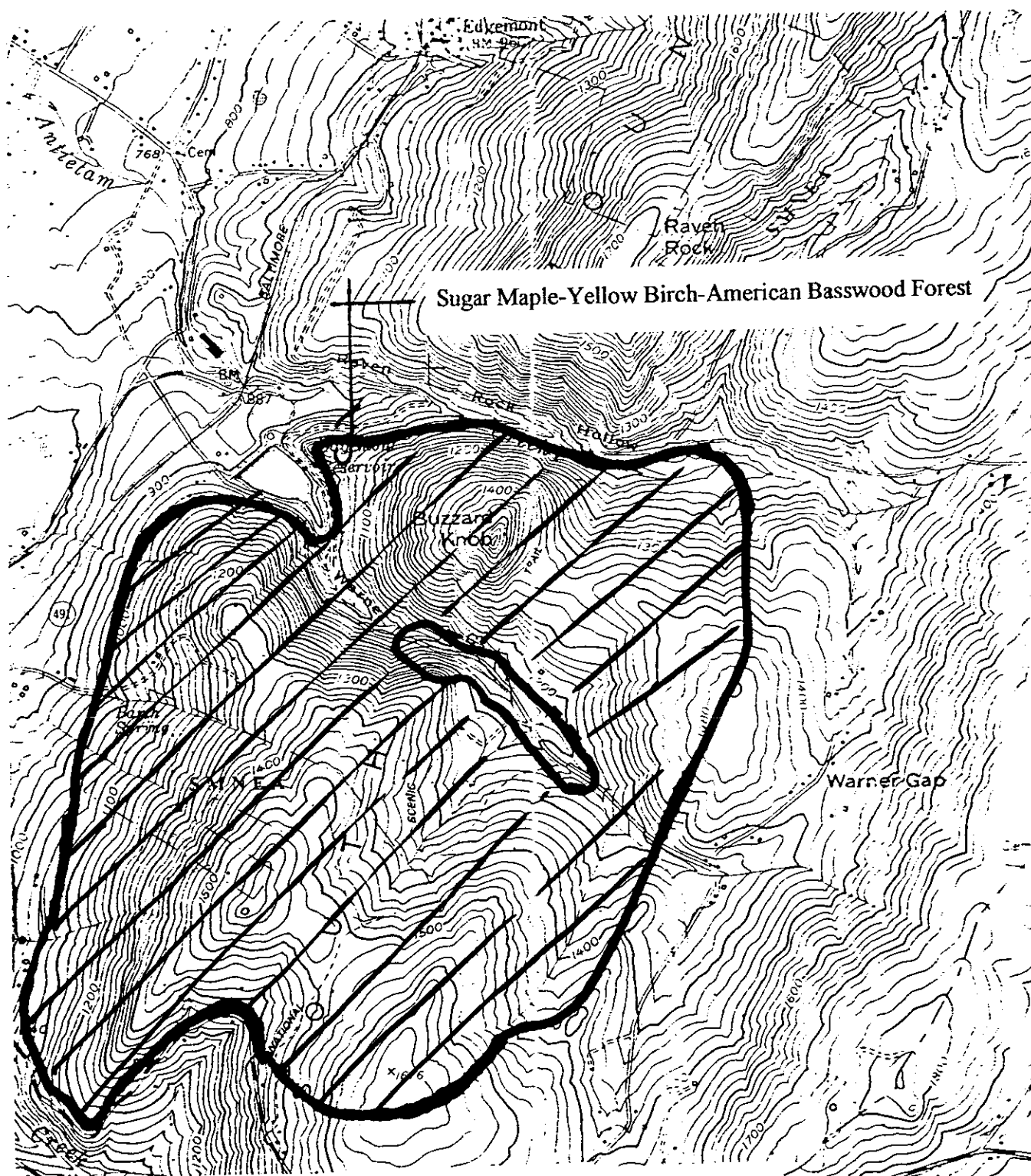
Large tracts of structurally and species diverse forest over greenstone geology are uncommon in Maryland, and nearly missing from the Catoclin –South Mountain region. For this reason, the Hagerstown Watershed is a very important area.





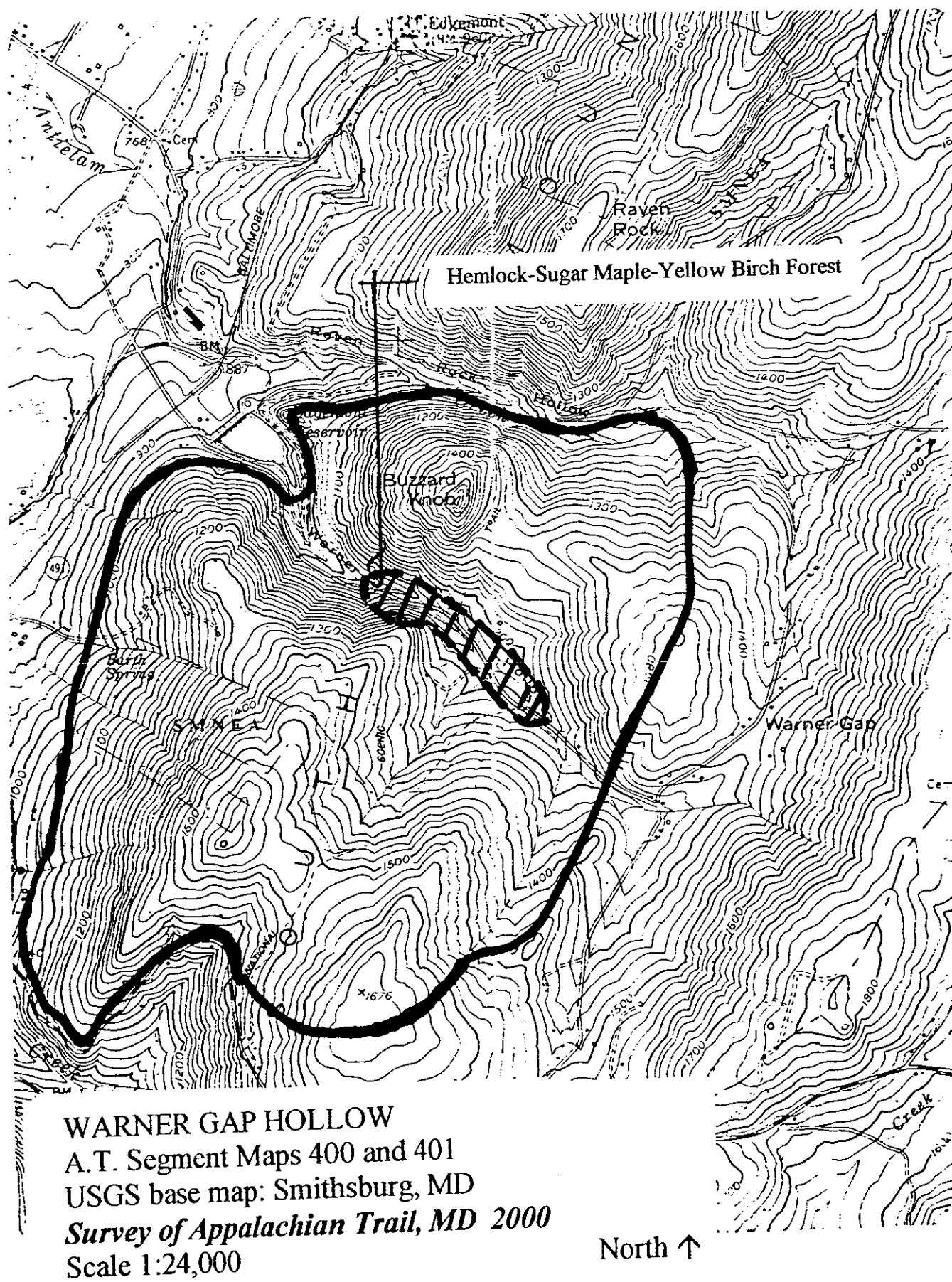
WARNER GAP HOLLOW
 A.T. Segment Maps 400 and 401
 USGS base map: Smithsburg, MD
Survey of Appalachian Trail, MD 2000
 Scale 1:24,000

North ↑



WARNER GAP HOLLOW
 A.T. Segment Maps 400 and 401
 USGS base map: Smithsburg, MD
Survey of Appalachian Trail, MD 2000
 Scale 1:24,000

North ↑



Site 8: HAGERSTOWN WATERSHED
USGS Quad: Smithsburg, MD **A.T. Segment Map #'s:** 400

Size: 380 acres

Ownership: National Park Service, City of Hagerstown (Watershed), State of Maryland (South Mountain State Park)

Location: This site is situated south of the Warner Gap Hollow site between two roads, Smithsburg-Wolfsville Road to the south and Foxville Road (Route 77) to the north. It includes all the intact forested area and watershed of Beaver Creek.

Natural Heritage Resource Summary

Common name	Scientific Name Or Community Association	Global/State Rank	MD Status	Occurrence Rank/Last Observed
Steele's meadow rue	<i>Thalictrum steeleanum</i>	G5 S3?	Pending Watch	1988
Mesophytic forest	Sugar Maple – Yellow Birch – American Basswood Forest	Exemplary Natural Community		B/2000

Site Description: The mesophytic forest community at this site is diverse and varies in quality from good in the interior to fair at the edges. The dominant trees and shrubs in this community include: tulip poplar (*Liriodendron tulipifera*), black locust (*Robinia pseudoacacia*), hackberry (*Celtis occidentalis*), sugar maple (*Acer saccharum*), yellow birch (*Betula lutea*), American beech (*Fagus grandifolia*) and hemlock (*Tsuga canadensis*). The understory shrub layer includes spicebush (*Lindera benzoin*), witch hazel (*Hamamelis virginiana*), and gooseberries (*Ribes* sp.). Vines dominate the midstory in light gaps such as, grapevine (*Vitis* sp.), moonseed vine (*Menispermum canadense*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*). The herbaceous layer includes Jack-in-the-pulpit (*Arisaema triphyllum*), wild sarsaparilla (*Aralia nudicaulis*), enchanter's nightshade (*Circaea quadrisulcata*), honewort (*Cryptotaenia canadensis*), wild ginger (*Asarum canadense*), sweet cicely (*Osmorhiza claytoni* and *O. longistylis*), mayapple (*Podophyllum peltatum*), Canada mayflower (*Maianthemum canadense*), Indian pipe (*Monotropa uniflora*), and Christmas fern (*Polystichum acrostichoides*).

Rare Occurrences:

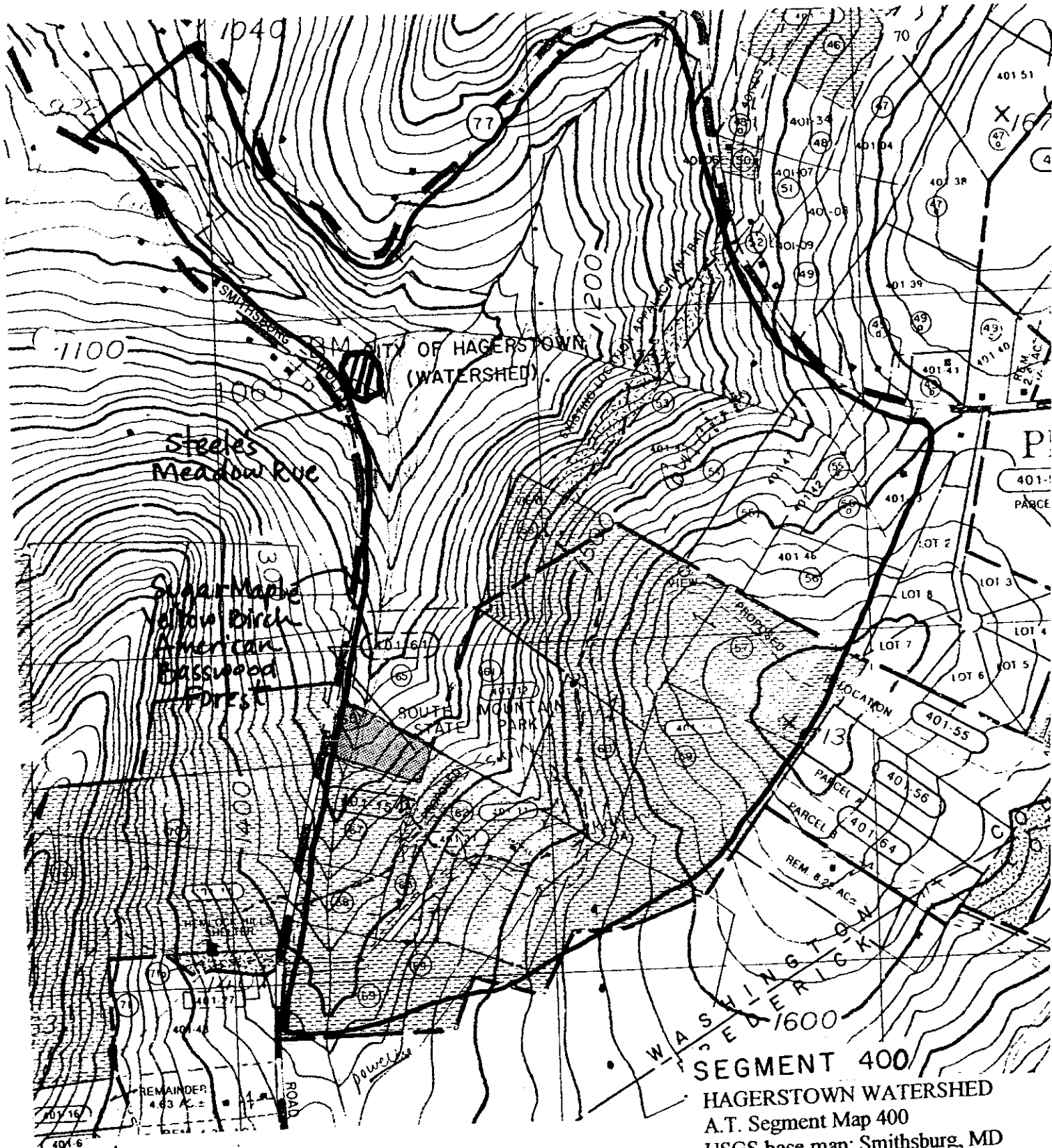
The Steele's meadow rue population was located by R. Bartgis in 1988. This plant grows in rich soils in moist alluvial thickets in very few places in central Maryland. The wetlands around Beaver Creek form a habitat for a diversity of plants and there is potential for other rare species if surveyed further. Taxonomists are debating on the taxa

for Steele's Meadow rue to determine if it is actually part of the *T. coriaceum* group, even though it appears very similar to *T. diocum*.

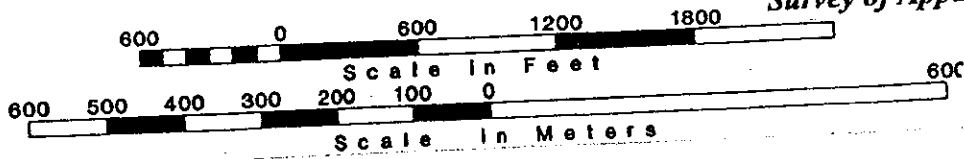
Boundary Justification: The Sugar Maple – Yellow Birch – American Basswood Forest community and larger area under natural cover is included in the boundaries shown on the map for the potential this site possesses for rare species. A substantial wetland buffer for the Steele's meadow rue is included in the boundary determination. The entire tract was not surveyed as a part of this study, but the limits of survey are indicated on the first general site map.

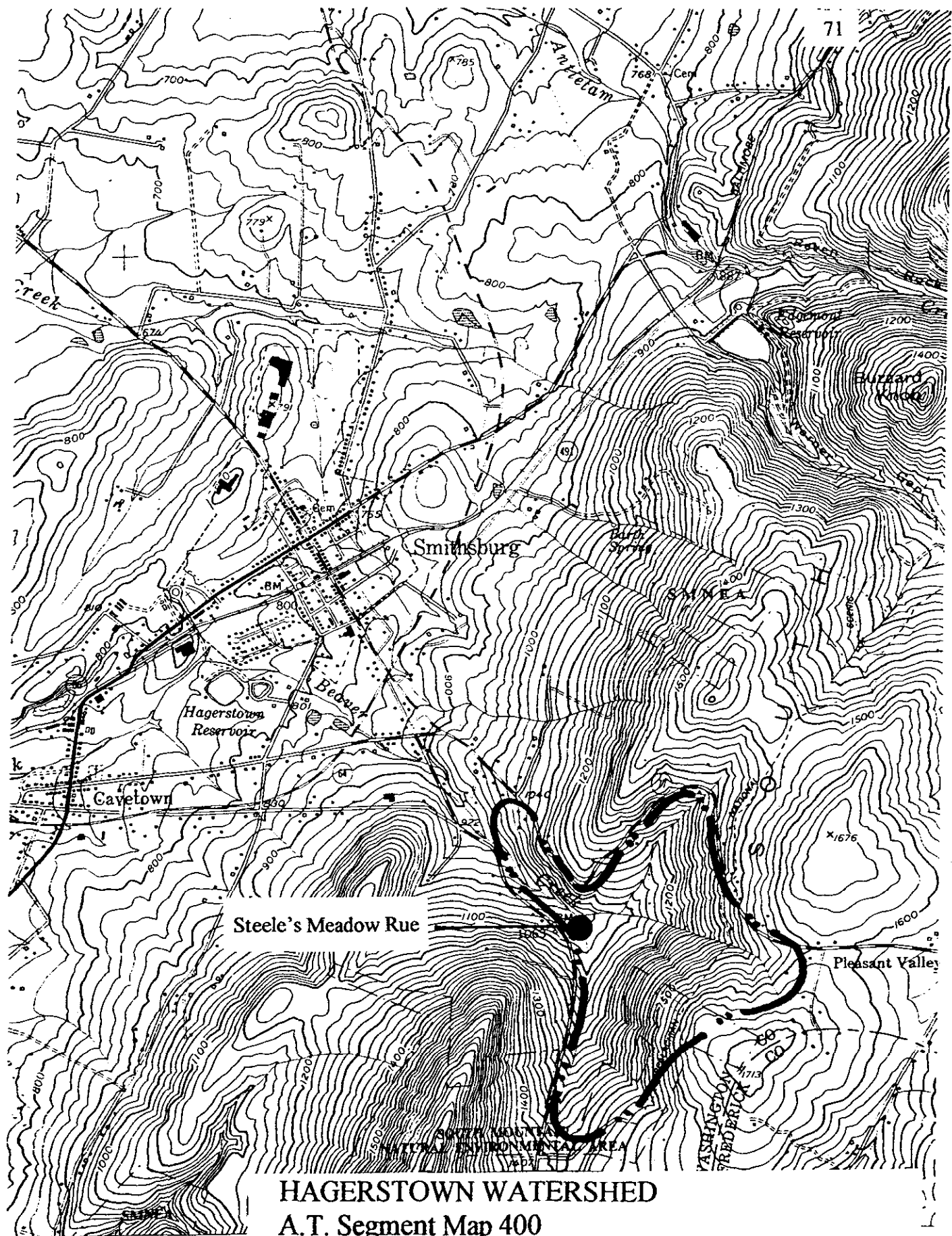
Threats: Logging, trail and road development are potential threats to the community. Any relocations of the A.T. could introduce non-native invasive species and threaten the diverse community and secluded rare plants, like the Steele's meadow rue.

Management and Protection Recommendations: The management responsibility of this site is primarily with the Forestry Department of the Maryland DNR and decision makers with the City of Hagerstown. A.T. managers should work jointly with them to help protect the Steele's meadow rue. A botanist should be consulted at the time of any trail relocations in order to determine the limits of the population. The forest community is a special and sensitive area that should be protected from City logging and A.T. relocations.



SEGMENT 400
HAGERSTOWN WATERSHED
A.T. Segment Map 400
USGS base map: Smithsburg, MD
Survey of Appalachian Trail, MD 200





HAGERSTOWN WATERSHED

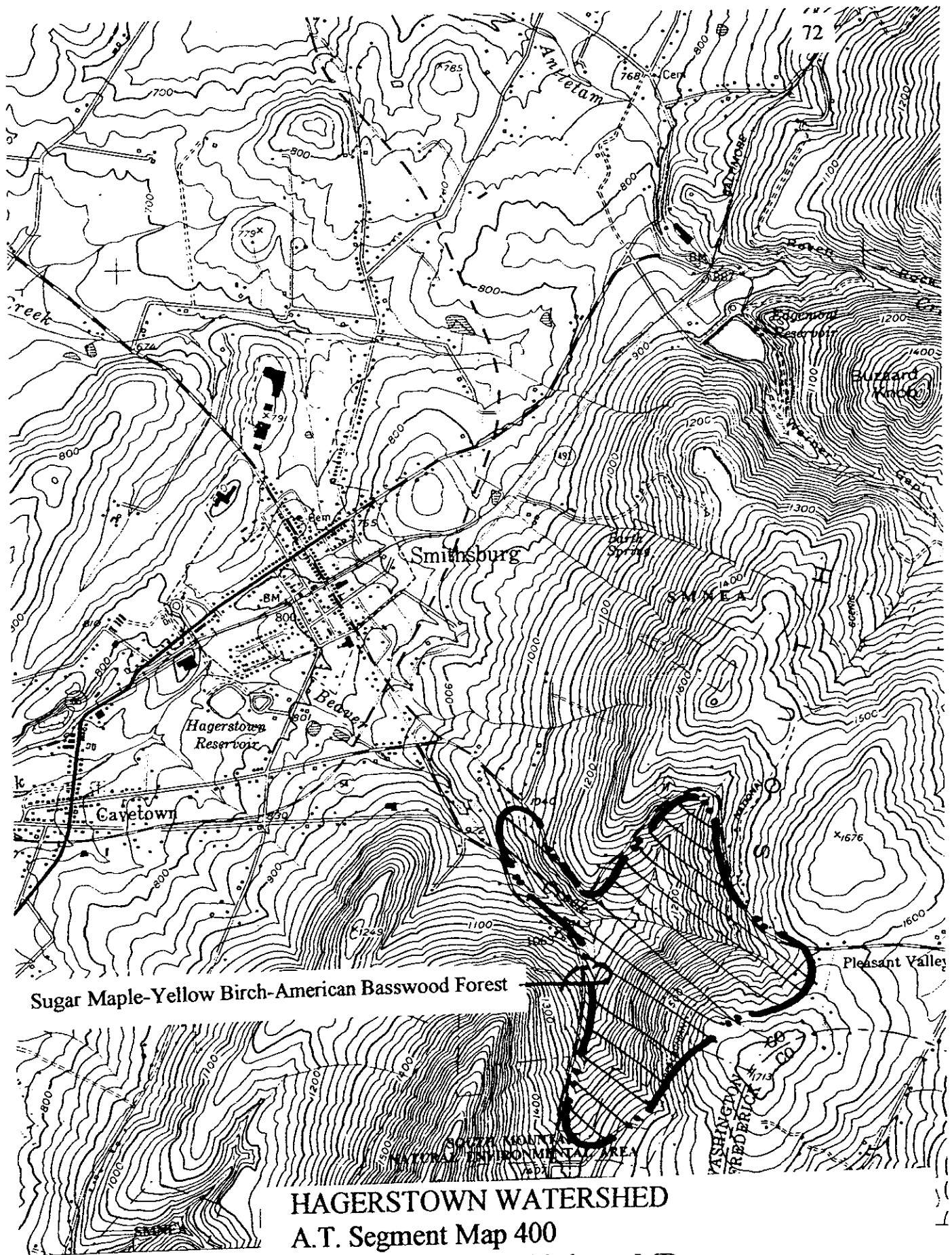
A.T. Segment Map 400

USGS base map: Smithsburg, MD

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑



HAGERSTOWN WATERSHED

A.T. Segment Map 400

USGS base map: Smithsburg, MD

Survey of Appalachian Trail, MD 2000

Scale 1:24,000

North ↑

Other areas of concern

This section outlines A.T. site information that does not meet the requirements of being a Natural Heritage Site, but deserves some mention because there are some good quality, common community types and plant populations ranked S4.

Other portions of Hagerstown Watershed

A specimen of fringe-tip closed gentian (*Gentiana andrewsii*) in the National Arboretum had a general location of South Mountain, NE Washington County near Smithsburg. It can not be mapped since the description is so general.

Buzzard Knob, a verbal report of presence of highly rare Larkspur (*Delphinium exaltatum*) not relocated during this survey.

Pink Lady slipper orchid (*Cypripedium acaule*) is found on the dryer slopes in the watershed. It is not as common as the Trail over South Mountain ridge to the south.

The Allegheny cave amphipod (*Stygobromus allegheniensis*) G4 S2S3 (Watch list species) has been reported at a site west of Quirauk Mountain, in the Beaver Creek watershed.

Rocky Run Shelter wetland

A shrub-scrub wetland downslope from the shelter, formed by the shelter's spring, is a fairly good example of this community type. It has a typical thicket structure with raspberries, ferns, spicebush and wetland sedges and grasses.

Pink Lady slipper orchid (*Cypripedium acaule*) occurs on the slope above the wetland.

South Mountain Rock outcrops

Over the central portion of the Trail on ridges underlain by Maryland Heights geologic formations are excellent rock outcrop habitats.

Potential Allegheny woodrat habitat exists on many of the rock ledges, such as Annapolis Rocks, High Rocks, Calico Rocks, and rock outcrops north of Gathland State Park.

Declining species or significant wildflowers

Field observations suggest that there has been a decline in the pink lady slipper populations (*Cypripedium acaule*) found in scattered patches along the Trail over the past ten years in Maryland (R. Wiegand, Pers. Comm.). Locations for many of the populations are included in the field notes map as a separate document for this report.

Overall Corridor Management Recommendations

Additional Inventory

There are some plants that have good potential for being found along the Maryland portion of the A.T., which I was not able to locate. Additional searches in the A.T. corridor should be made for the following plants:

Goldie's fern (*Dryopteris goldiana*)

Lycopodium (*Lycopodium selago*)

Black fruited mountain-rice (*Oryzopsis racemosa*), Threatened.

Bluecurls (*Trichostema setaceum*)

Short's rockcress (*Arabis shortii*)

Animal inventory should include:

Lepidoptera

Small mammal inventory, including woodrat.

Spring amphipods

Recognition of hot spots in management

There are places of special interest along the Maryland A.T. or "hotspots" of biodiversity. To maintain these special places, there needs to be management recognition so that actions have the goal to perpetuate diversity. The major hotspots along the Maryland portion of the A.T. are: streamside areas, spring wetlands, Potomac River floodplain, shaded rock cliffs, and mesic forests.

The fertile areas underlain by greenstone geology supports a significant forest community with a lush, diverse herbaceous layer and numerous seeps and springs. Awareness of management needs in this area can maintain their high quality into the future. Managers should be especially mindful of seeps in greenstone areas and identify these areas for summer staff and volunteers, since disturbance here could affect rare species. Balancing the benefits of maintaining the Trail with promoting diversity can be achieved with using a variety of management tools suited to the area. Seasonal timing of cutting and brushing trails, reducing trail width and culverting trails are examples of managing the trail with diversity in mind.

Rock outcrops importance as habitat for plants and animals.

It appears very difficult to control the unofficial trails evidenced around rock outcrops. These seem to be the areas where recreationalists leave the main trail to rest and explore, leaving the potential rare plants and animals vulnerable to destruction. This seems to have been the case with the lobed spleenwort sites near Weverton cliffs. Animals such as the timber rattlesnake and Allegheny woodrat will not persist at a site with heavy human traffic. If there are any known management responses to keeping high potential rock outcrops free from off-trail use, they should be implemented to protect the resource.

Non-native invasive plants

Invasive, non-native species pose a threat to rare plants and mesic communities along the Trail. Particularly vulnerable to problems are the Potomac River floodplain community

and mesic woodland with neutral soil pH. Much of the ridge top portion of the A.T. has relatively few non-native invasive species. The most troublesome weeds are garlic mustard (*Alliaria officinalis*), Japanese honeysuckle (*Lonicera japonica*) and Oriental stilt grass (*Microstegium vimineum* var. *imberbe*). Control of invasive species should be undertaken where necessary to prevent decline to rare species.

According to the Maryland Natural Heritage Program, the most serious problem invasive in rich habitats is Oriental stilt grass. This annual grass thrives in shaded areas and has spread very quickly in the past few years and will likely be a major problem along the A.T. since the grass spreads quickly along trails (R. Wiegand, pers. comm.). Controls for this grass are currently being studied by land managers with The Nature Conservancy.

Trail maintenance

In general, the maintenance observed during this survey was appropriate to conserve biodiversity and significant sites along the trail.

Although always a challenge, keeping users on the trail is the major recommendation to maintain the rare species. For example, the rock outcrop community at Weverton Cliffs was highly impacted by off-trail hikers.

Trail maintenance and other trail disturbances can be a major threat to high quality vegetative communities, especially in the Hagerstown Watershed. A light hand needs to be applied to the mesic forests.

Although rare plants occur adjacent to the Trail where it coincides with the C&O Canal towpath, there is not much maintenance trimming of trailside plants necessary to keep the trail clear.

Trail surfacing

Trail surfaces may help keep trail users on the designated trail, which is especially important in areas with sensitive vegetation. Hikers avoid wet, muddy spots on the trail by blazing new routes on either side of the designated trail. Rare plants can be found more often in these wet, seepy areas (especially over greenstone) and unknowingly trampled by hikers as they avoid the main trail. Design trails with proper drainage and gradients so trail users are less likely to trample vegetation. The installation of culverts for larger seasonal run-off areas is recommended. Providing clear side trail routes to springs at the shelters is important for the same reason. It is around these springs where significant wetland plant species are concentrated.

Non-wetland species that are at particular risk for trampling include pink ladyslipper, starry false solomon's seal, and nodding trillium. These plants and others can be reduced by trampling and picking. The effects of trampling also include the change of composition of dominant plants (Cole and Landres, 1995). Bare spots along the trail favor non-native species, the seeds of which are introduced by trail users. As populations of non-native invasives get a foot-hold in the community, the vertical structure of the vegetative community is altered.

Associated with trampling is soil compaction, which can contribute to erosion and affect plants downslope. Recovery from trampling varies according to the community and soil type. There are many trail planning related resources with techniques for remote trail surfacing that are compatible with wildlife and vegetation.

Trail re-routing

Once a trail is built, its physical presence creates a new ecological edge. Effects of an edge include increased, light, heat and moisture alterations, which results in a change in the community composition of plants and animals. The result of a newly blazed trail not only is the clearing of a swath of natural vegetation, but the creation of new corridors for the spread of non-native invasive species. The linear edge habitat interrupts the forest interior habitat for birds and other species for which interior places are important.

Trails should not be re-routed unless absolutely necessary. Existing trails should be improved and reconstructed in order to minimize soil and plant disturbance and the spread of invasive species. This is especially important in the very diverse and significant Hagerstown Watershed area. New trails should not be developed within the rich, mesic woods underlain by greenstone.

Gypsy Moth and Hemlock Woolly Adelgid

At present, the defoliation of upper canopy tree species by these two pests is severe. Both pests are also on the increase throughout Maryland and the mid-Atlantic.

The defoliation of overstory trees by the gypsy moth (*Lymantria dispar*) is a threat to the overall forest community structure. State foresters sprayed forests along the A.T. during the spring of 2000 in attempts to address the gypsy moth threat. The after-treatment monitoring results should be obtained from the state. Gypsy moth caterpillars were seen in good numbers throughout my survey following the month of the State's spray program. It is not known what effects there are on native butterflies from the control efforts. Current information from The Nature Conservancy discloses that the use of Bt sprays have more complicated impacts to lepidoptera than was known prior to 1995. In general, a current appropriate action for preserving forest biodiversity is for managers to consider the no-action and Bt alternatives. More specific control technologies are of limited availability (Dale Schweitzer, Pers. Comm.). (Digital copy of the Element Stewardship Abstract for Gypsy Moth is found on disk with this report)

The hemlock woolly adelgid (*Adelges tsugae*) has been in the United States since 1924, believed to be a native of Asia. White cottony sacs at the base of the needles are good evidence of a hemlock woolly adelgid infestation. The hemlock woolly adelgid feeds during all seasons with the greatest damage occurring in the spring. It is dispersed by wind, birds and mammals. By sucking sap from the young twigs, the insect retards or prevents tree growth causing needles to discolor from deep green to grayish green, and to drop prematurely. The loss of new shoots and needles seriously impairs tree health. Defoliation and tree death can occur within several years.

It has been found that hemlock forests can resist and/or recover from infestation by the hemlock woolly adelgid. Hemlocks in valleys and on north and northeast slopes appear to have the greatest resistance to adelgid damage (Bonneau, L, et. al. 2000). There are also biological controls (a beetle that preys on adelgid egg sacs) being researched currently.

Hemlock woolly adelgid infestations were noted on every mature hemlock inspected during this survey. This severe problem may threaten the survival of hemlocks throughout Maryland. A monitoring program is in place in the Harpers Ferry National Historical Park and the results of their monitoring should be useful to learn more about the A.T. situation as well.

Deer Management

White tail deer have had a great impact on the natural communities of Maryland. Deer in Maryland are a major threat to the botanical diversity of the National Park lands along the A.T. In general, deer prefer to forage on native species over non-natives and as a result are compounding the negative effect that non-native invasive species exert over native species. It is recommended that if the quality of the vegetation and integrity of natural communities is to be stabilized and maintained over the long term, acceptable methods of deer control must be found and implemented.

Water Quality Monitoring

The potential subterranean amphipods at springs are believed to be highly sensitive to degraded groundwater quality. As part of an overall spring assessment and inventory for rare amphipods, it is recommended that water quality analysis data be gathered. It is possible that rare species are found at designated A.T. shelter springs.

Research and Monitoring

Rare plant populations should be monitored at a frequency of every other year as part of a regular management program. The higher priority plants are those that are ranked as most rare and with evidence of trail users effecting them, such as lobed spleenwort.

Trail user impacts to the *Trillium cernuum* and associated mesic forest habitat in the Hagerstown Watershed area should be monitored.

The plants at the Potomac River floodplain are disturbance dependent species which require periodic flooding to maintain the scour bar communities. Populations are adapted to shifting locations as flooding creates new habitat. Monitoring should take this into account.

Cross Reference of Plant Synonym Names

<u>Synonym Name</u>	<u>Current Name</u>
<i>Ampelamus albidus</i>	<i>Cynanchum laeve</i>
<i>Habenaria flava</i>	<i>Platanthera flava</i>
<i>Smilacina stellata</i>	<i>Maianthemum stellatum</i>

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APPENDICES

**Appendix 1 – Explanation of Natural Heritage
Global and State Species Ranks**

EXPLANATION OF GLOBAL AND STATE SPECIES RANKS

Originally developed and instituted by The Nature Conservancy, an international conservation organization, the global and state ranking system is used by all 50 state Natural Heritage Programs and numerous Conservation Data Centers in other countries in this hemisphere. Because they are assigned based upon standard criteria, the ranks can be used to assess the range-wide status of a species as well as the status within portions of the species' range. The primary criterion used to define these ranks are the number of known distinct occurrences with consideration given to the total number of individuals at each locality. Additional factors considered include the current level of protection, the types and degree of threats, ecological vulnerability, and population trends. Global and state ranks are used in combination to set inventory, protection, and management priorities for species both at the state as well as regional level. Definitions for the following ranks have been modified from The Nature Conservancy's Operations Manual (1988).

GLOBAL RANK

- G1 Highly globally rare. Critically imperiled globally because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- G2 Globally rare. Imperiled globally because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- G3 Either very rare and local throughout its range or distributed locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; typically with 21 to 100 estimated occurrences.
- G4 Apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery.
- G5 Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.
- GH No known extant occurrences (i.e., formerly part of the established biota, with the expectation that it may be rediscovered).
- GU Possibly in peril range-wide, but its status is uncertain; more information is needed.
- GX Believed to be extinct throughout its range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered.
- G? The species has not yet been ranked.
- _Q Species containing a "Q" in the rank indicates that the taxon is of questionable or uncertain taxonomic standing (i.e., some taxonomists regard it as a full species, while others treat it as an infraspecific level).
- _T Ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species.

STATE RANK

- S1 Highly State rare. Critically imperiled in Maryland because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres in the State) or because of some factor(s) making it especially vulnerable to extirpation. Species with this rank are actively tracked by the Natural Heritage Program.
- S2 State rare. Imperiled in Maryland because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres in the State) or because of some factor(s) making it vulnerable to becoming extirpated. Species with this rank are actively tracked by the Natural Heritage Program.
- S3 Watch List. Rare to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland. It may have fewer occurrences but with a large number of individuals in some populations, and it may be susceptible to large-scale disturbances. Species with this rank are not actively tracked by the Natural Heritage Program.
- S3.1 A "Watch List" species that is actively tracked by the Natural Heritage Program because of the global significance of Maryland occurrences. For instance, a G3 S3 species is globally rare to uncommon, and although it may not be currently threatened with extirpation in Maryland, its occurrences in Maryland may be critical to the long term security of the species. Therefore, its status in the State is being monitored.
- S4 Apparently secure in Maryland with typically more than 100 occurrences in the State or may have fewer occurrences if they contain large numbers of individuals. It is apparently secure under present conditions, although it may be restricted to only a portion of the State.
- S5 Demonstrably secure in Maryland under present conditions.
- SA Accidental or a vagrant in Maryland.
- SE Established, but not native to Maryland; it may be native elsewhere in North America.
- SH Historically known from Maryland, but not verified for an extended period (usually 20 or more years), with the expectation that it may be rediscovered.
- SP Potentially occurring in Maryland or likely to have occurred in Maryland (but without persuasive documentation).
- SR Reported from Maryland, but without persuasive documentation that would provide a basis for either accepting or rejecting the report (e.g., no voucher specimen exists).
- SRF Reported falsely (in error) from Maryland, and the error may persist in the literature.
- SU Possibly rare in Maryland, but of uncertain status for reasons including lack of historical records, low search effort, cryptic nature of the species, or concerns that the species may not be native to the State. Uncertainty spans a range of 4 or 5 ranks as defined above.
- SX Believed to be extirpated in Maryland with virtually no chance of rediscovery.
- S? The species has not yet been ranked.
- _B This species is a migrant and the rank refers only to the breeding status of the species. Such a migrant may have a different rarity rank for non-breeding populations.

FEDERAL STATUS

This is the status of a species as determined by the U.S. Fish and Wildlife Service's Office of Endangered Species, in accordance with the Endangered Species Act. Definitions for the following categories have been modified from 50 CFR 17.

- LE Taxa listed as endangered; in danger of extinction throughout all or a significant portion of their range.
- LT Taxa listed as threatened; likely to become endangered within the foreseeable future throughout all or a significant portion of their range.
- PE Taxa proposed to be listed as endangered.
- PT Taxa proposed to be listed as threatened.
- C1 Candidate taxa for listing for which the Service has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened.
- C2 Candidate taxa for listing for which information now in possession of the Service indicates that proposing to list them as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat(s) are not currently available to support proposed rules.
- 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 distinct entities meeting the Act's definition of "species".
- 3C Taxa that have proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat.
- * A qualifier denoting taxa which may be possibly extinct (although persuasive documentation of extinction has not been made -- compare to 3A status).

STATE STATUS

This is the status of a species as determined by the Maryland Department of Natural Resources, in accordance with the Nongame and Endangered Species Conservation Act. Definitions for the following categories have been taken from Code of Maryland Regulations (COMAR) 08.03.08.

- E Endangered; a species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.
- I In Need of Conservation; an animal species whose population is limited or declining in the State such that it may become threatened in the foreseeable future if current trends or conditions persist.
- T Threatened; a species of flora or fauna which appears likely, within the foreseeable future, to become endangered in the State.
- X Endangered Extirpated; a species that was once a viable component of the flora or fauna of the State, but for which no naturally occurring populations are known to exist in the State.
- * A qualifier denoting the species is listed in a limited geographic area only.

Determining Heritage Occurrence Ranks

An Element Occurrence (EO) is the presence of an Element of Biodiversity (rare, threatened or endangered species) at a place.

Each species occurrence is ranked (A-D) according to the following factors:

- A – Excellent
- B – Good
- C – Marginal
- D – Poor

EO Quality – How representative is the occurrence? Consider size and productivity of the population and the vitality and vigor of the individuals.

EO Condition – Is the habitat supporting the EO pristine ~~or~~ degraded? Is there a potential for the habitat to recover from disturbances? ^{or}

EO Viability – What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?

EO Defensibility – Can this occurrence be protected from extrinsic human factors?

Overall EO Rank – Summary of all the factors listed above. This EO rank is indicated on the summary tables for each natural heritage site.

Appendix 2 –Natural Heritage Field Forms

(The Nature Conservancy, 1990)

MARILYN HEINTS

Source Code

Date		
(year)	(mo)	(day)

1998-02-27

Five

10

Surveyor

A. L. Ponty

1913年4月1日

E

F

F

F

LOCATION:

State: MD

County:

Wskazano

Quad: Hoped for

Товариство:

Section:

Meridian:

/ Town/Township:

Precise Location:
(distance and direction from a prominent feature shown on the topographic map, or some other map)

Site is south end of Mangrove Heights

Read Directions to Site: 340 south to Key Trysta Road. Left onto Key Trysta,
to go $\approx 1/3$ mile then right on Sandy Hook Road. Go through Sandy
Hook & over top railroad. Park at first cross over of canal &
 $1/2$ mile west railroad.

Location of Site Access Points:

(where to park, location of important trail)

Orange-blazed trail leads up to site from parking area.

EVENT OCCURRENCES:

Under "Element Name" list all elements sought, reported, or confirmed from the site. If known, record the Occurrence Numbers for each. Generate simple letter or number codes which identify each element occurrence on the base map; these codes help keep the base map uncluttered. Indicate whether the element was found (Y, N, N/A) on the date of the site visit, and whether a return visit is needed.

Date:

2/27/91

[illegible]

SITE DESCRIPTION:

Page 2

Site is a steep south-facing mountainside above the Potomac River. It has large granitic ~~at~~ open cliffs, some ~~wooded~~ is open ~~forest~~ and cliffs and is a mosaic hardwood forest ~~with~~ some pines. The area ~~is~~ looks Harpers Ferry and is very scenic.

PROTECTION URGENCY: (circle one)
 U1 immediately threatened
 U2 threat expected within 5 yrs.
U3 threatened, but not in next 5 yrs.
 U4 no threats imminent
 U5 land protection complete

MANAGEMENT URGENCY: (circle one)
 M1 management needed this year
 M2 management needed within 5 yrs to prevent loss of EOs
 M3 management needed within 5 yrs to maintain current EO quality
M4 management may be needed in future
 M5 no management needed

Protection Urgency Comments (& date): 91-02-28

Management Urgency Comments (& date): 91-02-28

Area heavily impacted in past; there

past impacts have lingering effect, soil is weedy ~~cliffs~~.

TOPOGRAPHIC BASE MAP:

Attach a photocopy of the topographic map and/or aerial photograph showing the site. Complete steps 1 to 3 below.

Completed?

- Yes ☐ no ☐ 1. Indicate precise element locations and/or boundaries (use solid lines). Identify each element with the codes you used on page 1.
- Yes ☐ no ☐ 2. If knowledge of the site permits, draw primary (+++++) and secondary (+++++) ecological site boundaries. Within the primary site boundary include all known element occurrences and lands necessary for the immediate protection of the EOs. The secondary boundary (or buffer) includes lands intended to mitigate future unforeseen negative impacts to the EOs (e.g. to control erosion, trespass related damage, natural succession, exotic species, urban sprawl). Use (+++++) where primary and secondary boundaries coincide. Below, provide a brief written justification of the boundary locations.

Boundary Justification:

Primary/secondary boundary include all of steep slope, which could be modified to a large scale if slope further undermined by roads.

- Yes ☐ no ☐ 3. If known, indicate tract ownership boundaries, using dashed lines (- - - -).

Tract Ownership or Managed Area Name (names, addresses, phone #):

Harpers Ferry National Historical Park

STEWARDSHIP:**Land Use Comments:**

Describe current and past land use, improvements, and structures, and possible stewardship implications.

National Park unit. Recreational climbing areas on cliffs and hikers use trails to overlooks (heavy visitation). Past impacts of building ~~at~~ roads, artillery batteries and powder magazine destroyed. Area burned in past and heavily damaged by troops in Civil War.

Potential Hazards:

Describe any potential hazards, both natural (e.g. cliffs, caves, venomous snakes, etc.), and of human origin (e.g. mine shafts, old wells, dangerous structures). Prescribe appropriate precautions.

Steep, high cliffs.

Exotic Flora/Fauna Comments:

List problem exotic species, describe their effects on the EOs, and, if possible, prescribe control methods.

Until late 1970's feral goats were common here - they substantially changed vegetation. Feral weeds are common.

Off-site Considerations:

Describe off-site land uses (e.g. farming, grazing, mining, urban development, stream perturbations) and how these uses might affect the EOs on the site and their future management.

Site and Element Management Needs:

Summarize the expected management needs for the site and its EOs.

Monitor feral population.

SPECIAL ANIMAL SURVEY FORM

Site Name: Manland Heights

Date: 27 Feb 91

Source Code: F912ARJMD

Quad Name: Hesperia Ferry

Weather Conditions: 40°F, sunny, slight breeze

Quad Code: 39077312

Date: _____ Source Code: _____

State: MD County: Washington

Weather Conditions: _____

Field Quad Margin #: _____

Date: _____ Source Code: _____

Full extent of EO known and mapped?

Weather Conditions: _____

yes ☒ no ☐

Date: _____ Source Code: _____

Precise locations of individuals or group

Weather Conditions: _____

mapped on base map? ☒ yes ☐ no

Date: _____ Source Code: _____

Weather Conditions: _____

BIOLOGY

Element Name: Neotoma floridana

Element Code: ANAF 08014 Occ. #: 001

Nature of observation: ☐ sight record; ☐ tracks; ☐ song; ☐ road kill;

☐ collected specimen; ☐ other: Sign

Numbers observed (give age and sex if known):

Two old scat piles found on cliff ledge in woods. Piles were about 100 yds apart and very small. There ~~was~~ ^{were} no fresh piles or other recent sign.

Numbers estimated: 0 at present Basis for this estimate: _____

Evidences of reproduction at site: None

Behavioral notes: _____

Suggestions for what to look for on next site visit: _____

IDENTIFICATION

Photograph taken? ☐ yes ☒ no

Specimen taken? ☐ yes ☒ no If yes, give coll. # and repository: _____

Identification problems? ☐ yes ☐ no Explain: _____

Associated natural community/plant community: shrubland oak - red oak - black hick

Natural community form completed? yes no Elevation: 800 ft to 11 ft

Substrate/soils: _____

Describe habitat and/or microhabitat (include associated plant species): _____

Large cliffs of sandstone / phyllite in dry south-facing hardwood forest. Most of area has been deep logged or clearcut, but some such areas occur. The where some pines were found outcrop is 40 to 80 feet high.

Associated animal species (list especially, any related species present): _____

Estimated # of acres of potential habitat in the immediate area: _____

Proportion of this habitat apparently occupied by species: 1/2

CONSERVATION

Owner aware of EO? yes X no unknown Owner protecting EO? yes X no unknown

Evidence of disturbance: _____

Threats to EO: _____

How large an area is needed to provide species survival here? _____

Explain: _____

Conservation/management needs: _____

Research needs: _____

Data security? yes X no Explain: _____

SUMMARY

EO Quality: (ie, How representative is this occurrence? Consider the size of the population and evidence of successful reproduction.)

A-Excellent

B-Good

C-Marginal

D-Poor X

Comments: Population appears extirpated

EO Condition: (ie, Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent

B-Good

C-Marginal

D-Poor

Comments: Extensive, but lots of alien weeds.

EO Viability: (ie, What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent

B-Good

C-Marginal

D-Poor

Comments: _____

EO Defensibility: (ie, Can this occurrence be protected from extrinsic human factors?)

A-Excellent

B-Good

C-Marginal

D-Poor

Comments: _____

EO Rank: (ie, a summary of all factors listed above) A B C D X

Comments: X - EXTIRPATED

SPECIAL PLANT SURVEY FORM

Site Name: Marland HeightsDate: 27 Feb 91 Source Code: E91EAE011Quad Name: Harper's Ferry

Date: _____ Source Code: _____

Quad Code: 3907736

Date: _____ Source Code: _____

State: MD County: Washington

Date: _____ Source Code: _____

Field Quad Margin #: _____

Date: _____ Source Code: _____

Full extent of EO known and mapped? yes ? noPrecise locations of individuals or groups mapped on base map? X yes no

BIOLOGY

Element Name: Asplenium platyneuronElement Code: _____ Occ. #: 6000

Phenology	Approx #	Population Area	Age Structure	Vigor
☒ In leaf	Romets	Genets	\$ Seedlings	Very feeble
☐ In bud	1-10	1-5 yd ²	\$ Immature	Feeble
☐ In flower	<u>18</u> 11-50	<u>10</u> 5-10 yd ²	\$ 1st year	☒ Normal
☐ Immature fruit	51-100	10-100 yd ²	\$ Mature	Vigorous
☐ Mature fruit	101-1000	100 yd ² -2ac	(established)	Exceptionally
☐ Seed dispersing	1001-10,000	2 ac+	\$ Senescent	vigorous
☐ Dormant	10K+	est. area		
	est. #			

Comments on above: Too small. Found, of 17 1/2 individuals rockEvidence of reproduction? yes no Explain: sporesType of reproduction: sexual asexual bothEvidence of symbiotic or parasitic relationships? yes no Explain: _____Evidence of disease, predation, etc. yes no Explain: _____

Success at Each Stage of Life Cycle

	good	fair	poor	none	uncertain
reproduction	☒				
dispersal			☒		
establishment					☒
maintenance					☒

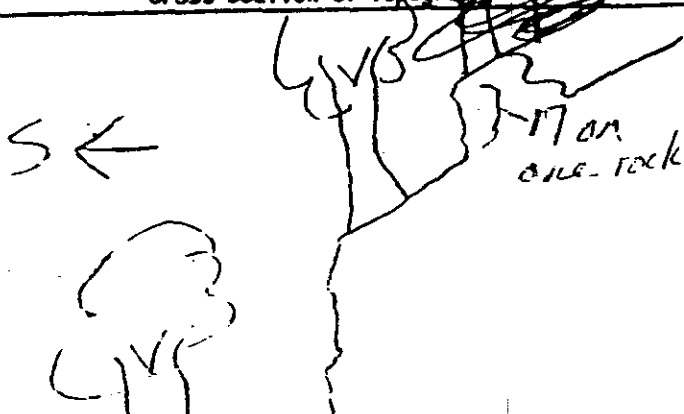
Comments: small to large plants
found

HABITAT

Aspect	Slope	Light	Topographic position	Moisture
<u>N</u> <u>NE</u>	<u>Flat</u>	<u>Open</u>	<u>Crest</u>	<u>Inundated (Hydric)</u>
<u>E</u> <u>NW</u>	<u>0-10</u>	<u>partial</u>	☒ <u>Upper Slope</u>	<u>Saturated (Wet-mesic)</u>
☒ <u>S</u> <u>SE</u>	<u>10-35</u>	☒ <u>Filtered</u>	<u>Mid-Slope</u>	<u>Moist (Mesic)</u>
<u>W</u> <u>SW</u>	<u>35+</u>	<u>shade</u>	<u>Lower-Slope</u>	☒ <u>Dry-Mesic</u>
	☒ <u>Vertical</u>		<u>Bottom</u>	<u>Dry (Xeric)</u>

Elevation: 800 ft to _____ ft

Cross section of topography (if any)/include scale, direction, element position



Associated natural community/plant community: _____

Natural community form completed? ☒ yes ☐ no

Associated plant species: _____

Substrate/Soils: _____

Estimated # of acres of potential habitat in the immediate area: _____

IDENTIFICATION

Photograph taken? ☐ yes ☒ no

Specimen taken? ☐ yes ☒ no If yes, give coll. # and repository: _____

Do other members of this genus co-occur at this site? ☐ yes ☒ no If yes, complete below:

List: _____

Hybridization? ☐ yes ☐ no

Identification problems? ☐ yes ☐ no Explain: _____

CONSERVATION

Owner aware of EO? ☐ yes ☒ no ☐ unknown Owner protecting EO? ☐ yes ☒ no ☐ Unknown

Evidence of disturbance: area heavily altered by man in partial forest recovery

Threats to EO: _____

How large an area is needed to provide species survival here? _____

Explain: _____

Conservation/management needs: _____

Research needs: lots of additional potential habitat

Data security? ☐ yes ☐ no Explain: _____

SUMMARY

EO Quality: (ie, How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of the individuals.)

A-Excellent B-Good C-Marginal D-Poor

Comments: moderately large population, may exist in all habitats

EO Condition: (ie, Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent B-Good C-Marginal D-Poor

Comments: leaving past impacts, but recovering

EO Viability: (ie, What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent B-Good C-Marginal D-Poor

Comments: NFS land

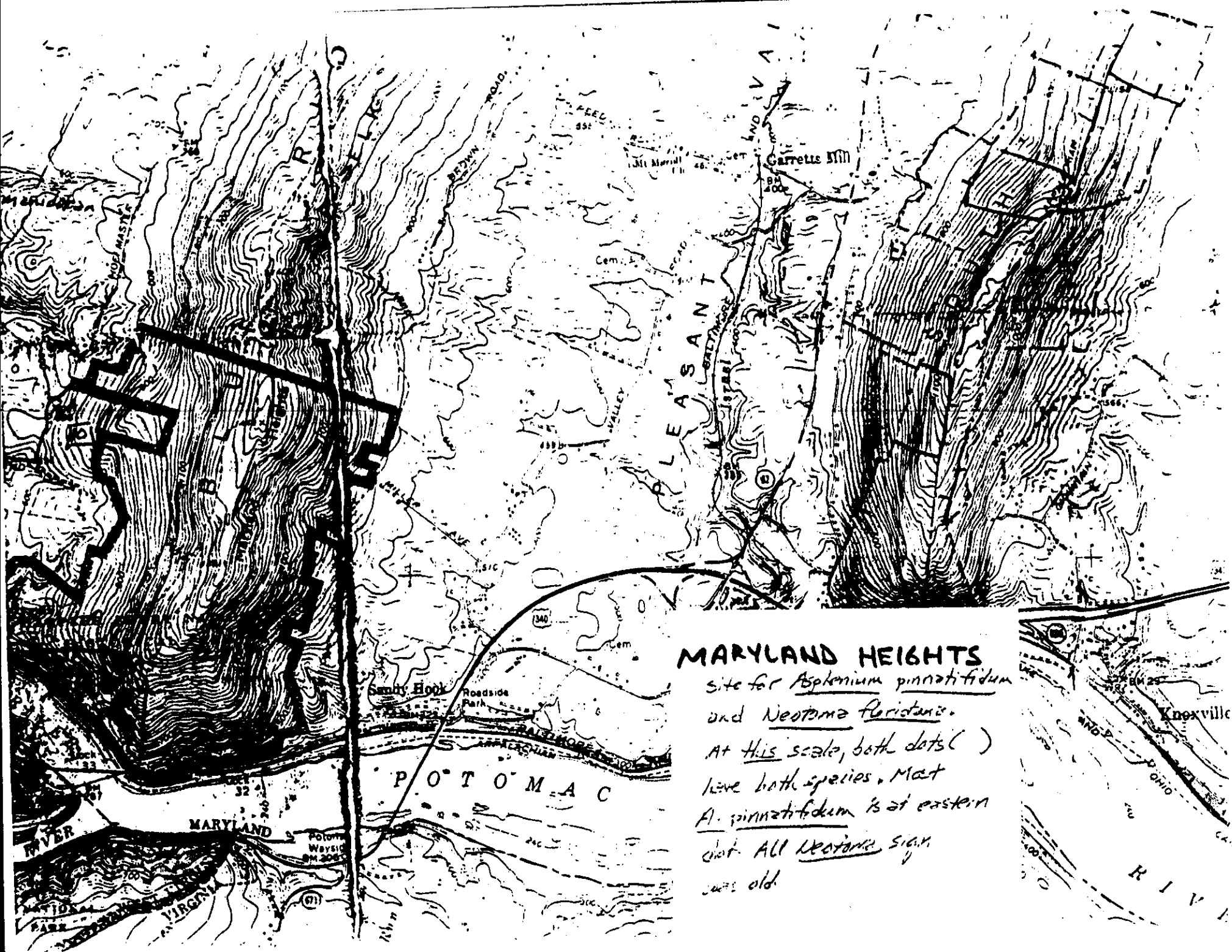
EO Defensibility: (ie, Can this occurrence be protected from extrinsic human factors?)

A-Excellent B-Good C-Marginal D-Poor

Comments: _____

EO Rank: (ie, a summary of all factors listed above) A (B) (C) D

Comments: R/S?



MARYLAND HEIGHTS

Site for Asplenium pinnatifidum
and Neotoma floridana.

At this scale, both dots ()
have both species. Mat
A. pinnatifidum is at eastern
dot. All Neotoma signs
were old.

SPECIAL PLANT SURVEY FORM

Site Name: SANDY HOOK FLOODPLAIN Date: 8/20/95 Source Code: F95WIEΦIMJ
 Quad Name(s): HARPERS FERRY Date: _____ Source Code: _____
 Quad Code(s): 3907736 Date: _____ Source Code: _____
 State: MD County(ies): WA. Date: _____ Source Code: _____
 Field Quad Margin #: _____ Date: _____ Source Code: _____
 Full extent of EO known and mapped? _____ yes _____ no
 Precise locations of individuals or groups mapped on base map? _____ yes _____ no

BIOLOGY

Element Name: SILENE NIVEA Element Code: _____ Occ. #: _____

Phenology	Population Size		Population Area	Age Structure	Vigor
☒ In leaf	Remots	Genets	1 yd ²	\$ Seedlings	Very feeble
☒ In bud	actual #		☒ 1-5 yd ²	\$ Immature	☒ Feeble
☒ In flower	estimated #		5-10 yd ²	\$ 1st year	☒ Normal
☒ Immature fruit	1-10		10-100 yd ²	\$ Mature	Vigorous
\$ Mature fruit	11-50		100 yd ² -2ac	(established)	Exceptional
\$ Seed dispersing	51-100		2 ac+	\$ Senescent	vigorous
\$ Dormant	101-1000		actual	☒ Age structure	
	1001-10,000		area (if known)	unknown	
	10K+				

Comments on above: CA. 10 PLANTS IN SMALL AREA INTERSPERSED W/ LYCHNIS ALBI
 Evidence of reproduction? _____ yes _____ no Explain: UNKNOWN
 Type of reproduction: _____ sexual _____ asexual _____ both
 Any symbiotic or parasitic relationships? _____ yes ☒ no Explain: _____
 Evidence of disease, predation or injury? _____ yes ☒ no Explain: _____

Success at Each Stage of Life Cycle

	good	fair	poor	none	uncertain
Reproduction					☒
Dispersal			☒		
Establishment			☒		
Maintenance			☒		

Comments: PLANTS APPEAR WEAK AS MAYBE SAPPED OF STRENGTH & COMPETING VEGETATION.

HABITAT

Aspect	Slope	Light	Topographic position	Moisture
N NE	☒ 0-3%	Open	Crest	Inundated (Hydric)
E NW	☒ 3-8%	Partial	Upper Slope	Saturated (wet-mesic)
☒ S SE	8-15%	☒ Filtered	☒ Mid-Slope	☒ Moist (Mesic)
W SW	15-35%	☒ Shade	Lower-Slope	☒ Dry-Mesic
☒ Flat	35%-vertical		Bottom	Dry (Xeric)

Elevation: 280 ft to 300 ft

Cross section or topography (habitat)/include scale, direction, element position

HABITAT (continued)

Associated natural community/plant community: UPPER FLOODPLAIN TERRACE

Natural community form completed? yes ☒ no

Associated plant species: ACER SACCHARINUM; ACER NEGUNDO; PLATANUS OCCIDENTALIS; LYCHNIS ALBA; VERBESINA ALTERNIFOLIA; URTICA DIOICA.

Soil name(s)/Substrate: ALLUVIAL SAND

Estimated # of acres of potential habitat in the immediate area: SEEMINGLY NUMEROUS

IDENTIFICATION

Photograph taken? ☒ yes ☐ no

Specimen taken? ☐ yes ☒ no If yes, give collector, collection # and repository: _____

Do other members of this genus co-occur at this site? ☐ yes ☒ no If yes, complete below:

List: HOWEVER, A LOT OF THE SIMILAR "LYCHNIS ALBA" IN AREA.

Hybridization? ☐ yes ☒ no

Identification problems? ☐ yes ☒ no Explain: _____

CONSERVATION

Owner aware of EO? ☐ yes ☐ no ☒ unknown Owner protecting EO? ☐ yes ☐ no ☒ unknown

Evidence of disturbance: PASSIVE RECREATIONAL ACTIVITIES IN VICINITY.

Threats to EO: TRAMPLING; COMPETITION FROM OTHER PLANTS.

Conservation/management needs: UNKNOWN

Research needs: DETERMINE BIOLOGICAL REQUIREMENTS OF THE SPECIES.

Data security? ☐ yes ☐ no Explain: UNKNOWN

SUMMARY

EO Quality: (i.e., How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of the individuals.)

A-Excellent B-Good C-Marginal (D) Poor

Comments: _____

EO Condition: (i.e., Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent B-Good C-Marginal (D) Poor

Comments: _____

EO Viability: (i.e., What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent B-Good C-Marginal (D) Poor

Comments: _____

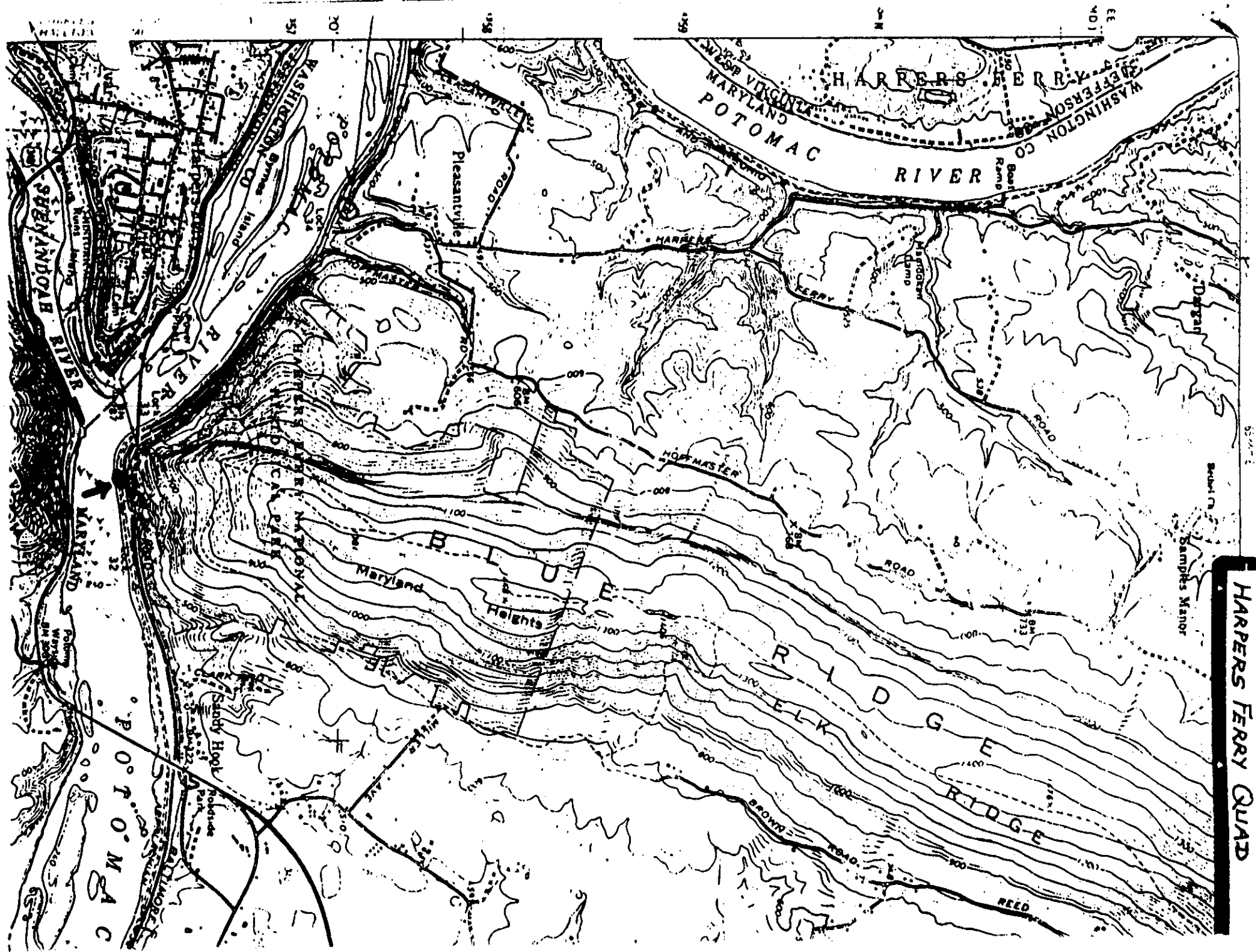
EO Defensibility: (i.e., Can this occurrence be protected from extrinsic human factors?)

A-Excellent B-Good C-Marginal (D) Poor

Comments: _____

EO Rank: (i.e., a summary of all factors listed above) A B C (D)

Comments: _____



WEVERTON SPECIAL PLANT SURVEY FORM

Site Name: WEVERTON FLOODPLAIN Date: 8/4/00 Source Code: Wiegand, Mothman, Shultz, Galbraith

Quad Name(s): HARPER'S FERRY WV-MD-VA Date: _____ Source Code: _____

Quad Code(s): _____ Date: _____ Source Code: _____

State: MD County(ies) WASH Date: _____ Source Code: _____

Field Quad Margin #: _____ Date: _____ Source Code: _____

Full extent of EO known and mapped? yes no

Precise locations of individuals or groups mapped on base map? ✓ yes no

BIOLOGY

Element Name: **RUELLIA STREPENS** Element Code: _____ Occ. #: _____

Phenology	Population Size	Population Area	Age Structure	Vigor
Stem leaf	Ramets	Genets	Seedlings	Very feeble
100% in bud	actual #	1 yd ²	Immature	Feeble
Stem flower	estimated #	3-10 yd ²	1st year	✓ Normal
✓ Immature fruit	1-10	10-100 yd ²	Mature	✓ Vigorous
Immature fruit	11-50	✓ 100 yd ² -2 ac	(established)	Exceptionally
Seed dispersing	51-100	2 ac+	Senescent	vigorous
Dormant	101-1000	actual	✓ Age structure	
	1001-10,000	area (if known)	unknown	
	10K+			

Area of each patch 3x5m

Comments on above: SEVERAL STEMS COME OUT OF BASE OF SINGLE PLANT. GROWING IN POISON IVY

Evidence of reproduction? yes no Explain: _____

Type of reproduction: sexual asexual both

Any symbiotic or parasitic relationships? yes no Explain: _____

Evidence of disease, predation or injury? yes no Explain: _____

Success at Each Stage of Life Cycle

	good	fair	poor	none	uncertain
Reproduction					✓
Dispersal		✓			
Establishment		✓			
Maintenance			✓		

Comments: _____

HABITAT

Aspect	Slope	Light	Topographic position	Moisture
N NE	0-3%	Open	Crest	Inundated (Hydric)
E NW	3-8%	Partial	Upper Slope	✓ Saturated (Wet-mesic)
S SE	8-15%	Filtered	Mid-Slope	✓ Moist (Mesic)
W SW	15-35%	Shade	Lower-Slope	Dry-Mesic
Flat	35%-Vertical		Bottom	Dry (Xeric)

(Rainy Mon)

Elevation: 240 ft to _____ ft

Cross section of topography (habitat)/Include scale, direction, element position

HABITAT (continued)

Associated natural community/plant community: Potomac R. Floodplain

Natural community form completed? yes ☒ no

Associated plant species: Sycamore, Hibiscus laciniatus*, Eupatorium serotinum, P-I, carpetweed, Stellaria media, Polygonum sp., Swamp milkweed, short-stem monkey flower, pokeweed, spicebush, Bidens sp.

Soil name(s)/Substrate: Sand / gravel / alluvium

Estimated # of acres of potential habitat in the immediate area: _____

IDENTIFICATION

Photograph taken? yes ☒ no

Specimen taken? ☒ yes no If yes, give collector, collection # and repository: _____

MIRVANS, NCTC HERBARIUM

Do other members of this genus co-occur at this site? yes ☒ no If yes, complete below:

List: _____

Hybridization? yes ☒ no

Identification problems? yes ☒ no Explain: Wide calyx lobes > 2mm

CONSERVATION

Owner aware of EO? ☒ yes no unknown Owner protecting EO? yes no unknown

Evidence of disturbance: Human Activities - Fishy paths, Recreation

Threats to EO: Human activities, Non-native invasives, Natural flooding

Conservation/management needs: _____

Research needs: _____

Data security? yes no Explain: _____

SUMMARY

EO Quality: (i.e., How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of the individuals.)

A-Excellent B-Good (BC) C-Marginal D Poor

Comments: _____

EO Condition: (i.e., Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent B-Good (C) C-Marginal D Poor

Comments: _____

EO Viability: (i.e., What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent (B) B-Good C-Marginal D Poor

Comments: _____

EO Defensibility: (i.e., Can this occurrence be protected from extrinsic human factors?)

A-Excellent B-Good (C) C-Marginal D Poor

Comments: _____

EO Rank: (i.e., a summary of all factors listed above) A B (C)

Comments: _____

SPECIAL PLANT SURVEY FORM

Site Name: WEAVERTON FLOODPLAIN Date: 5/11/00 Source Code: Karene Motiva hs
 Quad Name(s): HARPER'S PERRY WV-MD-VA Date: 0/4/00 Source Code: Wiegand, Motiva
 Quad Code(s): _____ Date: _____ Source Code: Shultz, Gal
 State: MD County(ies): WASH. Date: _____ Source Code: _____
 Field Quad Margin #: _____ Date: _____ Source Code: _____
 Full extent of EO known and mapped? yes no
 Precise locations of individuals or groups mapped on base map? ✓ yes no

BIOLOGY

Element Name: MAIANTHEMUM STELLATUM Formerly Smilacina stellata
 Element Code: _____ Occ. #: _____

Phenology	Population Size	Population Area	Age Structure	Vigor
<u>50</u> in leaf	Samers	Genets	1 yd ²	Seedlings
in bud	actual #	1-5 yd ²	Immature	Very feeble
<u>50</u> in flower	estimated #	<u>✓</u> 5-10 yd ²	1st year	Feeble
Immature fruit	1-10	10-100 yd ²	Mature	<u>✓</u> Normal
Mature fruit	11-50	100 yd ² -2ac	(established)	Vigorous
Seed dispersing	51-100	2 ac+	Senescent	Exceptionally
Dormant	101-1000	actual	<u>✓</u> Age structure	vigorous
	1001-10,000	area (if known)	unknown	
	10K+			

Comments on above: PLANTS ARE ONLY ON WEST SIDE OF BLUEBLAZED CAMPSITE TRAIL
 Evidence of reproduction? ✓ yes no Explain: FLOWERING
 Type of reproduction: sexual asexual ✓ both
 Any symbiotic or parasitic relationships? yes ✓ no Explain: _____
 Evidence of disease, predation or injury? yes ✓ no Explain: _____

Success at Each Stage of Life Cycle

	good	fair	poor	none	uncertain
reproduction					<u>✓</u>
dispersal					
establishment		<u>✓</u>			
maintenance		<u>✓</u>			

Comments: _____

HABITAT

Aspect	Slope	Light	Topographic position	Moisture
<u>✓</u> N	<u>✓</u> 0-3%	Open	Crest	Inundated (Hydric)
E	<u>✓</u> 3-8%	Partial	Upper Slope	<u>✓</u> Saturated (Wet-mesic)
<u>✓</u> S	8-15%	<u>✓</u> Filtered	<u>✓</u> Mid-Slope	<u>✓</u> Moist (Mesic)
W	15-35%	Shade	Lower-Slope	Dry-Mesic
<u>✓</u> Flat	35%-Vertical		Bottom	Dry (Xeric)

Elevation: 240 ft to 240 ft

Cross section of topography (habitat)/include scale, direction, element position

HABITAT (continued)

Associated natural community/plant community: Potomac R. Floodplain + Scourbar

Natural community form completed? yes ☒ no

Associated plant species: Silver maple, Sycamore, Box elder, Paw Paw, Spicebush, Joe Pye weed, P.I., Polygonum biflora, Wingsum, Indian strawberry,

Eupatorium serotinum (late flowering thoroughwort), Jewelweed, Pigweed, Pokeweed, Stinging nettle

Soil name(s)/Substrate: sand/gravel/alluvium

Estimated # of acres of potential habitat in the immediate area: 500+

IDENTIFICATION

Photograph taken? yes ☒ no

Specimen taken? yes ☒ no If yes, give collector, collection # and repository: _____

Do other members of this genus co-occur at this site? ☒ yes no If yes, complete below:

List: SMILACINA RACEMOSA

Hybridization? yes ☒ no

Identification problems? yes ☒ no Explain: Flowers distinct. Leaves may be confusing

CONSERVATION

Owner aware of EO? ☒ yes no unknown Owner protecting EO? yes no ☒ unknown

Evidence of disturbance: TRAIL USE + MAINTENANCE, NATURAL FLOODING

Threats to EO: HUMAN ACTIVITY, NON-NATIVE INVASIVES (Morning glory, garlic mustard, Jay grasses, Multifl. Rose)

Conservation/management needs: KEEP MANAGERS INFORMED OF RARE PLANT LOCATIONS. COULD BE EASILY DESTROYED BY TRAIL BRUSHING

Research needs: EFFECT OF INVASIVES MAINTENANCE/REMOVAL

Data security? yes no Explain: COLLECTIONS DUE TO EASY ACCESS COULD BE PROBLEM.

SUMMARY

EO Quality: (ie, How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of the individuals.)

A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Condition: (ie, Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent B-Good (BC) C-Marginal D Poor

Comments: _____

EO Viability: (ie, What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Defensibility: (ie, Can this occurrence be protected from extrinsic human factors?)

A-Excellent B-Good (C) C-Marginal D Poor

Comments: _____

EO Rank: (ie, a summary of all factors listed above) A (C) D

Comments: _____

INDEX

Under "Element Name", list all heritage-listed species/communities sought, found or reported from site. Under "Code ELEM #", indicate a simple code number or letter to be used in identifying element locations on the base map. Indicate occurrence numbers, if known. Lastly, indicate whether the element was found (Y,N,N/A) on each particular date. Whether the EOR was transcribed or updated and whether a return visit is needed.

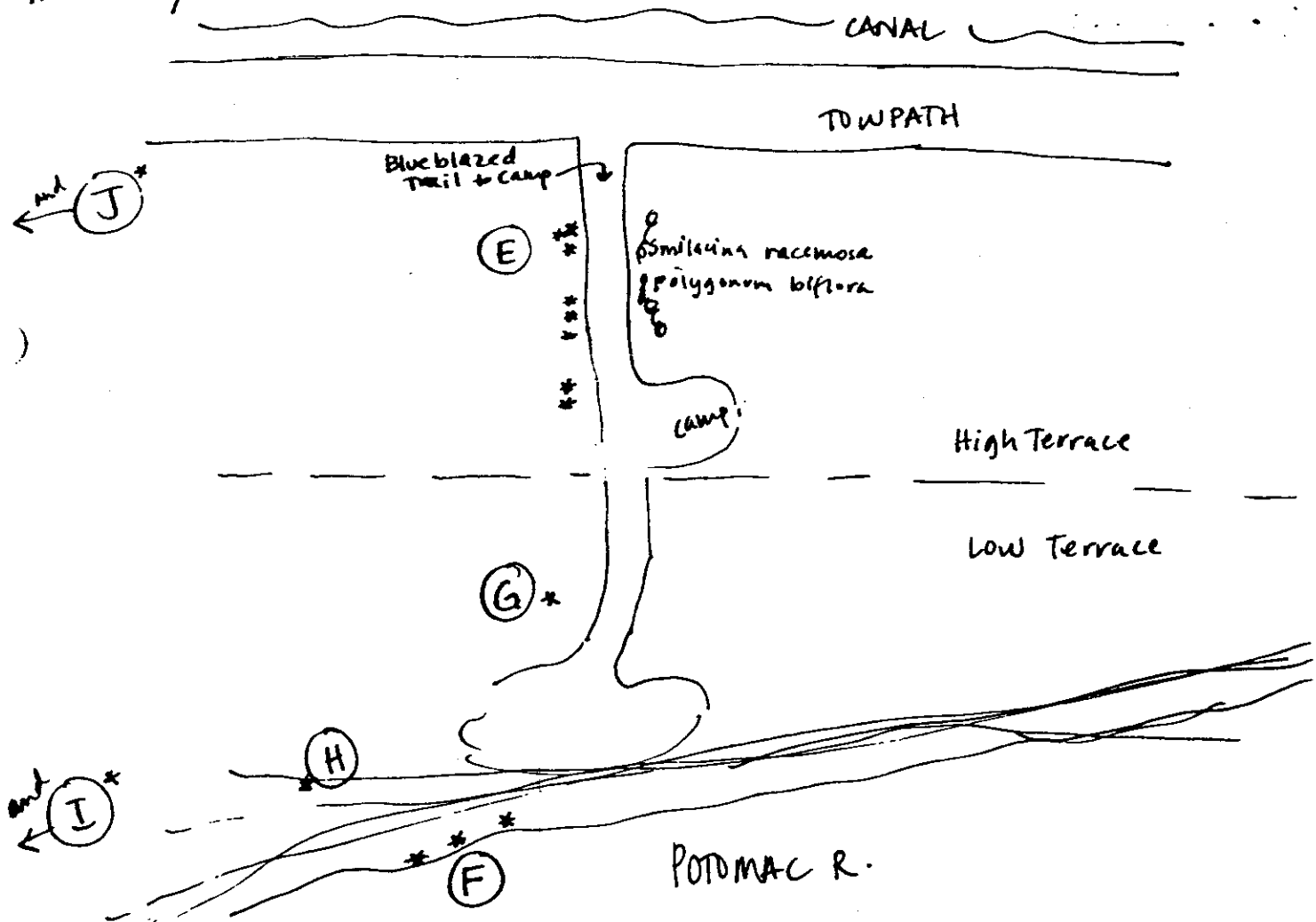
[illegible]

Maianthemum stellatum (Starry Solomon's seal)
Harper's Ferry, WV-MD-VA Quad. (100%)
Washington County
Survey of Appalachian Trail, MD 2000



Sketch Map: Weaverston
Floodplain
AT Campsite

NO SCALE / NORTH ↑



*see Quad
map for
rest of coded
plant location.

SPECIAL PLANT SURVEY FORM

Site Name: WEAVERTON FLOODPLAIN Date: 5/10/99 Source Code: F99WIEØIMD
 Quad Name(s): HARPERS FERRY Date: _____ Source Code: _____
 Quad Code(s): _____ Date: _____ Source Code: _____
 State: MD. County(ies) WASH. Date: _____ Source Code: _____
 Field Quad Margin #: _____ Date: _____ Source Code: _____
 Full extent of EO known and mapped? yes no
 Precise locations of individuals or groups mapped on base map? yes no

BIOLOGY

Element Name: SMILACINA STELLATA Element Code: _____ Occ. #: _____
 Phenology Population Size Population Area Age Structure Vigor
 50% in leaf Ramets Genets 1yd² % Seedlings Very feeble
 % in bud _____ actual # _____ 1-5 yd² % Immature Feeble
 50% in flower _____ estimated # _____ 5-10 yd² % 1st year ☒ Normal
 % Immature fruit _____ 1-10 ☒ 10-100 yd² % Mature Vigorous
 % Mature fruit _____ 11-50 _____ 100 yd²-2ac (established) Exceptionally
 % Seed dispersing _____ 51-100 _____ 2 ac+ % Senescent vigorous
 % Dormant _____ 101-1000 _____ actual ☒ Age structure unknown
 _____ 1001-10,000 _____ area (if known)
 _____ 10K+ _____

Comments on above: AT LEAST FOUR SEPARATE GROUPS OF PLANTS SCATTERED A.
 Evidence of reproduction? ☒ yes no Explain: FLOWERS PRESENT
 Type of reproduction: sexual asexual ☒ both
 Any symbiotic or parasitic relationships? yes ☒ no Explain: _____
 Evidence of disease, predation or injury? yes ☒ no Explain: _____

Success at Each Stage of Life Cycle

	good	fair	poor	none	uncertain
reproduction					☒
dispersal	☒				
establishment		☒			
maintenance		☒			

Comments: _____

HABITAT

Aspect	Slope	Light	Topographic position	Moisture
N NE	☒ 0-35	☒ Open	Crest	<u>inundated (Hydric)</u>
E NW	☒ 3-85	☒ Partial	☒ Upper Slope	<u>Saturated (Wet-mesic)</u>
☒ S SE	<u>8-155</u>	☒ Filtered	☒ Mid-Slope	☒ Moist (Mesic)
W SW	<u>15-355</u>	Shade	☒ Lower-Slope	☒ Dry-Mesic
☒ Flat	<u>355-Vertical</u>		Bottom	<u>Dry (Xeric)</u>

Elevation: _____ ft to _____ ft

Cross section of topography (habitat)/include scale, direction, element position

1/4 to 1/2 MILE OF TOWPATH. NUMBER OF PLANTS IN EACH GROUP WERE
COUNTED AS FOLLOWS (LETTER DESIGNATORS CORRESPOND TO ATTACHED MAP).
 A.) 58
 B.) 161
 C.) 65

HABITAT (continued)

Associated natural community/plant community: FLOODPLAIN TERRACE FOREST

Natural community form completed? yes ☒ no

Associated plant species: COTTONWOOD; SILVER MAPLE; ASH; BOX ELDER;
SPICE BUSH; PAWPAW; CLEAVERS; ELLISIA; GARLIC MUSTARD; STAR OF
BETHLEHEM; SANICULA SP.; VERONICA SP.; VIRGINIA CREEPER

Soil name(s)/Substrate: RICH ALLUVIAL SAND

Estimated # of acres of potential habitat in the immediate area: SEVERAL

IDENTIFICATION

Photograph taken? ☒ yes ☐ no

Specimen taken? ☐ yes ☒ no If yes, give collector, collection # and repository: _____

Do other members of this genus co-occur at this site? ☒ yes ☐ no If yes, complete below:

List: S. RACEMOSA

Hybridization? ☐ yes ☒ no

Identification problems? ☐ yes ☒ no Explain: _____

CONSERVATION

Owner aware of EO? ☒ yes ☐ no ☐ unknown Owner protecting EO? ☐ yes ☐ no ☒ unknown

Evidence of disturbance: NATURAL FLOODING DISTURBANCE

Threats to EO: INVASIVE NON-NATIVE WEEDS

Conservation/management needs: _____

Research needs: _____

Data security? ☐ yes ☐ no Explain: _____

SUMMARY

EO Quality: (I.e., How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of the individuals.)

A-Excellent ☒ B-Good ☐ C-Marginal ☐ D Poor

Comments: _____

EO Condition: (I.e., Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent ☐ B-Good ☒ C-Marginal ☐ D Poor

Comments: _____

EO Viability: (I.e., What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent ☐ B-Good ☒ C-Marginal ☐ D Poor

Comments: _____

EO Defensibility: (I.e., Can this occurrence be protected from extrinsic human factors?)

A-Excellent ☐ B-Good ☒ C-Marginal ☐ D Poor

Comments: _____

EO Rank: (I.e., a summary of all factors listed above) A ☐ B ☒ C ☐ D

Comments: _____

SMILACINA STELLATA
HARPERS FERRY QUAD. 100%

A. = 58

C. = 65

B. = 161

D. = 23



(The Nature Conservancy, 1990)

WEVERTON CLIFFS

Source Code

Date			Time	Surveyor	Source Code
(year)	(mo)	(day)			
96	11	02	to	Portis	F 90BARCI M
00	09	08	1100 to 2100	K. U Motivans	F 00MOT
-	-	-	to		F
-	-	-	to		F
-	-	-	to		F

LOCATION: State: MD County: FREDERICK Quad: HARPERS FERRY
Townrange: _____ Section: _____ Meridian: _____ / Town/Township: _____

Precise Location:
(distance and direction from a prominent feature shown on the topographic map, or some other map)

Site is at south end of South Mountain.

Road Directions to Site:
From US 340 go north on MD 67 1/4 mile to West End Exit; turn right. When road comes to a T-intersection, the Appalachian Trail is ~~at~~ across intersection.

(where to park, location of important trail)

Park and hike up trail to top of ridge; take Waverton cliff (Pell's Place) trail
50' top of trail descends back down to cliff.

Under "Element Name" list all elements sought, reported, or confirmed from the site. If known, record the Occurrence Numbers for each. Generate simple letter or number codes which identify each element occurrence on the base map; these codes help keep the base map uncluttered. Indicate whether the element was found (Y, N, N/A) on the date of the site visit, and whether a return visit is needed.

Date:

2 NOV 50 8 SEP 00

[illegible]

Site Name: Weverton Cliffs
 Quad Name: Harpers Ferry
 Quad Code: 3907736
 State: MD County: Fredrick
 Field Quad Margin #: 25

Date: 2 Nov 90 Source Code: EGU BAROIAN
 Date: _____ Source Code: _____
 Date: _____ Source Code: _____
 Date: _____ Source Code: _____
 Date: _____ Source Code: _____

Full extent of EO known and mapped? ☒ yes ☐ no

Precise locations of individuals or groups mapped on base map? ☒ yes ☐ no

BIOLOGY

Element Name: Asplenium pinnatifidum Element Code: _____ Occ. #: 008

Phenology	Approx #	Population Area	Age Structure	Vigor
In leaf	Ramets	Genets	% Seedlings	Very feeble
In bud	☒ 1-10	☒ 1-5 yd ²	% Immature	Feeble
In flower	11-50	5-10 yd ²	% 1st year	Normal
Immature fruit	51-100	10-100 yd ²	% Mature	Vigorous
Mature fruit	101-1000	100 yd ² -2ac	(established)	Exceptionally
Seed dispersing	1001-10,000	2 ac+	% Senescent	vigorous
Dormant	10K+	est. area		
	est. #			

Comments on above: TWO smallish plants

Evidence of reproduction? ☐ yes ☒ no Explain: _____

Type of reproduction: ☐ sexual ☐ asexual ☐ both

Evidence of symbiotic or parasitic relationships? ☐ yes ☒ no Explain: _____

Evidence of disease, predation, etc. ☐ yes ☒ no Explain: _____

Success at Each Stage of Life Cycle

	good	fair	poor	none	uncertain
Reproduction			☒		
Dispersal			☒		
Establishment			☒		
Maintenance			☒		

Comments: _____

HABITAT

Aspect	Slope	Light	Topographic position	Moisture
N NE	Flat	Open	Crest	Inundated (Hydric)
E NW	0-10	partial	Upper Slope	Saturated (Wet-mesic)
S SE	10-35	☒ Filtered	☒ Mid-Slope	Moist (Mesic)
W SW	35+	shade	Lower-Slope	Dry-Mesic
	Vertical		Bottom	☒ Dry (Xeric)

Elevation: 600 ft to _____ ft

Cross section of topography (habitat)/Include scale, direction, element position

SITE DESCRIPTION:

Page 2

Site is a large quartzite cliff at south end of South Mountain.
Much of cliff is open with scattered scattered oaks and pines. A talus of very large boulders is at base of cliff.
Ledges to periphery are woody but still dry. The cliff offers very scenic panorama of Potomac River and Harpers Ferry.

PROTECTION URGENCY:
(circle one)

- ☒ U1 immediately threatened
U2 threat expected within 5 yrs.
U3 threatened, but not in next 5 yrs.
U4 no threats imminent
U5 land protection complete

MANAGEMENT URGENCY:
(circle one)

- ☒ M1 management needed this year
M2 management needed within 5 yrs. to prevent loss of EOs
M3 management needed within 5 yrs. to maintain current EO quality
M4 management may be needed in future
M5 no management needed

Protection Urgency Comments (& date): 91-01-15

Management Urgency Comments (& date): 91-01-05

Population of rare fern is quite small because of all the problems it faces: trampling & alien weeds in particular

TOPOGRAPHIC BASE MAP:

Attach a photocopy of the topographic map and/or aerial photograph showing the site. Complete steps 1 to 3 below.

Completed?

- ☒ yes ☐ no 1. Indicate precise element locations and/or boundaries (use solid lines). Identify each element with the codes you used on page 1.
- ☒ yes ☐ no 2. If knowledge of the site permits, draw primary (+++++) and secondary (---) ecological site boundaries. Within the primary site boundary include all known element occurrences and lands necessary for the immediate protection of the EOs. The secondary boundary (or buffer) includes lands intended to mitigate future unforeseen negative impacts to the EOs (e.g. to control erosion, trespass related damage, natural succession, exotic species, urban sprawl). Use (---) where primary and secondary boundaries coincide. Below, provide a brief written justification of the boundary locations.

Boundary Justification:

Primary & secondary are same. They include all occupied & potential habitat at site on slope area [which could be a source of erosion] is source of human access & develop [which could be quarried out if US340 widened further.

- ☒ yes ☐ no 3. If known, indicate tract ownership boundaries, using dashed lines (-----).

Tract Ownership or Managed Area Name (names, addresses, phone #):

MD DNR-South Mountain State Park

Associated natural community: prairie community

Natural community form completed? yes no

Associated plant species: _____

Substrate/Soils: Waverly quartzite

Estimated # of acres of potential habitat in the immediate area: 2

IDENTIFICATION

Photograph taken? yes no

Specimen taken? yes no If yes, give coll. # and repository: _____

Do other members of this genus co-occur at this site? yes no If yes, complete below:

List: A. montanum, A. platyneuron

Hybridization? yes no

Identification problems? yes no Explain: _____

CONSERVATION

Owner aware of EO? yes no unknown Owner protecting EO? yes no Unknown

Evidence of disturbance: Cliffs heavily abused, lots of trash, alien weeds

Threats to EO: and eroding foot paths.

How large an area is needed to provide species survival here? _____

Explain: _____

Conservation/management needs: _____

Research needs: _____

Data security? yes no Explain: _____

SUMMARY

EO Quality: (i.e., How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of the individuals.)

A-Excellent B-Good C-Marginal D Poor

Comments: tiny, relictual population

EO Condition: (i.e., Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent B-Good C-Marginal D Poor

Comments: OK right at pkts, but area not trashed is limited.

EO Viability: (i.e., What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Defensibility: (i.e., Can this occurrence be protected from extrinsic human factors?)

A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Rank: (i.e., a summary of all factors listed above) A B C D

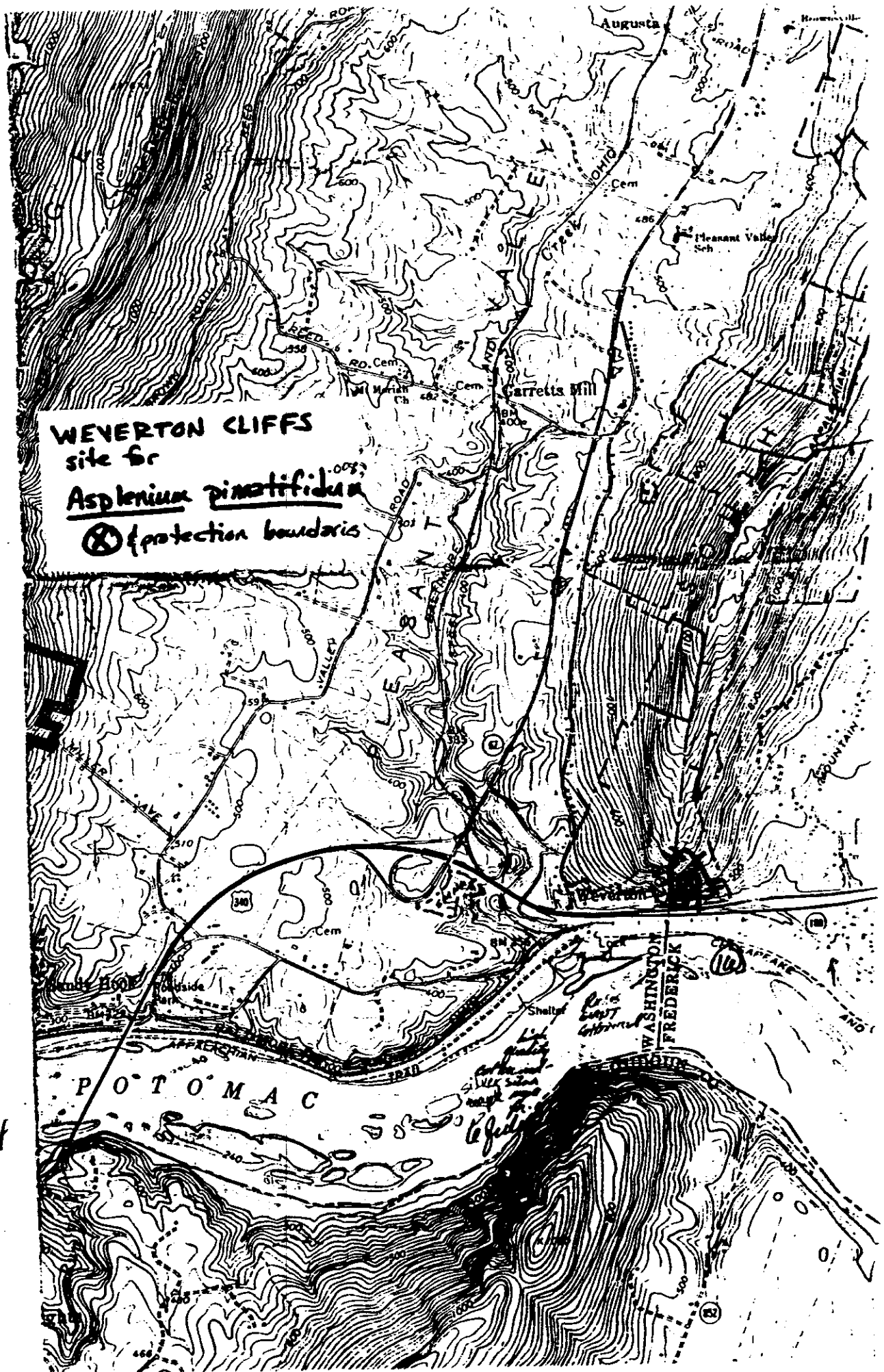
Comments: D

WEVERTON CLIFFS
site for

Asplenium pinatifidum

⊗ protection boundaries

PERS FERRY
R07736



SMITHSBURG 7 1/2' USGS topo showing

HAGERSTOWN WATERSHED timber

compartments A-6 and

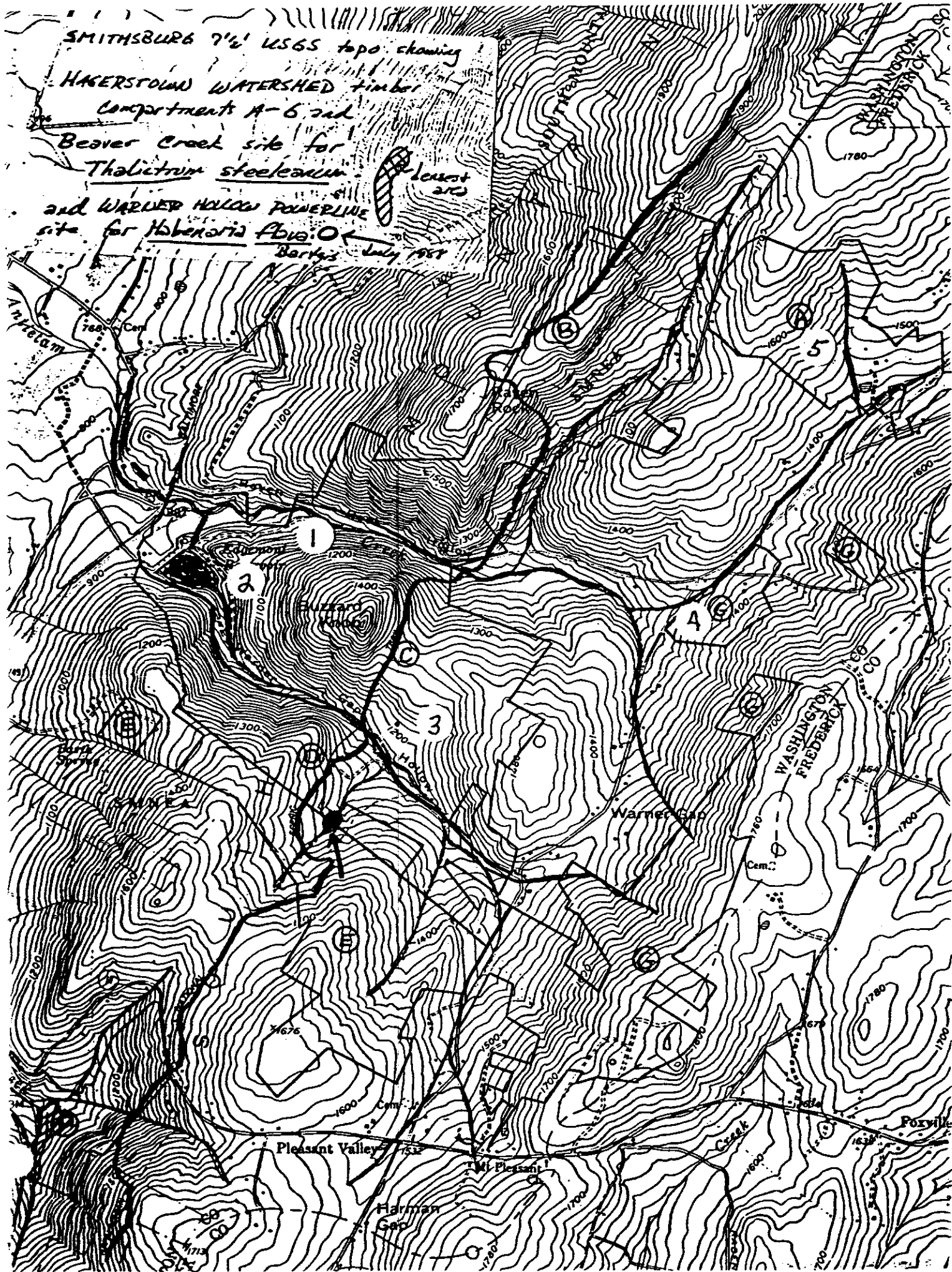
Beaver Creek site for

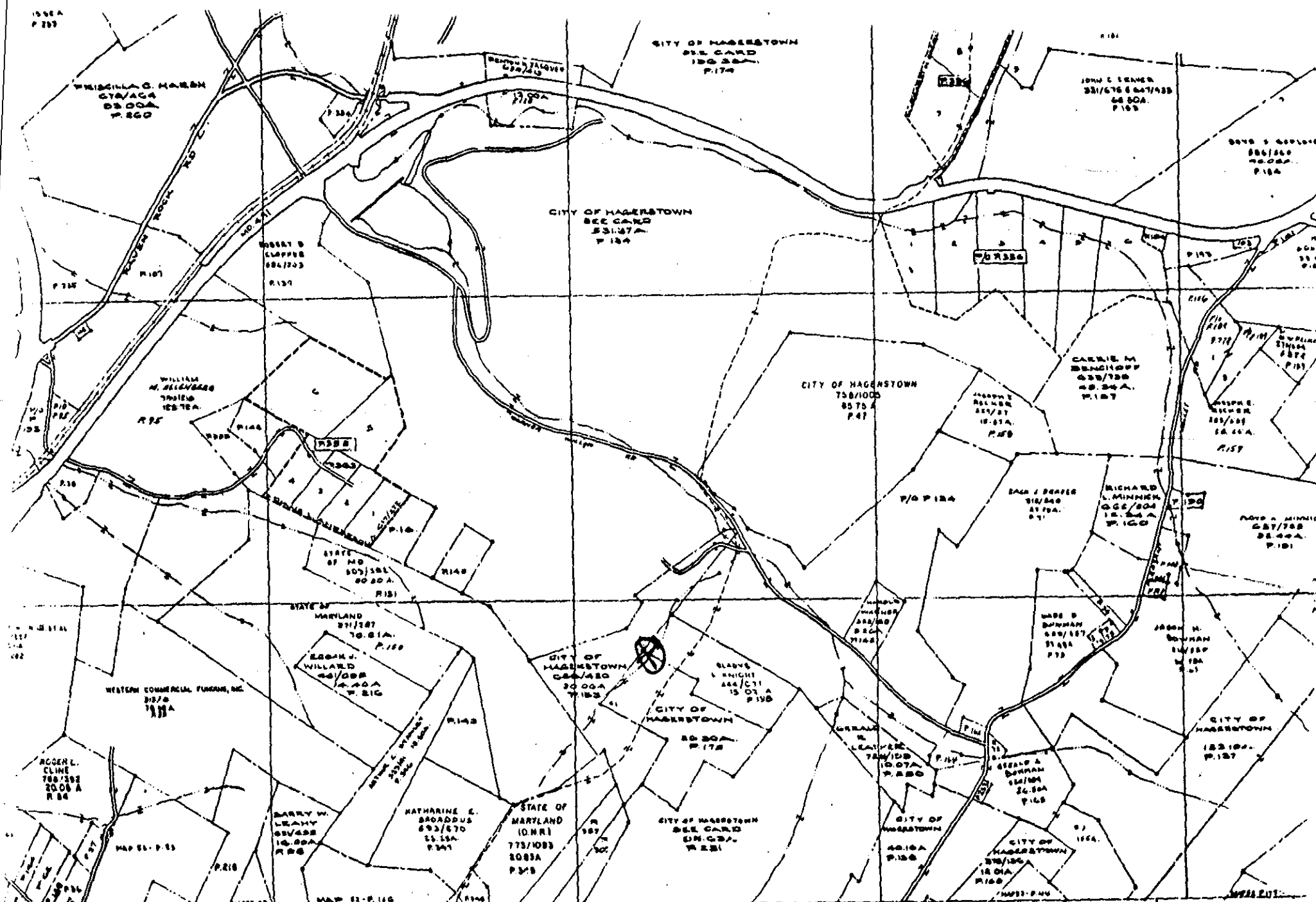
Thalictum steeleianum

and WARNER HOLLOW POWERLINE

site for Habenaria flava O

Berry's July 1957





WAGNER Hollow Powerline
WA Co. Map 40

DEPT. OF ASSESSMENTS & TAXATION
MAP DIVISION

REVISED TO: DATE: 1/1/81

PROPERTY LINE
S&W DIVISION BOUNDARY
CONTINUING OWNER'S RAMP - Z I E - Z - ± - Z
PARCEL NUMBER - P. 349 (ASSIGNED TO IDENTIFY AND NUMBER
OWNER'S RAMP MUST BE PRECEDED
BY MAP NUMBER)
SCALE: 1" = 600'
BY LAST MS PHOTO QUANTITY



SCAU



653604

9

WASHINGTON

SPECIAL PLANT SURVEY FORM

Site Name: Hagerstown Watershed Date: 7/3/00 Source Code: Wiegand, Motlans,
 Quad Name(s): Smithsburg Date: _____ Source Code: Shultz, Johnsons
 Quad Code(s): _____ Date: _____ Source Code: _____
 State: MD County(ies) Wash. Date: _____ Source Code: _____
 Field Quad Margin #: _____ Date: _____ Source Code: _____
 Full extent of EO known and mapped? yes ☒ no ☐
 Precise locations of individuals or groups mapped on base map? ☒ yes ☐ no

BIOLOGY

Element Name: Trillium cernuum Element Code: _____ Occ. #: _____

Phenology	Population Size	Population Area	Age Structure	Vigor
☐ In leaf	Remets	Genets	% Seedlings	Very feeble
☐ In bud	actual #	1 yd ²	<u>30%</u> Immature	☒ Feeble
☒ In flower	estimated #	5-10 yd ²	% 1st year	☒ Normal
☒ Immature fruit	<u>60</u> 1-10	10-100 yd ²	<u>50%</u> Mature	☒ Vigorous
☐ Mature fruit	11-50	100' yd ² -2ac	(established)	Exceptionally
☐ Seed dispersing	51-100	2 ac+	<u>20%</u> Senescent	vigorous
☐ Dormant	101-1000	<u>LINEAR</u> actual	Age structure	
	1001-10,000	area (if known)	unknown	
	10K+	<u>100' scattered along trail</u>		

Comments on above:

Evidence of reproduction? ☒ yes ☐ no Explain: Fruit, young plants
 Type of reproduction: ☒ sexual ☐ asexual ☐ both
 Any symbiotic or parasitic relationships? ☐ yes ☐ no Explain: _____
 Evidence of disease, predation or injury? ☒ yes ☐ no Explain: chewed leaves, yellowed leaves

Success at Each Stage of Life Cycle

	good	fair	poor	none	uncertain
reproduction					☒
dispersal		☒	☒		
establishment					☒
maintenance					

Comments:

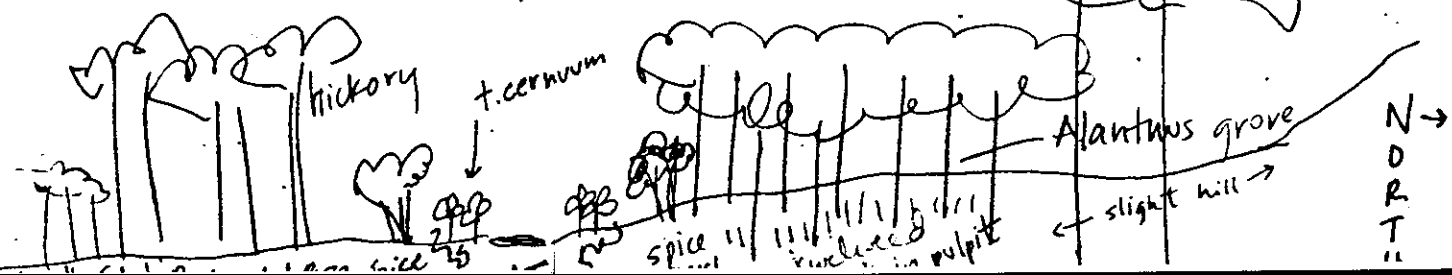
Some. Several plants looked "burned" brown and shriveled. flower bud had not fully matured.
Tears on leaves

Aspect: N NE E SE S SW Flat
 Slope: 0-3% 3-8% 8-15% 15-35% 35%-Vertical
 Light: Open Partial Filtered Shade
 Topographic position: Crest Upper Slope Mid-Slope Lower-Slope Bottom

Moisture: Inundated (Hydric) Saturated (Wet-mesic) ☒ Moist (Mesic) Dry-Mesic Dry (Xeric)

Elevation: 1400' ft to 1430' ft

Cross section of topography (habitat)/include scale, direction, element position



HABITAT (continued)

Associated natural community/plant community: Rich tulip poplar woods over Greenstone

Natural community form completed? yes ☒ no

Associated plant species: May apple, Jack in the Pulpit, Spice bush, Honeysuckle
cleared, Multiflora rose, Sweet cicely, PI, Smilacina racemosa, Polygonum
Doll's eyes, Tulip tree, Parthenocissus quinifolia Stand of young Alantus ^{persica}

Soil name(s)/Substrate: grown up in a
light gap

Estimated # of acres of potential habitat in the immediate area: _____

IDENTIFICATION

Photograph taken? ☒ yes ☐ no Dick took photos

Specimen taken? ☐ yes ☒ no If yes, give collector, collection # and repository: _____

Do other members of this genus co-occur at this site? ☐ yes ☒ no If yes, complete below:

List: _____

Hybridization? ☐ yes ☒ no

Identification problems? ☐ yes ☒ no Explain: _____

CONSERVATION

Owner aware of EO? ☒ yes ☐ no ☐ unknown Owner protecting EO? ☒ yes ☐ no ☐ unknown

Evidence of disturbance: Multiflora expandig, Alantus invasion

Threats to EO: Trail clearing, Timbering by watershed

Conservation/management needs: Trail activities limited to fall.

Pome plants just inches from trail.

Research needs: What is best time of year (if any) to cut back

Data security? ☐ yes ☐ no Explain: collection tract - easy access, vulnerable

SUMMARY

EO Quality: (I.e., How representative is this occurrence? Consider the size and productivity of the population and the vitality and vigor of the individuals.)

A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Condition: (I.e., Is the habitat supporting the EO pristine or degraded? Is there a potential for the habitat to recover from disturbances?)

A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Viability: (I.e., What are the long-term prospects for continued existence of this occurrence at the indicated level of quality?)

A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Defensibility: (I.e., Can this occurrence be protected from extrinsic human factors?)

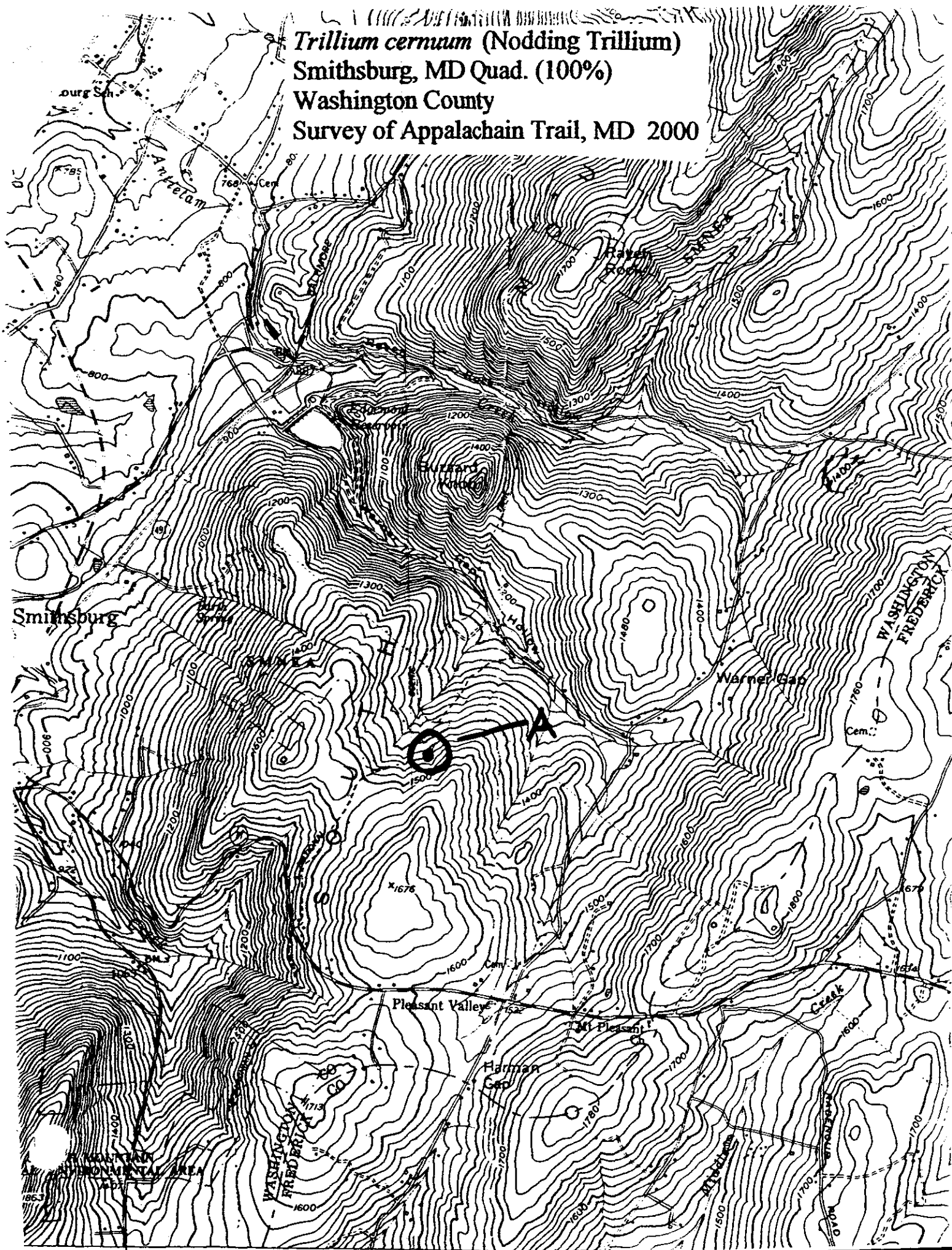
A-Excellent B-Good C-Marginal D Poor

Comments: _____

EO Rank: (I.e., a summary of all factors listed above) A B C D

Comments: _____

Trillium cernuum (Nodding Trillium)
Smithsburg, MD Quad. (100%)
Washington County
Survey of Appalachian Trail, MD 2000



06/03/87

Page

ECCODE: PDGEN06040.022

NAME: GENTIANA ANDREWSII

COMNAME: FRINGE-TIP CLOSED GENTIAN

MARGNUM: 18 TENTEN: 06,08 IDENT: EORANK:

EORANKCOMM:

SURVEYDATE: LASTOBS: 1947-09-06 FIRSTOBS: 1947 GRANK: 64

SRANK: B2 STATE: MD COUNTYNAME: MDWASH

QUADCODE: 3907765

QUADNAME: SMITHBURG

LAT: 393911 LONG: 773300 S: 0 N: 0 E: 0 W: 0 PRECISION: 6

PHYSPROV: BR WATERSHED: 02070004

DIRECTIONS:

SOUTH MOUNTAIN, NE WASHINGTON CO.

GENDESC:

ELEV: 1340 SIZE: 0

EODATA:

COMMENTS:

O.M. FREEMAN (COLLECTOR)

MACODE1: MDSNRNESOUT1 CONTAINED1: 7 MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADDLMAS: MORELAND: MOREPROT:

MOREMGMT: SITECODE:

SITENAME:

OWNER:

OWNERCOMM:

PROTCOMM:

MGMTCOMM:

MONITOR:

MONITORNUM:

BESTSOURCE:

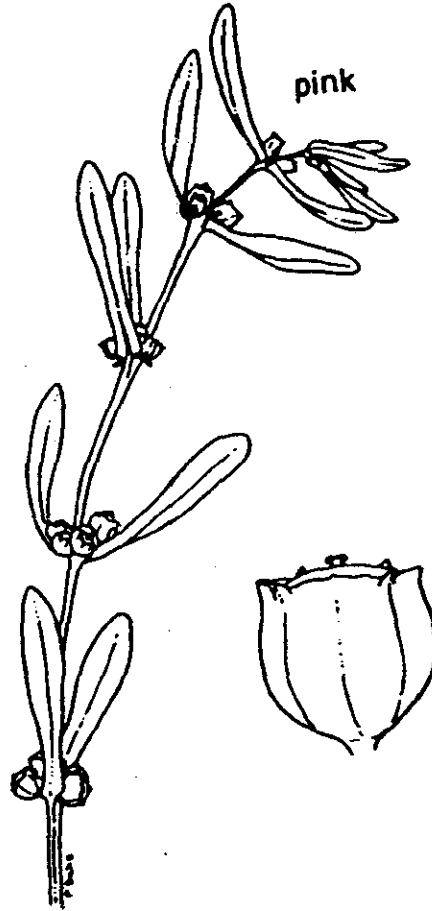
SPECIMEN IN THE NATIONAL ARBORETUM HERBARIUM.

SOURCECODE: 547FRENAMD

DATASENS: BOUNDARIES: PHOTOS: OWNERINFO:
TRANSCRIBR: 87-05-01 RMK CDREV: Y MAPPER: 87-05-27 RMK GC:
UPDATE: 87-06-02 RMK

Appendix 3 – Line Drawings of rare plant species

Ammannia coccinea



Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. *Herbaceous Plants of Maryland*.
Port City Press, Inc. Baltimore, MD

Asplenium pinnatifidum



8. *Asplenium*
pinnatifidum

Source of line drawing:
Gleason and Cronquist, 1991. Illustrated Manual of Vascular Plants of Northeastern
United States and Adjacent Canada, The New York Botanical Garden

Commelina erecta var. *angustifolia*

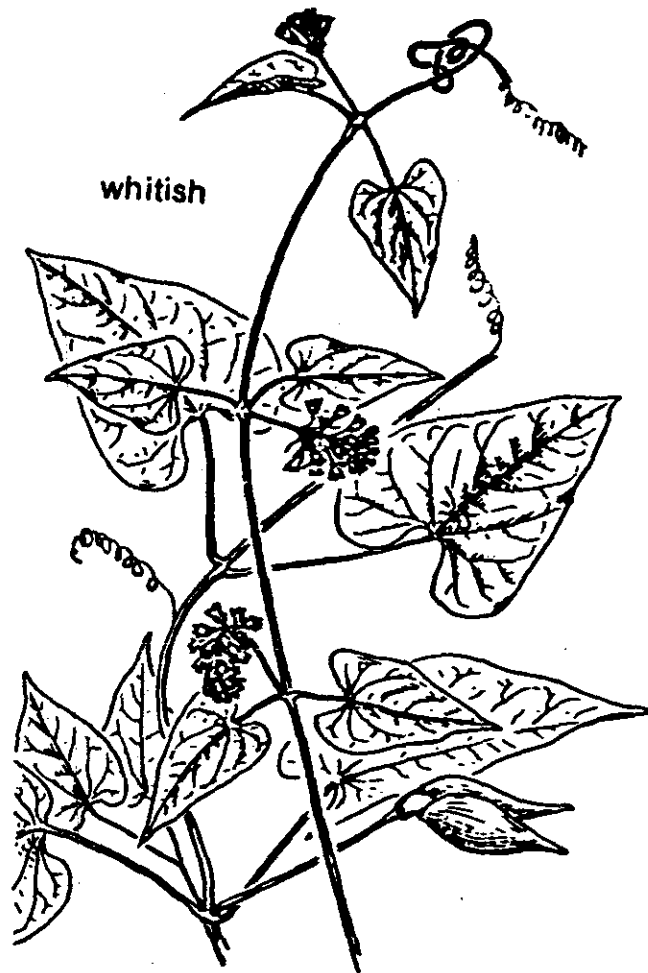


C. erecta

Source of line drawing:

Brown, M. L. and R. G. Brown, 1984. *Herbaceous Plants of Maryland*.
Port City Press, Inc. Baltimore, MD

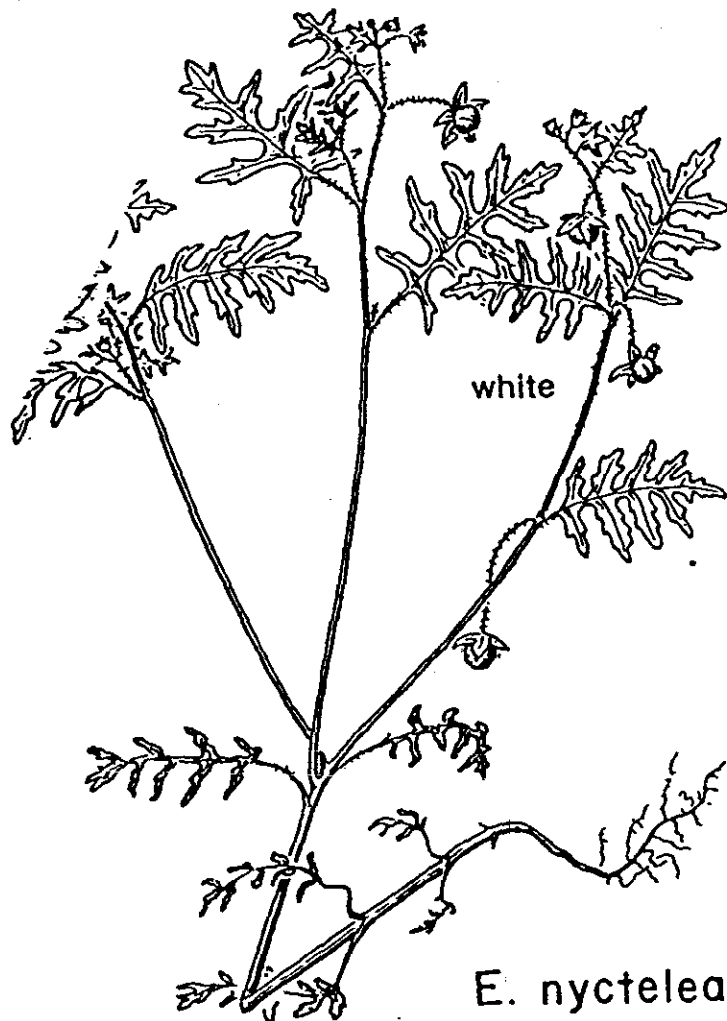
Cynanchum laeve



C. laeve

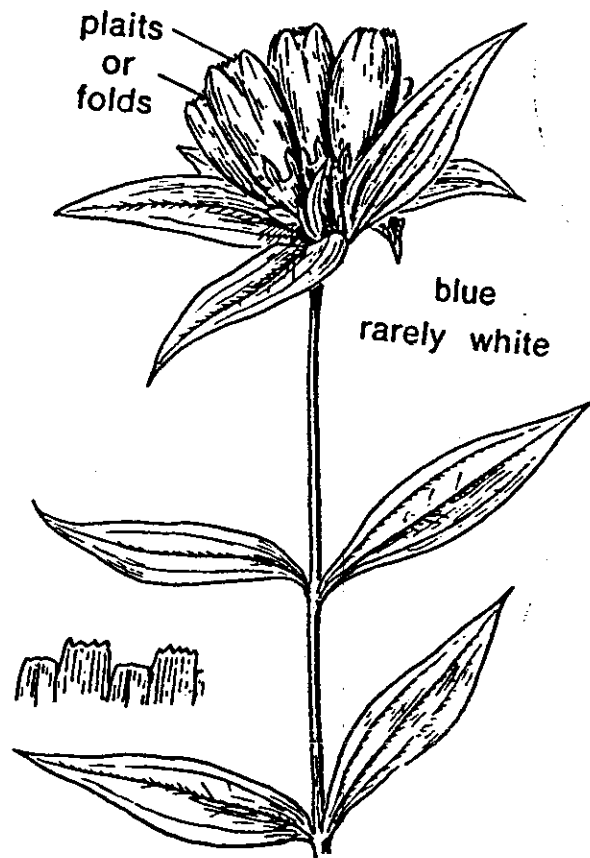
Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. Herbaceous Plants of Maryland.
Port City Press, Inc. Baltimore, MD

Ellisia nyctelea



Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. *Herbaceous Plants of Maryland*.
Port City Press, Inc. Baltimore, MD

Gentiana andrewsii



Source of line drawing:

Brown, M. L. and R. G. Brown, 1984. *Herbaceous Plants of Maryland*.
Port City Press, Inc. Baltimore, MD

Geum vernum



Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. Herbaceous Plants of Maryland.
Port City Press, Inc. Baltimore, MD

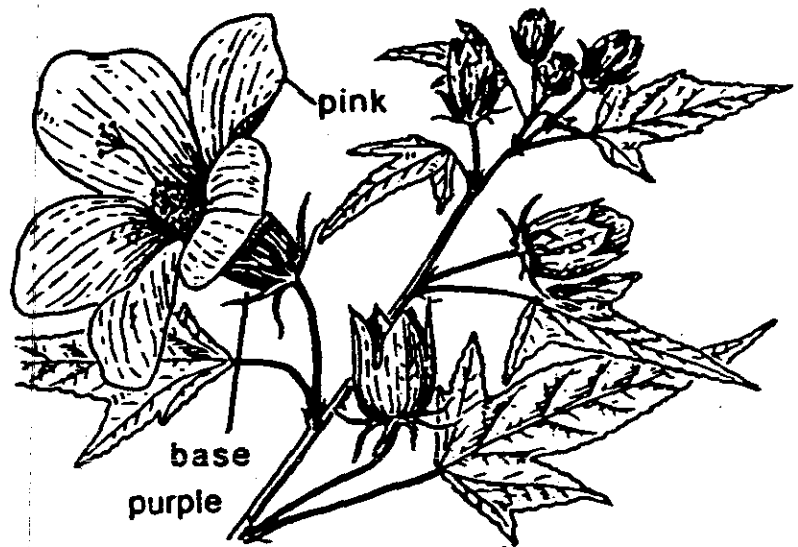
Heuchera pubescens



greenish tinted purple
H. pubescens

Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. Herbaceous Plants of Maryland.
Port City Press, Inc. Baltimore, MD

Hibiscus laevis



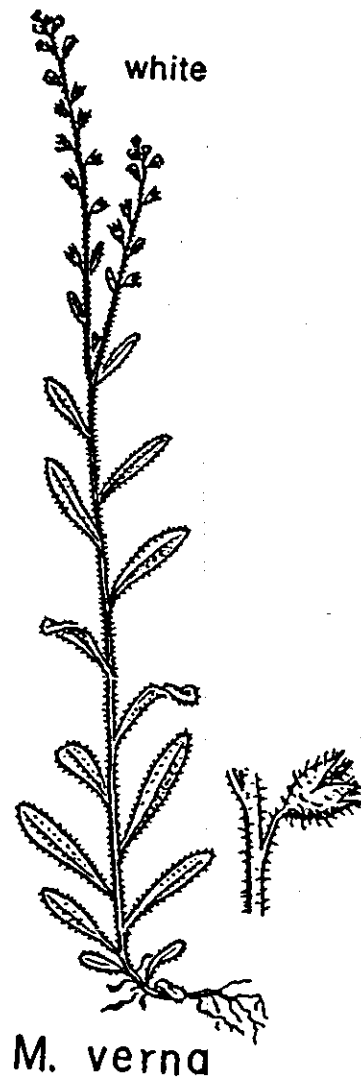
Source of line drawing:

Brown, M. L. and R. G. Brown, 1984. Herbaceous Plants of Maryland.
Port City Press, Inc. Baltimore, MD

Maianthemum stellatum



Source of line drawing:
Gleason and Cronquist, 1991. Illustrated Manual of Vascular Plants of Northeastern
United States and Adjacent Canada, The New York Botanical Garden

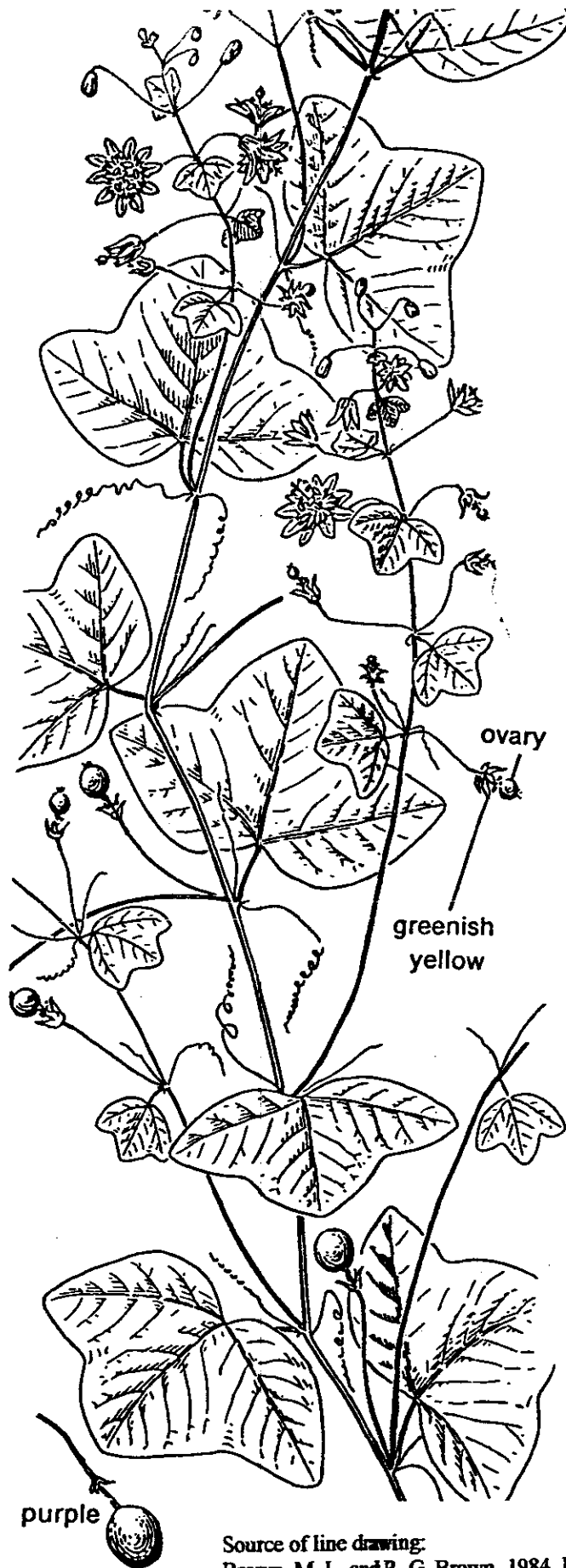


Myosotis verna

M. verna

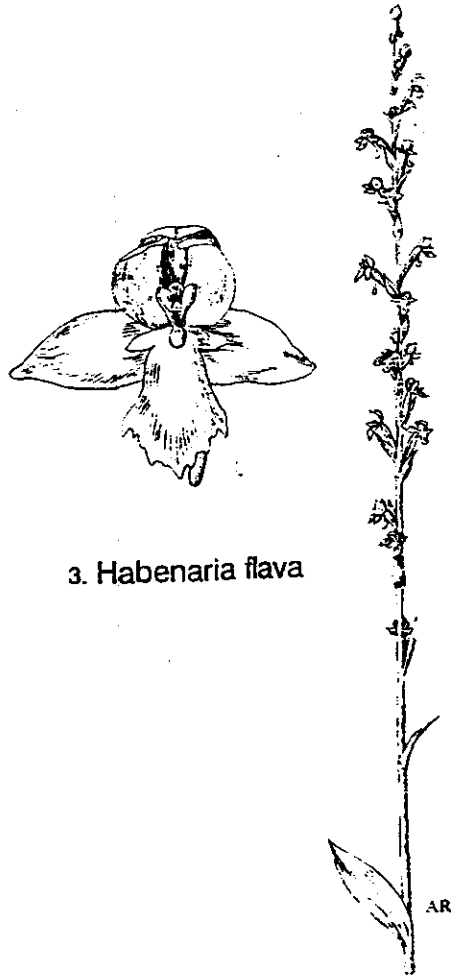
Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. *Herbaceous Plants of Maryland*.
Port City Press, Inc. Baltimore, MD

Passiflora lutea

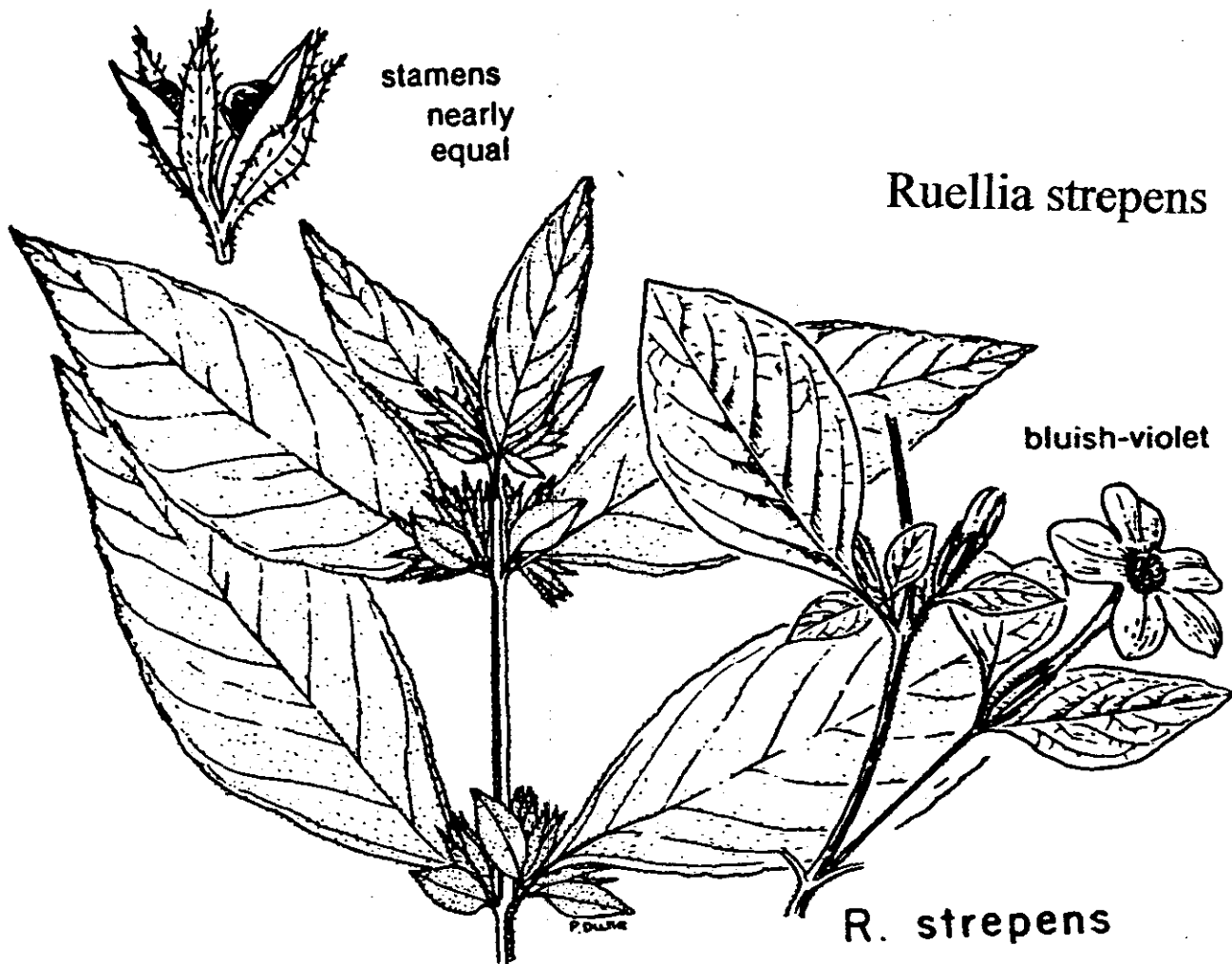


Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. Herbaceous Plants of Maryland.
Port City Press, Inc. Baltimore, MD

Platanthera flava (Habenaria flava)

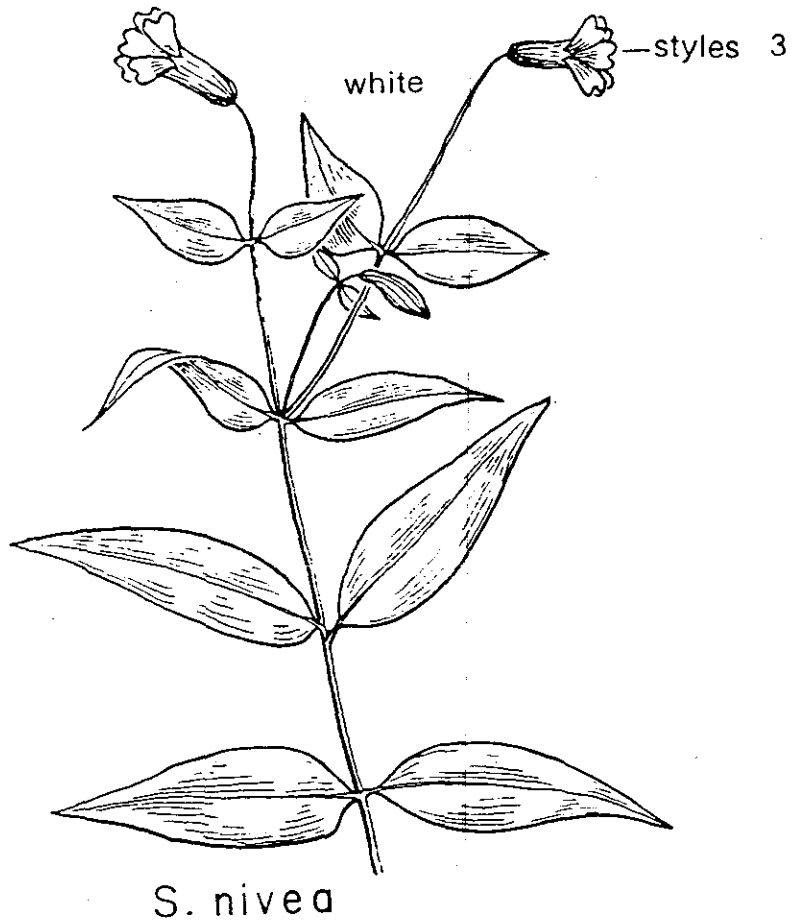


Source of line drawing:
Gleason and Cronquist, 1991. Illustrated Manual of Vascular Plants of Northeastern
United States and Adjacent Canada, The New York Botanical Garden



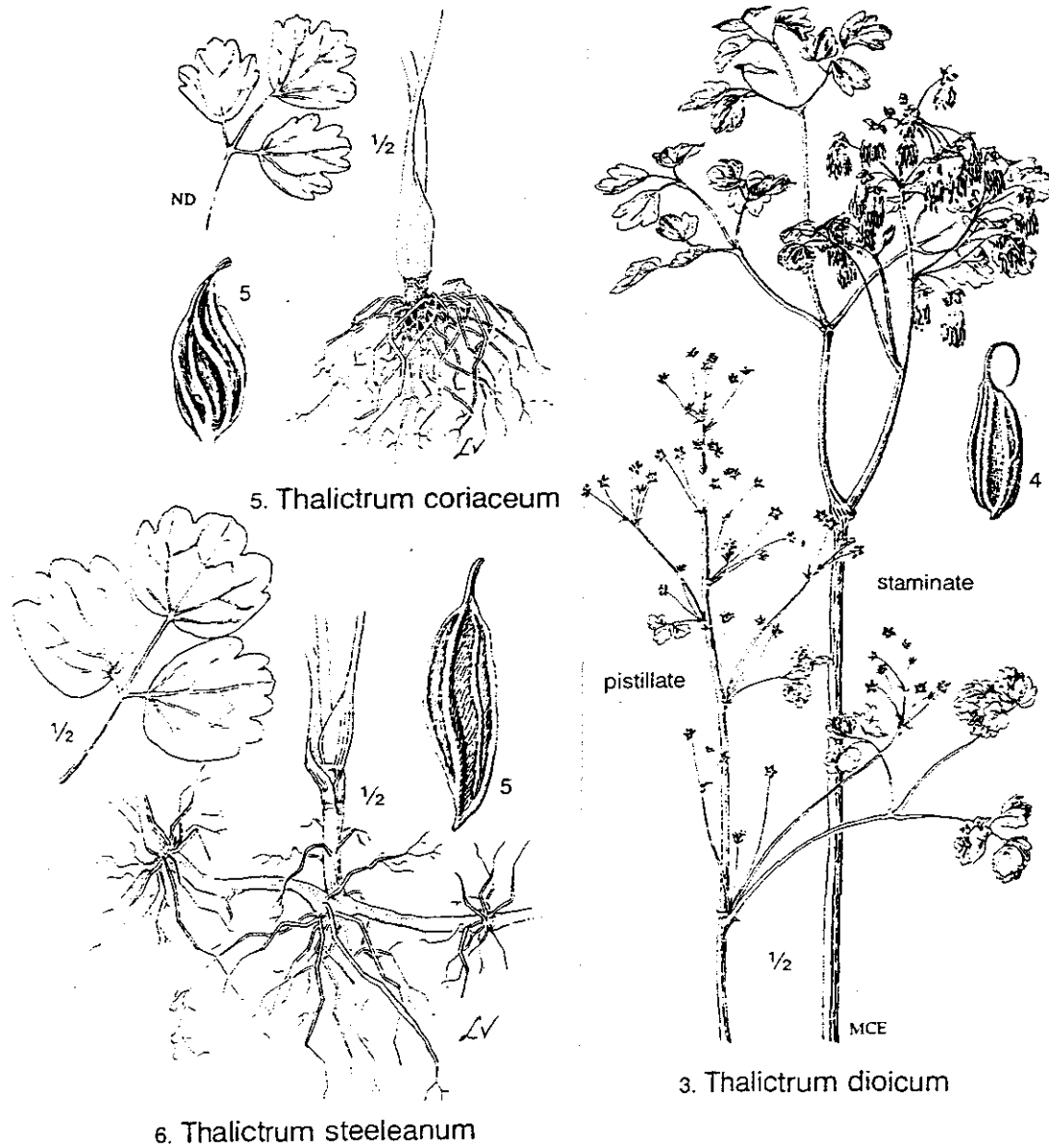
Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. Herbaceous Plants of Maryland.
Port City Press, Inc. Baltimore, MD

Silene nivea



Source of line drawing:
Brown, M. L. and R. G. Brown. 1984. *Herbaceous Plants of Maryland*.
Port City Press, Inc. Baltimore, MD

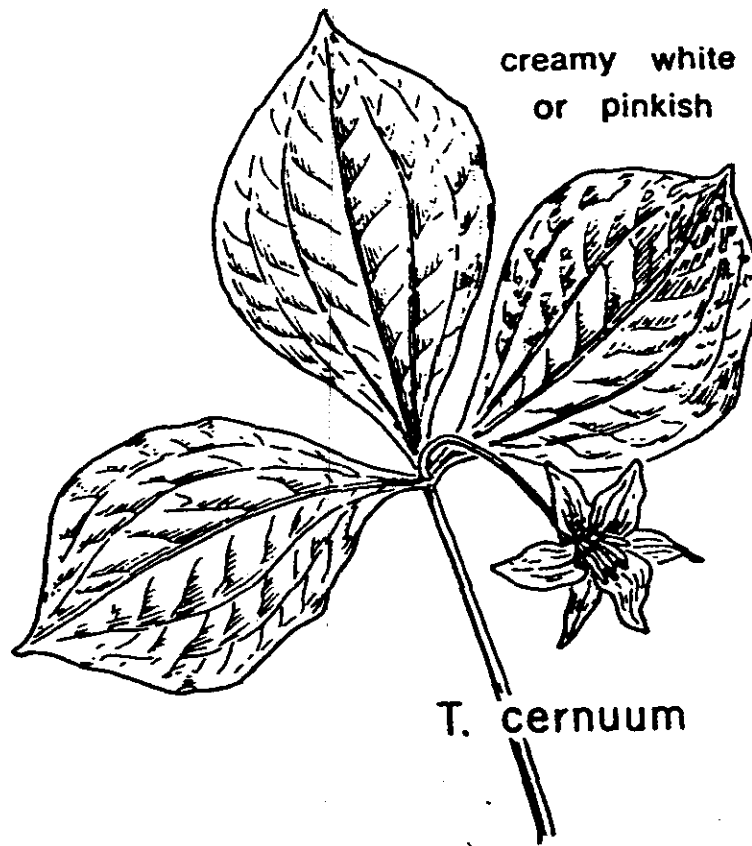
Thalictrum steeleanum



Source of line drawing:

Gleason and Cronquist, 1991. Illustrated Manual of Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden

Trillium cernuum



Source of line drawing:
Brown, M. L. and R. G. Brown, 1984. *Herbaceous Plants of Maryland*.
Port City Press, Inc. Baltimore, MD

Appendix 4 – Slides of rare plant species



Allegheny Woodrat
Neotoma floridana magister

Photograph by Allen H.

The Allegheny Woodrat, *Neotoma floridana magister*, has been a longtime resident of Maryland. Evidence of Woodrat remains have been found in our State dating back over 10,000 years. Not to be confused with introduced Murid (true) rats that are closely associated with human dwellings, the Allegheny Woodrat is most often found in remote areas, living in the rock tunnels associated with cliffs and caves. In the 1950s this species began to experience a range wide decline. Survey evidence demonstrates a population reduction in

State was captured in 1987 and sent to the Baltimore Zoo where a captive breeding program is underway with individuals captured from Maryland's population.

This rare mammal is no longer present in New York and Connecticut and is experiencing a decline in New Jersey, Ohio, Pennsylvania, and Maryland. The cause of the decline is still a mystery. Several single factor theories have been introduced to explain the disappearance, however, the most likely cause seems to be a combination of factors. The Allegheny Woodrat is listed as In Need of Conservation in Maryland.