

COPY

STEWARDSHIP PLAN

For

Greenbelt Homes, Inc. (GHI)

#1 Hamilton Place
Greenbelt, MD 20770



GHI Parcels A, B, C, D, E & 7, L, M, V, W,
in
Greenbelt, Prince George's County, MD.

85.9 acres

Subject to a
Forest Conservation Mangementment Agreement

Prepared by:
H. Stacy Miller and Richard F. Masse, Registered Foresters

January, 1998

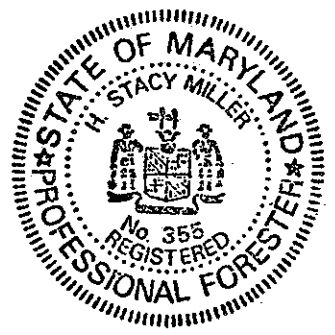


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C:	CFI Plot Location Diagrams
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K:	Lists of Rare, Threatened and Endangered Species of Maryland
L:	Nature Trail Plan
M:	Information About Invasive Species <ul style="list-style-type: none">• Lists of Exotic Invasives that Threaten Maryland Ecosystems• Information on Removal Techniques
N:	Information About Establishing a Fire Emergency Plan
O:	Form for Ongoing Information Collection

FOLDERS: aside from Appendix J (folder containing wildlife information) there are also folders with information for GHI Woodlands Committee Reference: "FOREST MANAGEMENT" and "BIORETENTION, RIPARIAN ZONES, STREAM RESTORATION, STORMWATER MANAGEMENT"

I. INTRODUCTION AND GENERAL DESCRIPTION OF PROPERTY

The subject of this Stewardship Plan is 85.9 acres of woodland owned by Greenbelt Homes, Inc. (GHI) in Greenbelt, Prince George's County, Maryland. The property lies close to the intersection of the Capital Beltway and the Baltimore Washington Parkway. As such, the wooded acreage of GHI provides a well-received noise buffer and aesthetically pleasing setting for its residents. The woodland has been under a Forest Management Plan since the 1970's which qualifies it for an agricultural assessment and therefore a lower tax rate for GHI. Figure 1 is a general location map for the GHI property, while Figure 2 is a larger scale map showing GHI property boundaries and its woodland. Figure 3 is a recent (1993) aerial photograph showing the GHI property and the surrounding area, at the same scale as Figure 2.

The woodland at GHI is composed of several stands of mixed hardwood, nearly all of which are near or at maturity. There are a few small areas where disturbances or mortality has allowed a younger mixed wood stand to emerge. The dominant species are Red Oak, White Oak, Yellow Poplar, Hickory, Black Gum, Sweetgum, and Virginia Pine.

The topography is variable across the stands, with elevations from 140 to 234 feet above sea level. There are several areas of steep or severe slopes, defined as those slopes greater than 15%. Soil types at GHI are generally well-drained, but highly erodible, with clay layers that cause poor drainage in some areas. Where erodible soils occur on steep slopes, or where there is excessive stormwater runoff, some erosional problems have resulted. Figures 9 and 10 are maps of the soils types and slope categories at GHI.

The woodland at GHI is an integral part of the community. The GHI woodlands benefit the local residents in many ways, by providing recreational opportunities, an aesthetic backdrop to living areas, and noise buffering from major thoroughfares. There have been some negative impacts resulting from the close proximity of the woodlands to residents, namely a buildup of yard wastes, and localized invasion of exotic plant species. All these issues will be discussed in detail throughout this report.

II. VISION, MISSION AND GOALS

During several work sessions between the consulting foresters who prepared this Stewardship Plan and the GHI Woodlands Committee, vision and mission statements were tailored to incorporate the ideals the community holds for its woodland with forest management goals.

The Vision

The vision for the GHI woodlands is to provide a peaceful place for low impact and passive recreation, and for learning about and enjoying the natural order of a forest ecosystem in both a local and regional context.

The Mission

The mission is to develop a Forest Stewardship Plan that will guide GHI in achieving their vision through provision of background and technical materials and a schedule of stewardship activities.

Goals

Under the general guidance of the vision and mission statements, the following goals were established. Management recommendations to achieve these goals follow the inventory section.

- 1) To manage for low impact and passive recreation within the woodlands and to maintain the trails
- 2) To control erosion within the woodland, including its trails and streams
- 3) To promote and maintain the health and character of the GHI forest using methods that are ecologically sound and minimally intrusive
- 4) To understand the role of GHI woodlands in the regional ecosystem and foster stewardship partnerships with adjacent owners.
- 5) To maintain and encourage biodiversity of native plant and animal species
- 6) To monitor and learn about the growth and change of the ecological system.
- 7) To promote the knowledge gained about GHI's natural resources and their interrelationships to the community, and to encourage the community's participation in achieving these goals

III. BACKGROUND AND HISTORIC INFORMATION

Brief Overview of Greenbelt History

In the late 1700's, when Bladensburg became a busy port town, the first settlement came to the Greenbelt area in the form of farms carved out of the wilderness. There were several colonial land grants in the area. The area owned by Greenbelt Homes, Inc. was probably part of John Hamilton's 240-acre "Hamilton's Purchase" in 1768. The Hamilton Cemetery, now a historic site, is at the end of Hamilton Place. Prior to European settlement, it is probable that bands of the Piscataway or Susquehanna tribes used the lands. Nearby, in another part of Greenbelt, there was an area called "Indian Springs" which contained springs, extremely old trees and an Indian burial ground. Unfortunately, much of this was destroyed when the Beltway right-of-way was cleared. Further research into the archaeological sites or indicators for GHI lands should be pursued at a later date.

For more than 200 yrs. the predominant land use in the area was agriculture, and the farm owners took their produce by wagon down Edmonston Road to Bladensburg. Tobacco farming in the 18th century was replaced by grains and vegetable crops in the 19th century. Beltsville, with its new rail and road connections replaced Bladensburg as the marketing center for Greenbelt.

Following the Civil War, the population shifted from 30+/- farming families to a variety of residents, including those who were escaping from the city to practice their trades in the countryside, and commuters who worked in Washington D.C. but wanted to live in the country. Trolleys were built from Washington out towards Greenbelt in the early 1900's bringing with them suburban towns along their route. Even so, the land use in what is now Greenbelt remained primarily agricultural, with truck farms, hog farms, and poultry farms. It is not uncommon to find old foundations, burial plots and farmyard trees in the woods of Greenbelt.

Whether it was depleted soil, land speculation or economic conditions, the 1920's and 1930's brought the sale of most of the farms to distant buyers who had no intention of farming the land. Many of the remaining farm families gradually found employment elsewhere and let their farms lay idle. When the Federal government purchased the land that now includes Greenbelt in 1935 and 1936, the area was still rural and agricultural in nature, but declining in productivity and it was ripe for development.

Following the market crash and ensuing economic chaos of the Great Depression, Franklin Delano Roosevelt created new agencies to deal with the national crisis. FDR's Resettlement Administration planned several, but actually only built three "greenbelt" towns, the first of which became Greenbelt, Md. Greenbelt was built by relief workers to provide housing for government-farm research workers and low-income families from the city. The layout of the new city included many unique and aesthetic residential, commercial and municipal spaces, arranged into a "masterful...orderly, tranquil environment" (p.25 of Greenbelt, History of a New Town, 1937-1997). Greenbelt was created as a "premier example of a community planned and administered for the enhancement of wholesome human relationships" (p.12) Indeed, Greenbelt has had an history of active and intense community life since its inception. The development

ideals used to create Greenbelt have carried through to the present:

- utilization of natural contours
- minimization of clearing
- encouragement of community and cooperative spirit.
- inclusion of a greenbelt (1/2-mile wide in the original plans) as a buffer against future haphazard development, to be used for recreation, gardening or expansion by Greenbelt itself.

Greenbelt was federally owned and managed until 1952, when it was sold, along with the vacant land that had not yet been developed. In the early 1940's homes built by the Defense Department, "defense homes", were constructed in rapidly expanding Greenbelt. In the remaining war years, and into the 1950's, there was a great deal of political activity and land transferring in Greenbelt. Most of Greenbelt was sold to a cooperative housing organization. Several local housing cooperatives came and went, and in 1953, most of the residential community was sold to Greenbelt Veterans Housing Corporation (GVHC). The rest of the town, including many acres of undeveloped land was not purchased by the coop. This acreage changed hands many times, but was never developed. In 1957 the GVHC changed its name, and also its policies, resulting in the new Greenbelt Homes, Inc. (GHI)

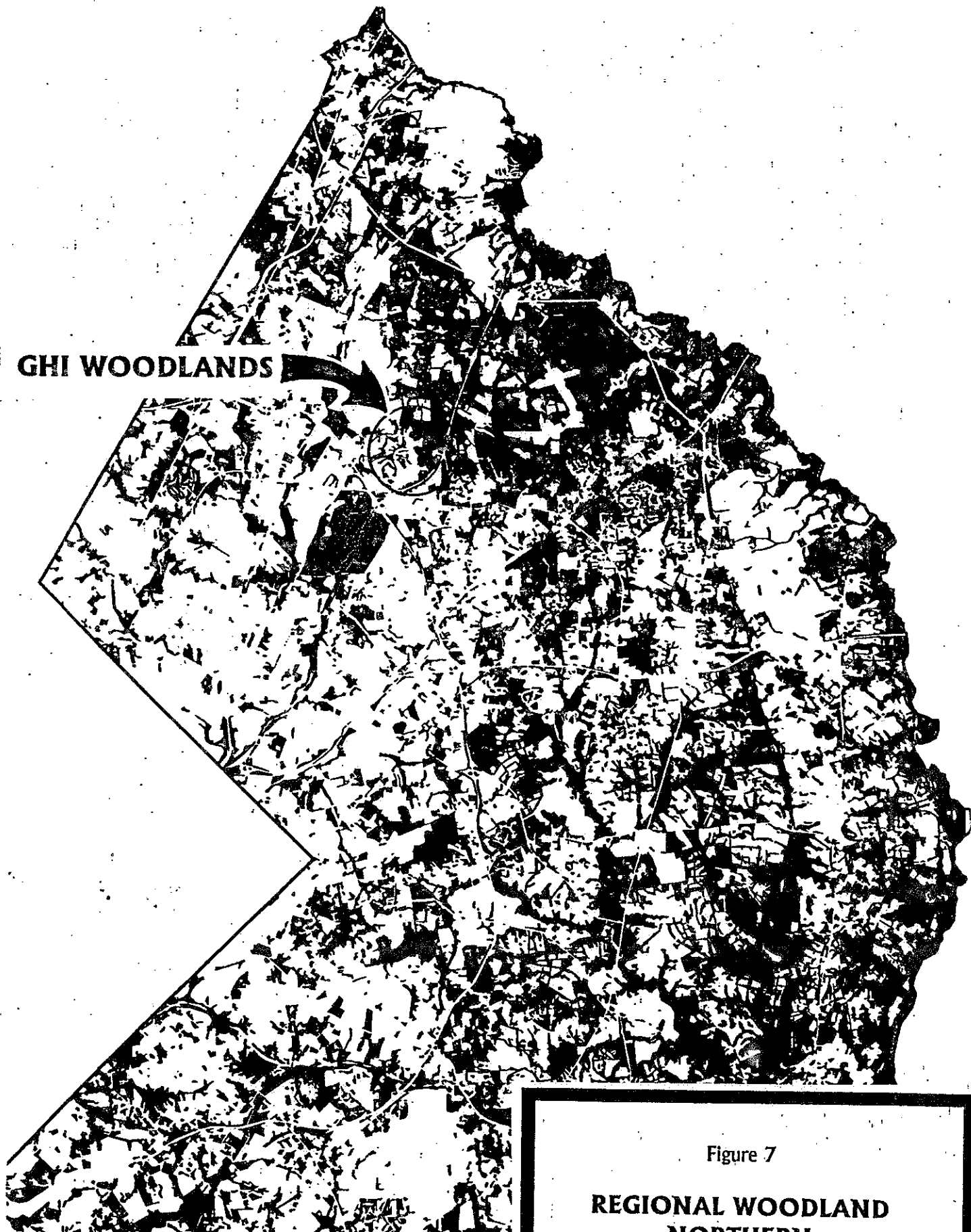
Among the many residential and open space holdings, GHI also owns and manages woodland 85.9 acres of which are the subject of this stewardship plan. Through the years, the people of the GHI community have "demonstrated their commitment to the green towns concept and their willingness to preserve and maintain the original design" (p.255 epilogue). This ideal has been incorporated into the Forest Stewardship Plan.

Land Use in General Area

Historically, the areas of GHI which are now wooded have remained wooded since at least the 1930's, as illustrated by Figure 4, a photocopy of 1938 aerial photography with the current GHI property boundary. Similarly, Figures 5 and 6, which are copies of 1952 and 1965 aerial photography, respectively, show the same thing. Comparison of these historic photos to the 1993 photo in Figure 3 reveals that the wooded area surrounding GHI has also remained mostly undeveloped. The 1938 photos seem to show harvesting activities on the Beltsville Agricultural Research Center (BARC) north of Stand 1. As an interesting aside, a 1935 map of the area (reproduced from Greenbelt, History of a New Town) shows "Iron Mine Park Land" in Stand 1, although no evidence for the source of the label was found.

Although there are roads that separate Stands 1-4, the canopy is connected, for all intent and purpose, resulting in a fairly large contiguous woodland. (See photo below showing Stands 2 and 3, separated by Northway) In turn, the GHI woodland is part of a large regional woodland that includes woodland ownership by BARC and the City of Greenbelt (see Figure 2). As a recommendation for the stewardship plan, GHI should pursue common stewardship goals and strategies with these owners. The City of Greenbelt has been exploring the possibility of preserving its woodland in a conservation easement. To illustrate the importance of preserving the GHI/Greenbelt/BARC woodland in a regional context, reference is made to Figure 7, a map showing the woodland in the north part of Prince George's County.

The historic photos show the great increase in land development in areas of GHI and Greenbelt that are adjacent to the woodland. The cumulative effects of development have impacted the woodlands in many ways, such as increased stormwater runoff from impervious surfaces, increased recreational use, and the introduction of yard wastes and exotic plant species.

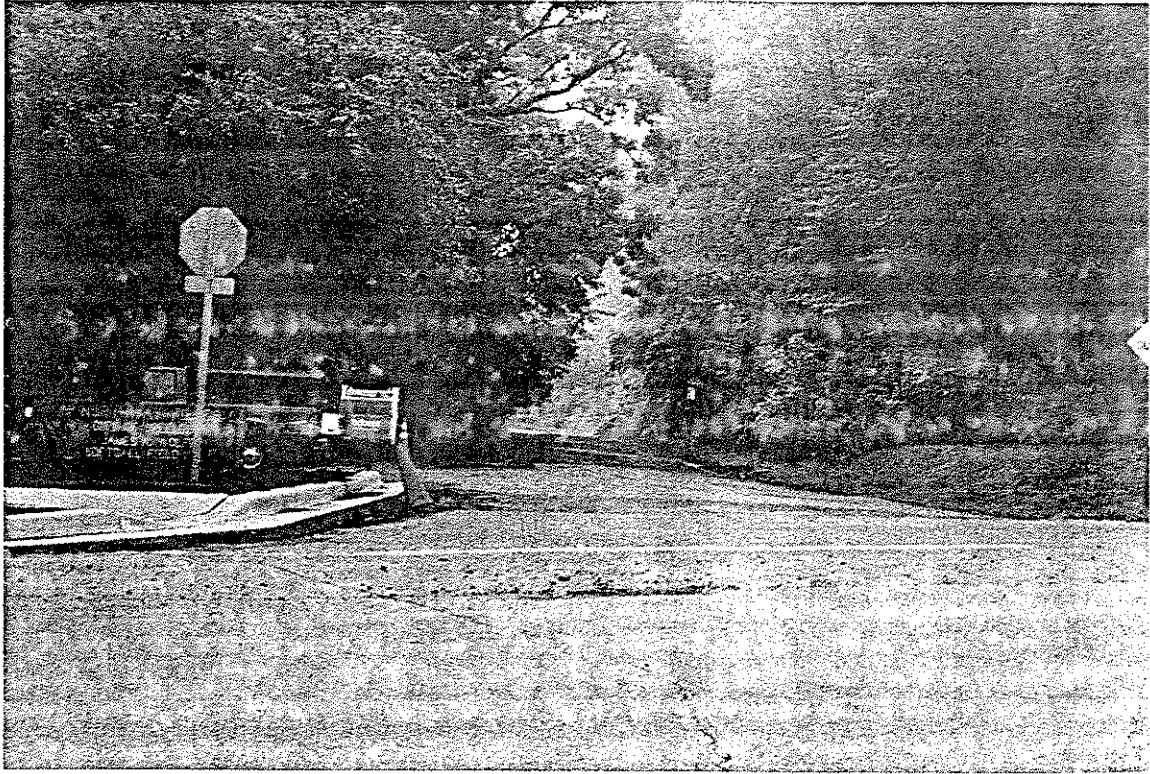


GHI WOODLANDS

Figure 7

**REGIONAL WOODLAND
NORTHERN
PRINCE GEORGE'S COUNTY**

Stands 2 and 3, separated by Northway



Past Management Plans and Activities:

Greenbelt Homes, Inc. (GHI) is currently operating under an approved Forest Resource Conservation Plan (FRCP) which was prepared by the Maryland Forest, Park and Wildlife Service of the Maryland Department of Natural Resources (Appendix A). Based on the creation and maintenance of the Forest Resource Conservation Plan, GHI signed a Forest Conservation Management Agreement (FCMA) with the State of Maryland which 1) ensures that GHI's forest land will remain forested under a 15-year conservation easement, and 2) allows the forest land to be taxed using Prince George's County agricultural assessment, resulting in significant tax savings to GHI. GHI has been a participant in the FCMA program since the 1970's.

In the spring of 1996, GHI began an active process to revise their current FRCP to more clearly reflect their goals and objectives for their woodland. The current plan will expire on February 3, 1998. If a revised plan is prepared and approved by that time, it will replace the current plan and a new FCMA agreement can be executed based on the revised plan. The revised management plan will be called a "Stewardship Plan" to be compliant with recent revisions to the State program. The following table summarizes the history of GHI's involvement with the FCMA program.

<u>Date</u>	<u>Item</u>	<u>Acreage involved</u>
07-26-72	Forest Management Plan	26.0 acres
07-26-72	Forest Management Plan	56.5 acres
11-30-73	FCMA signed for 5 years	56.5 acres
02-26-74	FCMA signed for 10 years	26.0 acres
07-25-75	Nature trail report prepared	26.0 acres
06-09-76	FCMA inspection done; very little work reported	56.5 acres
06-07-78	Following FCMA inspection, 2.5 acres removed from program	56.5 acres
06-07-78	Forest Management Plan for remaining acreage	54.0 acres
07-21-78	FCMA inspection; added 2.5 acres	26.0 acres
08-08-78	Revised Forest Management Plan for total acreage	28.5 acres
05-26-80	FCMA renewed for 10 years	54.0 acres
06-30-80	FCMA inspection; everything okay	54.0 acres
06-30-80	FCMA inspection; reported no work on trail, GHI warned about termination of FCMA	28.5 acres
05-26-81	FCMA inspection; reported lack of compliance; FCMA terminated	28.5 acres
08-24-81	FCMA inspection; reported everything okay	54.0 acres
11-10-81	FCMA Amended to revise management practices schedule	54.0 acres
03-28 82	Forest Management Plan prepared	28.5 acres
02-03-83	New FCMA signed for 15 years (expires 02-03-98)	28.5 acres
02-09-88	FCMA inspection; reported everything okay	28.5 acres
10-28-90	Forest Management Plan prepared for total acreage	82.5 acres
10-28-90	FCMA inspection	28.5 acres

10-28-90	FCMA amended to combine acreage (expires 02-03-98)	82.5 acres
July, 1991	GHI established a Woodlands Committee	
01-02-92	Updated Forest Management Plan schedule of management practices (see Appendix A)	82.5 acres
03-10-92	Letter from Donald MacLauchlan (MDNR) about revising the Forest Management Plan; State Foresters prepare draft plan	82.5 acres
Mar.-Apr.92	Discussions between GHI and MDNR regarding Management Plan and community goals/objectives. GHI Woodland Committee rejects the revised Forest Management Plan dated 1992	82.5 acres
09-30-93	FCMA inspection; reported lack of compliance; instituted yearly inspections	82.5 acres
11-17-94	FCMA inspection; reported some compliance; recommended continuing yearly inspections	82.5 acres
1995	Steve D'arcy from Prince George's Co. Soil Conservation District conducted a site visit to assess stormwater runoff problems	
08-15-96	Letter from General Manager of GHI to MDNR affirming that the FCMA would be honored, and that the management plan was under revision	82.5 acres
09-04-96	GHI under new management; Forest Management Plan referred to consulting foresters	
10-17-96	FCMA inspection; reported compliance to a limited extent and recommended more on-the-ground work	82.5 acres

Some of the areas of previous silvacultural treatments were observed and inventoried during the fieldwork for this revised stewardship plan. These areas will be discussed under the appropriate stand description sections.

IV. INVENTORY

A woodland is a dynamic living and changing ecosystem comprised of many natural resources. The characteristics of each forest stand were used to assess the condition of the existing woodland, and to establish a baseline of ecosystem information. The inventory to date is composed of an in-depth review of forest stand features and a collection of general information regarding other natural resources. We encourage GHI to continue the inventory of baseline information as expertise within the community becomes available.

A. FOREST STANDS

In the previous management plans, the woodland had been divided into 6 forest stands. These stand boundaries were also used for this stewardship plan to facilitate comparison between plans. The definition of a forest stand in Working with your Woodland (p.91) is:

“A stand is a contiguous area where the species, size, age, and general condition of the trees is uniform enough to be distinguished from adjacent areas.”

In reality, the stands at GHI are sometimes more distinct by their geographic position rather than by their particular forest features. Although this phenomenon causes less statistical confidence than could otherwise be achieved, due to increased variability across a stand, maintaining the geographical stand boundaries allows for easier division of management activities and comparison to past plans. To compensate for the variability, a fixed radius plot was used for sampling the woodland, and a greater number of sample points were installed than usual. The forest stands were inventoried between April and August of 1997.

There are some small wooded areas at GHI that are not part of this plan, but might be considered as possible additions to the plan in the future. In particular, parcels X and U contain 1-2 acre patches of isolated woodland. Depending on their use and condition, these stands may not be worthy additions to the stewardship plan. However, there is a 3.7 acre stand west of Ridge Road between Hamilton Place and Gardenway that should be considered.

The measured areas for the 6 stands that are subject to this stewardship plan do not totally agree with those listed in previous plans. Aside from differences that can be attributed to variations in measuring techniques, acreages for stands 1, 4, and 5 are particularly different, by +5.1, -3.8 and +2.0 acres respectively, bringing the total woodland acreage (that is subject to the stewardship plan) to 85.9 acres. MDNR has agreed to revise the FCMA to reflect this acreage.

Sampling Procedure

There were two kinds of inventory plots used for data collection. One permanent plot, called a “Continuous Forest Inventory Plot” (CFI) was installed in each stand, except for Stand 1, in which 2 CFI plots were installed, due to the large size of the stand. Non-permanent sample points were also installed in each stand. The number of these sample points was based on the size of the stand. There was a total of 26 plots overall, or about 1 plot for 3.3 acres. Figure 11 is the “cruise map” for the forest inventory. It shows the 6 forest stands and the location of both the CFI plots and the sample points.

1) Sampling of Continuous Forest Inventory (CFI) Plots

In order to study and monitor the dynamics of the woodland in the future, CFI plots were installed in each stand. These plots were 1/10-acre in size. Detailed information was collected within each plot and recorded on specially designed CFI data collection sheets. A copy of the 2-page data collection sheet is included in Appendix B.

Each CFI plot center was marked with a metal post and an aluminum identification tag. Each tree within the 1/10-acre plot was marked with an aluminum tag and a particular number. The trees were numbered in sequence in a clockwise sweep. The plot centers were located at the intersection of lines between 4 of the numbered trees, so that the plot centers could be reinstalled if necessary. The procedure for installation of each CFI plot is described in Figure 12. Location diagrams were created for each plot, so that the plots could be found for future inventory and monitoring activities. Copies of these maps are in Appendix C.

For each CFI plot, the following information was collected:

Individual trees:

- tree species and DBH of every tree greater than 3" DBH
- crown position, soundness, vigor, pests/disease, and wildlife value were evaluated and recorded for each tree
- tree height was measured for 2-3 representative trees in each plot

Regeneration plot:

- notation of which quadrants were measured (generally, the NE and SW quadrants)
- species and number of tree seedlings, woody plants, herbaceous plants and other plants
- the % and major components of downed woody debris, herbaceous cover, invasive cover, and canopy cover within the regeneration plot frame
- miscellaneous remarks

General plot characteristics:

- crown closure
- # dead trees
- successional stage
- basal area using BAF 10 prism
- estimates of degree of slope and aspect
- specimen trees on or near plot
- list of species in the overstory, understory, herbaceous layer and seedling/shrub layer (the most frequent species are marked with an underline on the tally sheets)
- invasive species and % coverage
- general comments about the plot and environs

An explanation of terms and measurement procedures is included as Appendix D. The tally sheets with the recorded CFI plot data is in Appendix E.

Figure 12:

INSTALLATION PROCEDURE FOR CONTINUOUS FOREST INVENTORY PLOTS

Materials

Pail to carry materials	Regeneration plot frame
Compass	ID books
Map(s)	Ribbon and Sharpee marker
D-Tape (to measure tree diameters)	37.2 foot line (radius of 1/10-ac. plot) with stake
Tally sheets on clipboard	Camera
Permanent plot stakes	Permanent plot labels
Numbered tree tags - numerical order	Hammer and nails
Retractable tape to clip to belt	Basal area prism
Pencils with erasers	Ruler for map measurements
Clinometer for tree ht. measurement	Bug dope

Procedure

1. Locate plot center by crossing tape and line between 4 trees. Note which 4 trees were used for future reference.
2. Run out 37.2 foot line on magnetic north. This is the radius of the 1/10-acre plot.
3. Lay out and tally regeneration plot(s). Lay out from plot center in due north direction and then another true south. Sample northeast and southwest quadrants or note which 2 quadrants tallied. (Note: tally person should stand away from plot center)
4. Starting at due north tally all trees, by nailing numbered tags on trees, with the nail exactly at D.B.H. To find D.B.H. use regeneration plot stick, which is 4.5' long.
5. Tally specific information on tally sheet for all trees > 3"D.B.H.. Go in a clockwise direction, starting with tree #1.
6. Measure heights of representative trees. (2-3 trees in Dominant/Codominant category)
7. Record the rest of the general plot / stand data, noting slope, aspect, wildlife, trash, invasive species, disturbances, etc. Take photos.

2) **Sampling of Non-Permanent Sample Points**

A total of 19 sample points were used to collect representative data from the 6 forest stands. Again, 1/10-acre fixed radius plots were used, so that the data could be combined with the data from the CFI plots for statistical analysis. The information collected from the sample points included:

- tree species and DBH of every tree in the plot
- crown closure
- # dead trees
- successional stage
- basal area using BAF 10 prism
- estimates of degree of slope and aspect
- specimen trees on or near plot
- list of species in the overstory, understory, herbaceous layer and seedling/shrub layer (the most frequent species are marked with an underline on the tally sheets)
- invasive species and % coverage
- general comments about the plot and environs

The tally sheets with recorded data for the sample points is in Appendix F. The processed inventory data is presented in table format in Appendix G. It was processed using the Northeast Forest Experiment Station computer program for forest inventory "SILVAH." The inventory data for each stand is discussed in detail in the next chapter.

B. SOILS

Within a woodland, the productivity, mix of species, and susceptibility to erosion are all affected by the types of soils that are present. For example, the amount of moisture a soil retains directly affects the water available to trees and other plants. The amount and frequency of drying and wetting also affects the availability of water. Each tree and plant species has particular tolerances to the physical and chemical composition of the soils in an area. For example, Red Maple is quite tolerant of wet conditions and is often found in floodplain and wetlands where species requiring well-drained soils, such as Red Oak, would rarely occur. Pines, azaleas, and blueberries often occur where soil pH is more acid, and the texture is sandy. The aspect of a slope, given the same soil type, can also affect the type of woodland present. Slopes facing south are more prone to drying conditions from the sun.

The soil types occurring on GHI woodlands, based on the 1969 Prince George's County Soil Survey are listed below by forest stand. A brief discussion of the general soil series follows. Figure 8 shows the soil types in relation to the forest stand boundaries.

Stand 1

CdC2: Christiana fine sandy loam, 5 to 10 % slopes, moderately eroded

StB2 : Sunnyside fine sandy loam, 0 to 5 % slopes, moderately eroded

StC2: Sunnyside fine sandy loam, 5 to 10% slopes, moderately eroded

StD2: Sunnyside fine sandy loam, 10 to 15 % slopes, moderately eroded
SwB: Sunnyside-Urban land complex, 0 to 5% slopes
SwC: Sunnyside-Urban land complex, 5 to 15% slopes

Stand 2

StC2: Sunnyside fine sandy loam, 5 to 10% slopes, moderately eroded
Bo: Bibb silt loam

Stand 3

CcC3: Christiana clay, 5 to 10% slopes, severely eroded
StC2: Sunnyside fine sandy loam, 5 to 10% slopes, moderately eroded
SwB: Sunnyside-Urban land complex, 0 to 5% slopes
SwC: Sunnyside-Urban land complex, 5 to 15% slopes

Stand 4

BIA: Beltsville silt loam, 0 to 2 % slopes
StB2: Sunnyside fine sandy loam, 0 to 5 % slopes, moderately eroded
StC2: Sunnyside fine sandy loam, 5 to 10% slopes, moderately eroded

Stand 5

BmB: Beltsville-Urban land complex, 0 to 5 % slopes
BmC: Beltsville-Urban land complex, 5 to 15 % slopes
CdC2: Christiana fine sandy loam, 5 to 10 % slopes, moderately eroded
CdD2: Christiana fine sandy loam, 10 to 15% slopes, moderately eroded
CeD2: Christiana silt loam, 10 to 25 % slopes, moderately eroded
KpB2: Keyport silt loam, 2 to 5 % slopes, moderately eroded

Stand 6

StC2: Sunnyside fine sandy loam, 5 to 10% slopes, moderately eroded
StE: Sunnyside fine sandy loam, 15 to 30% slopes
SwB: Sunnyside-Urban land complex, 0 to 5% slopes
SvD3: Sunnyside sandy clay loam, 10 to 15 %, severely eroded

The Sunnyside soils series are deep well-drained soils with moderate infiltration rates. They developed in fine sandy sediments and often contain reddish clays. Sunnyside soils are sandier and more red in color than the Christiana soils often found nearby. They have historically been good soils for agricultural activities, and generally support woodland species such as upland oaks and other hardwoods, and Virginia Pine. There are no restrictions imposed by these soils for most activities, except moderate erosional tendencies on slopes. As slopes exceed 10% gullies begin to form, and vegetative cover, such as woodland is recommended to stabilize the soils.

The Christiana soils series consists of deep well-drained silt loams, clays, and fine sandy loams, that often display low infiltration rates when thoroughly wetted, due to layers of clay sub-

soils that impede the downward movement of water. The clays are very old reddish clays that can have a very high shrink-swell potential. They can be quite hard and impermeable when dry, or very plastic when wet. The Christiana soils are also highly erodible, and disturbance to areas where slopes are greater than 10% should be avoided. Deep gullies are often found with the Christiana soils. Typically, native woodland supported by these soils are upland hardwoods (especially oak) and Virginia Pine.

Beltsville soils are moderately well-drained, but often have a fragipan or impermeable intrusion that causes a perched water table and impeded drainage. It is known locally as "hardpan" or "foolish earth." The Beltsville soils formed in silty to sandy materials that were probably deposited by winds on top of old sandy/gravelly alluvium. Historically, they have been important for farming and development, but have been difficult to manage. The native tree species occurring on Beltsville soils are generally mixed hardwoods and Virginia Pine. These soils are also highly erodible, and should not be disturbed on slopes.

There is only one small area of **Keyport soil** in Stand 5. Keyport soils are deep, moderately well-drained, and highly erodible soils. They may exhibit a seasonally high water table and impeded drainage due to their development from Coastal Plain clays. Both rapid surface runoff on the top of the clays and erosional gully formation are typical.

Stand 2 contains an area of the **Bibb soil series**. These are deep, level, poorly drained soils along floodplain and streams, as is the case in Stand 2. The Bibb soils formed from materials washed from silty and sandy uplands and deposited along streams and drainage ways. These soils are "hydric", with very low infiltration rates and high runoff potential. They display high water table, flood hazard, and poor drainage. Native woodland on the Bibb soils are maple, gum, oak and other water tolerant hardwoods.

C. TOPOGRAPHY AND SLOPES

Elevations at GHI range from 140 to 234 feet above sea level. Figure 9 is a topographic map for GHI. It includes 5-foot contour intervals, and also shows the woodland and streams. From this topographic information a map showing slopes greater than 15% was generated (Figure 10). Slopes that exceed 15% are viewed as "steep and severe" slopes in Prince George's County. Disturbance to these areas should be avoided, such as for trails, especially where erodible soils occur. Vegetative cover should be maintained in these areas.

D. OTHER WOODLAND ELEMENTS

1. Biodiversity

The concept of biodiversity is basic to this management plan and represents a theme that is carried out in the goals and objectives listed in the document. Many definitions of biodiversity can be found in modern literature. The definition for this plan comes from a book entitled "Saving Nature's Legacy" by Reed F. Noss and Allen Y. Cooperrider (1994). It states:

"Biodiversity is the variety of life and processes. It includes the variety of living

organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting".

Just the mere presence or absence of species, plants, animals, insects, etc., is not as important as having a "native" biodiversity. The authors mentioned above consider exotic species introduced by humans as contributing nothing to biodiversity, and cause communities to lose their distinctive characteristics (pg 4). In many cases, exotics are introduced, invade an ecosystem, and take vital nutrients, sunlight, and water from native plants thus impacting the system in a negative manner.

The reasons for maintaining biodiversity are many, but essentially the primary rationale is to reduce the continuing and staggering loss of species around the world that are critical to our human existence. As more and more land areas undergo development, burning, soil loss due to erosion, over grazing, clearcutting, and other pressures brought on by mankind, we continue to lose our environment as we once knew it. It is a fundamental obligation for our generation to begin to turn the tide of these losses and protect our future generations. Biodiversity values go beyond the idea of "it's just nice to have and think about" when one considers the medicinal, and other products biodiversity provides.

GHI lands, albeit small, represent a portion of a larger ecosystem that includes adjacent lands and thus become an important link in the overall scheme of things. The character of GHI lands have not changed much in the recent past as there has not been a lot of alteration caused by timber harvesting, thinning, fire, or development. Although there has been some disease and insect infestations, these are to be considered normal and can have a positive influence on species diversification and overall stability.

2. Native Plants

The preservation of native plants is an important element of biodiversity. These are the plants that are best suited to the particular physical characteristics of land. Reference is made to Appendix H for an in depth discussion of the definition and value of native plants in the landscape contained in the publication "Native Plants of Prince George's County, Maryland." The plant list has been extracted from this publication and a checklist column has been added for GHI. This is also in Appendix H. Native plants encountered during the inventory have been check-marked. As more plants are encountered during the ongoing stewardship activities, they should be checked off as well.

During the inventory work at GHI to date, the population of native plants was found to be healthy and diverse in the forest stands. There were no non-native trees tallied on any of the plots, and very few, if any, non-native trees within the interior of stands. However, there are non-native trees on the edges of the woodlands in places. These species, especially the exotic invasives such as the "Tree of Heaven" should be removed and replaced with vigorous native species before they invade the native ecosystem. In general, the non-native species classified as "invasive exotics" can wreak havoc on the delicate balance of an ecosystem by outcompeting native species.

Although the non-native invasive tree population is low at GHI, this is not true for the vine and herbaceous plant population. Exotic invasives such as English Ivy, Day Lilies, Japanese Honeysuckle, Barberry, Wisteria, and Bamboo have invaded and replaced native plants in several areas on the woodland edge. These species have escaped from adjacent yards through their tenacious "runner" root systems, or simply from discarded yard wastes. Birds have also played a role in dispersing seeds from exotic plants.

As a point of interest, the use and transplantation of native plants is not a new concept in Greenbelt. The following page shows the use of native trees in the original development. The trees were transplanted during construction and a native tree nursery was also established.

3. Old Growth Forest Concept

By its true definition, there is no large area of old growth forest at GHI. A true old growth forest would be a "virgin" forest that has never been altered by humans. Nonetheless, when a forest maintains its natural climax state for many years, it establishes a complete life cycle in which nutrient loss and death roughly equal the nutrients and life entering the system. This fully-developed complex climax state is what ecologists call "old-growth." Generally, an old growth forest would take 500+/- years to attain this equilibrium. There could be pockets of GHI woodlands that are approaching this status in certain small areas that were never farmed or harvested.

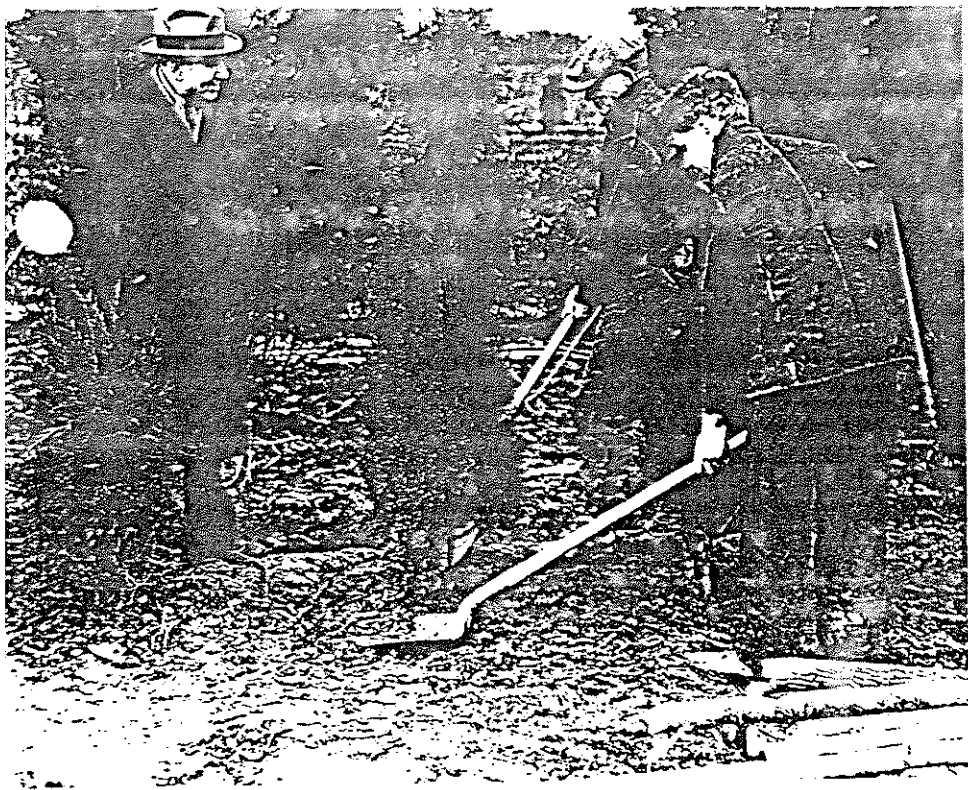
The characteristics of a old growth forest include:

- larger diameter trees of climax species
- a fair amount of standing dead trees and downed woody debris
- an uneven canopy with gaps
- a diversity of tree sizes
- a forest floor that has a variety of light, moisture and temperature conditions, but is generally cooler and more moist than younger stands, and contains a thick organic layer
- a great diversity in forest structure
- pit and mound topography
- presence of certain wildlife species
- exceptional aesthetic value

It would be a valuable exercise for GHI representatives to visit the Belt Woods with someone from the Maryland Natural Heritage Program. This is the best example of old growth forest for Prince George's County. Reference materials about old growth forests are included in Appendix I.

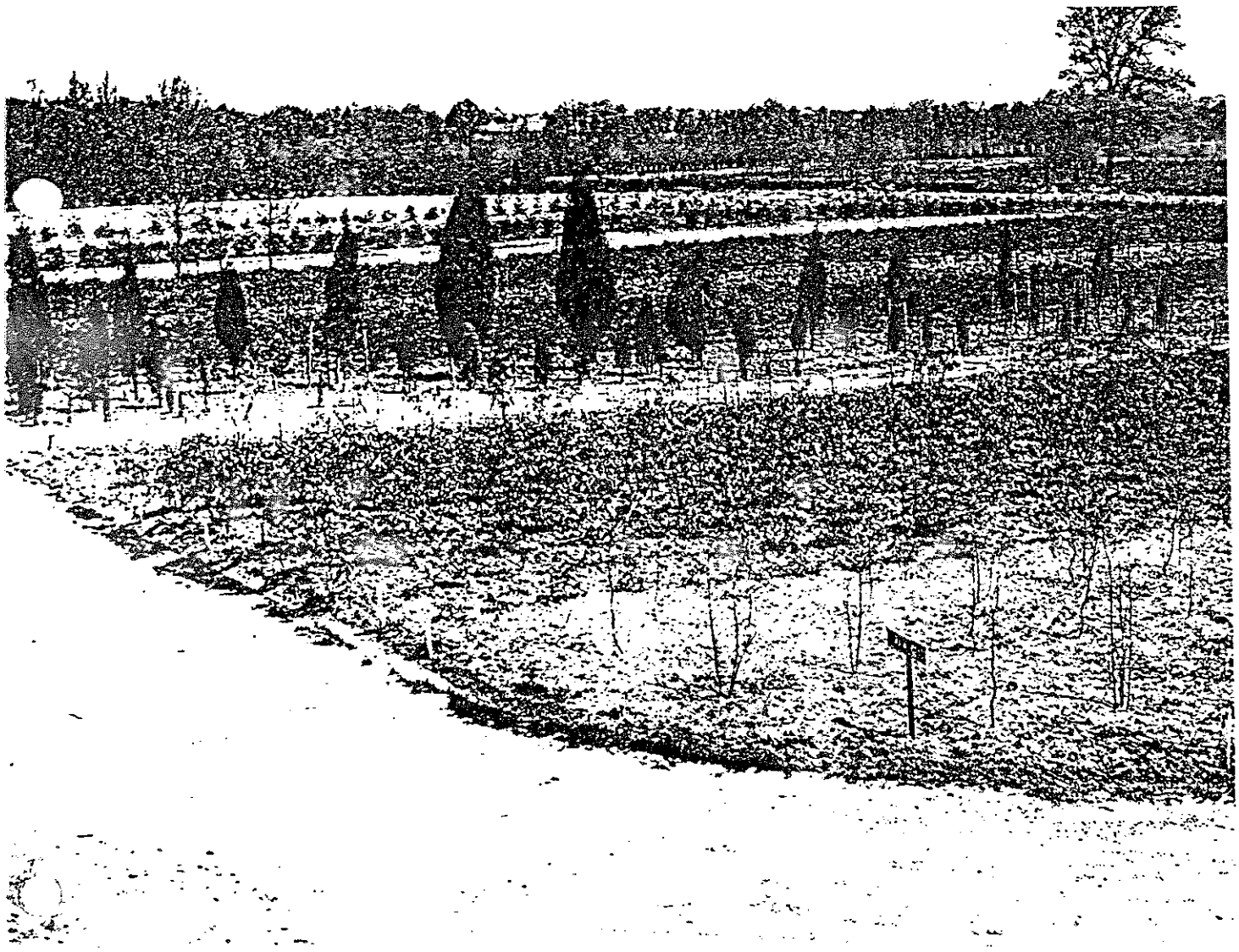
4. Pests and Disease

As would be expected in any natural ecosystem, there is a certain amount of pests and disease infestation. Those most prevalent were gypsy moth, tent caterpillars, and oak decline.



On one of his visits to the Greenbelt project, Resettlement Administrator Rexford Tugwell observed the saving of native trees and shrubs by the nursery crew. Photo by Johnson, courtesy Library of Congress

Trees and shrubs were planted in a nursery and replanted in the new town during the final phase of construction. Photo by Brooks, courtesy Library of Congress



Gypsy Moth: Since its introduction to the northeast United States in the late 1800's, the Gypsy Moth has become a major problem to our natural ecosystems in recent years. It gained a foothold in Maryland in 1981, and has become its most serious woodland pest. Statewide, it has relatively low populations, especially in the past few years, except for noted "hot-spots", including places in Prince George's County.

The most preferred species for Gypsy Moth are Oaks. However, they will also feed on Sweetgum, Black Gum, Dogwood, Hickory, Red Maple, and Pines. There is an abundance of the species at GHI, and Gypsy Moth has attacked the woodlands severely in the past. Although a certain amount of leaf feeding on Oak (especial White Oak) was noticed in the spring of 1997, most trees seemed to recover by mid-summer. Some of this feeding may also be attributable to other pests.

GHI opted to withdraw from the spraying of Dimilin in 1997 (see attached news articles).
Greenbelt News Review Articles about the Gypsy Moth 1997 "no-spray" decision

Letters to the Editor

No Spraying in GHI

The article on Moth Spraying in Greenbelt (News Review, April 17) provides an accurate account of the Maryland Department of Agriculture's original plans for spraying Dimilin in Greenbelt. However, recent developments are of interest. Representatives of the MD Department of Agriculture presented information about their plans at a public meeting at GHI on April 9. Over twenty GHI members participated in a spirited give and take for about two hours. On April 10, the GHI Board of Directors voted, unanimously, to request that GHI not be sprayed this year. (The state procedures give all landowners the right to opt out of a spraying program with such a request.) A key factor in our decision (as reported in the News Review the preceding week) was that there is currently no gypsy moth population in Greenbelt, and that the planned spraying was to prevent a problem which may or may not exist this year. As a result, GHI has requested that we not be sprayed as part of the 1997 program.

Gypsy moths have been a severe problem in the past, and will eventually re-appear in Greenbelt. I am pleased that several GHI members have expressed an interest in forming a study group over the summer to collect information on the current state of knowledge on the effectiveness of various treatments (Dimilin, B.T., Gypchek) against gypsy moths and side effects. The intent is to survey pesticide manufacturers and environmental groups to receive as wide a spectrum of opinions on this issue as possible. This information would be used when there is once again a real problem, perhaps next year. People interested in joining this group (open to non-GHI members as well) should contact me, c/o GHI.

Keith Jahoda
GHI Vice President

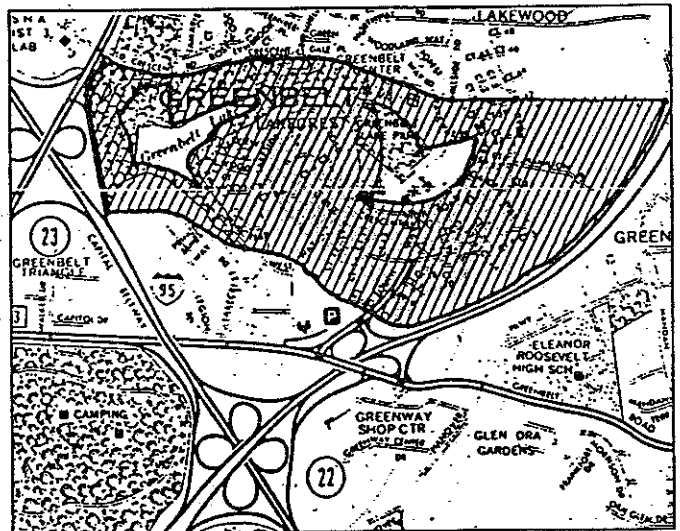
GHI Votes Against Gypsy Moth Spraying

by Betsy Likowski

The portion of Greenbelt that will be sprayed with dimilin to kill gypsy moth caterpillars will be reduced from 398 acres to 142 acres since Greenbelt Homes Inc. (GHI) has decided not to be sprayed. All other areas that were originally slated to be sprayed will be so in late April or early May.

The GHI Board of Directors voted at its regular meeting on Thursday, April 10 to write a letter to the state requesting not to be sprayed. This letter was mailed to the state on April 14. According to GHI Manager Gretchen Overdurf, GHI was not informed early enough to give time to research the options. There are no gypsy moths in Greenbelt now, but GHI will work with the state in the future if there is a need, she said.

The state has a "policy not to spray anyone who does not want to be sprayed," said Sally Hughe of the Maryland Department of



The State plans to spray the chemical Dimilin over the shaded area to control the infestation of the gypsy moths into city woodlands.

Agriculture. People do write the state asking not to be sprayed. They are sent information outlining the consequences of this action and a withdrawal form requesting opting out. This form must be filled out and returned in

order to opt out of being sprayed. Hughe estimated that the gypsy moth caterpillars hatched about April 12. They are being checked, she said.



The State of Maryland Dept. of Agriculture had scheduled a spraying of all Greenbelt woodlands, although no moths were found there this year. GHI fostered the formation of a study group to research the options available and their consequences. This group should remain intact, as the Gypsy Moth levels are likely to peak again someday, and the decision to spray or not will again be an issue. Written reports of the information engendered by the study are available for public reading in the Tugwell Room of the Greenbelt Public Library. A summary of the report is in the GHI library, in their building at Hamilton Place.

Oak Decline: Combination of drought on GHI's well-drained soils, added to gypsy Moth infestation has caused oak decline in years past. Mortality and decline of White Oaks was noticed this year, but did not seem severe overall. A healthy amount of regeneration was noticed in many areas.

Oak wilt/fungus agents: This has been documented in the past, and noted during the recent inventory. However, the authors of this report are not experts in this area, and advise the consultation of someone who has more expertise.

Tent Caterpillars: These were noticed in the Spring and Summer, exclusively on Black Cherry understory trees.

5. Archeology

Very little is known about the use of GHI lands by pre-European people. However, there have been materials collected during development of the federal properties in the Greenbelt Area, such as the Federal Courthouse, USDA, and Metrorail sites. Federal law requires federal projects to survey the archeological resources on their sites prior to development.

As a breakpoint between the Piedmont and Coastal Plain physiographic regions, it is likely that the area was used by many pre-European inhabitants. Humans first appeared in Prince George's County about 8000 years ago. The latest period before the European occupation was known as the "woodland period". During this time, people of the Piscataway or Susquehanna tribes used the area for fishing, hunting, and eventually had villages, complete with governments, agricultural area, and hunting grounds. There were Indian graves and an area of springs that they used ("Indian Springs") near the intersection of the Beltway and BW Parkway.

To understand the evolution of land use in the forest that includes GHI, we suggest additional research into the possibility of archeological sites. Assistance from the Maryland Historical Trust, and the Maryland-National Capital Park and Planning Commission are suggested.

6. Wildlife

An in depth inventory of wildlife was not conducted as part of this plan. It is, however, an important element that warrants more data collection. Some methods of collecting this information are included in the Appendix J, and assistance from the State of Maryland or other

wildlife biologists are recommended.

The species observed during the inventory (or signs of) include deer, squirrels, woodpeckers (several species), songbirds, bats, butterflies, moths and other insects. There are certainly several species of mammals, birds, invertebrates, amphibians, insects, and macroinvertebrates that could (and should) be inventoried. The occurrence of opossums, red fox, flying squirrels, and rabbits, skunks and small insectivore such as moles and shrews is highly probable. The abundance of den trees, downed woody debris and food source is generally good. The variety of cover and food could perhaps be improved.

The woodland at GHI provides some good habitat for wildlife, especially stands 1-4, which are part of a large contiguous woodland. These areas have a lower edge ratio, and less fragmentation than the other stands, and fewer exotic invasive plants. These items just mention have reduced habitat and diversity in the other stands. The planting of wildlife crops in specific areas might be considered at GHI. Crops such as corn, soybeans, sorghum, millet, rice, small grains, legumes, grasses and sunflowers are commonly used for wildlife food plots. However, these plots should be isolated from gardens and residences.

Stands 1-4 are capable of supporting forest interior dwelling birds (FID's). These species generally need 100 acres+/- to breed successfully, a well stratified forest with good vertical diversity, and a well developed shrub and herbaceous layer. When combined with adjacent woodland, Stands 1-4 have many of these characteristics. A list of the FID species in Maryland is attached at the end of this section, and publications about Maryland FID's is in Appendix J. Kathy McCarthy, a Maryland Heritage Program biologist stated in some previous correspondence (see appendix) that there were FID's observed at BARC property and they are certainly at GHI as well. She recommended leaving the GHI woodlands (Stands 1-4) in their natural state, as has been done at BARC, as an "example of the native forest vegetation and wildlife."

A wildlife biologist at the Patuxent Wildlife Research Center (Deana Dawson) has been contacted regarding the bird sampling that has taken place at BARC and Greenbelt. She has forwarded that information to the woodlands Committee, and it is in Appendix J. Ms. Dawson, as a resident of Greenbelt, has expressed a willingness to assist GHI in its bird surveys. Annual bird counts by other groups can perhaps be incorporated into the GHI forest stewardship data.

Bird species observations by MDNR biologist Erin Denneke a few years ago include:

Blue Jay	Downy Woodpecker	Pileated Woodpecker
Redheaded Woodpecker	Yellow-bellied Sapsucker	Hairy Woodpecker
Phoebe	Kingbird	PeeWee
Chickadee	Nuthatch	Brown Creeper
Baltimore Northern Oriole	Cardinal	Titmouse
Crow	Carolina Wren	Mockingbird
Bluebird	Cedar Waxwing	Starling
Red-eyed Vireo	Cowbird	Blackbird
Mourning Dove	House Sparrow	Yellow Spotted Flicker

Bobwhite Quail

Other species noted by GHI residents are:

- Ovenbird
- Scarlet Tanager
- Red Bellied Woodpecker
- Wood Thrush
- Kentucky Warbler
- Black-and-white Warbler
- Yellow Rumped Warbler

Plant species that are often used by birds and other wildlife for food and cover are listed in Appendix H in the Native Plant List, and in publications in Appendix J as well.

List of FID's in Coastal Plain of Maryland, taken from Maryland Forest Service Forest Management Notes "What are FID Birds?" (see Appendix J)

Forest Interior Breeding Birds of Coastal Maryland

Red Shouldered Hawk*	American Redstart*
Barred Owl*	Prothonotary Warbler
Whip-poor-will	Worm-eating Warbler*
Hairy Woodpecker	Swainson's Warbler*
Pileated Woodpecker	Ovenbird
Acadian Flycatcher	Louisiana Waterthrush
Yellow-throated Vireo	Kentucky Warbler*
Red-eyed Vireo	Hooded Warbler*
Northern Parula	Scarlet Tanager
Black-and-White Warbler	

*Note: these species are especially sensitive to disturbance

7. Rare, Threatened and Endangered Species

Although there were no RTE species observed to date, continual observation is needed to verify their presence or absence. It would not be surprising to find some of these species, especially in part of the woodland that have minimal human intrusion. Publications and lists of RTE's for Maryland are included in Appendix K. These include plants as well as animals.

V. SUMMARY AND DISCUSSION OF INVENTORY DATA FOR EACH FOREST STAND

Please refer to Appendix D for definitions of terms.

Abbreviations used in the following pages include:

DBH	diameter at breast height
DWD	downed woody debris
FID	forest interior dwelling bird
GPS	global positioning system
Herb.	herbaceous plants
Inv.	invasives
OS	overstory
US	understory
soils types	refer to section in chapter IV. regarding soils
Sp.	species
S & S	seedlings and shrubs

FOREST STAND 1

Forest Type: H3B generally, but can vary from A to C **Acres:** 33.6

Sample Point #'s: 3, 4, 5, 6, 7, 8, 9, CFI 1, CFI 1-A

Location: North of Ridge Rd., between Laurel Rd. and Plateau Place

Dominant Trees: Yellow Poplar, Southern Red Oak, and White Oak comprise 69% of the basal area; the rest being divided between 14 other species.

Size of Trees: Large Sawtimber **Average Diameter:** 19.5 inches

Trees per Acre: 176

Approximate Age and Successional Stage: 118; Mature

Soils: CdC2, StB2, StC2, StD2, SwB, SwC

Slope/topography: Land forms a bowl sloping to stream in middle of stand that runs SW to NE. Flat areas at ends of Plateau Place and Laurel Rd.

Basal Area: 141 square feet per acre **Relative Density:** 80% of ideal density

Per-Acre Gross Volume: 15,768 board feet/ac. or 45 cords/ac.

Ave. Canopy Closure **Overstory:** 60-65% **Understory:** 25-30%

Understory Species: Red Maple, Black Gum, White Oak, Mockernut Hickory, Dogwood, Sweetgum, American Holly, Black Cherry, Azalea, Arrowwood, Red Oak, Yellow Poplar, Pignut Hickory, Hornbeam

Seedling & Shrubs: Black Gum, No. Red. Oak, Arrowwood, So. Red Oak, Pignut Hickory, Azalea, Black Cherry, Sweetgum, Red Maple, Yellow Poplar, White Oak, Blueberry, Chestnut Oak, Hornbeam, American Holly, Mockernut Hickory, Dogwood, Sassafras, Barberry, Willow Oak, American Beech

Invasive Plants: Multiflora Rose, Wisteria, Virginia Creeper, Greenbriar, Trumpet Creeper, Poison Ivy, Japanese Honeysuckle

Herbaceous Plants: Cinnamon Fern, False Solomon's Seal, Swamp Dewberry, Partridge Berry, Wild Sarsaparilla, Violets, Mayapple, Onion Grass, Christmas Fern, Maple-leaved Viburnum, Wood Lily, Indian Cucumber, Beggar's Tick, Wild Strawberry, ground ivy, Strawberry Bush, Unidentified Sp.

Species in 1/1250 acre regeneration area (CFI 1): 3 Mockernut Hickory, 1 Black Gum, 4 hornbeam, 4 Red Maple, 3 black cherry, 21 Azalea, 11 Blueberry, 9 Asian Honeysuckle?, 1

Arrowwood, 6 Dewberry, 3 Partridgeberry, 1 Virginia Creeper, 5 Strawberry Bush, 2 unidentified herb. sp. ; 10-15% DWD as sticks and twigs

Species in 1/1250 acre regeneration area (CFI 1-A): 1 White Oak, 2 No. RED. Oak, 5 Dogwood, 11 Arrowwood, Dewberry-20% of plot, 5 Partridgeberry, 2 unidentified herb. sp.; DWD 20%, logs, twigs, sticks

Downed Woody Debris: Moderate Amount of DWD, diameters 4-10"

Standing Dead Trees/Ac: 17

Value for Wildlife: Very High

Value for Recreation: Moderate to High

Diversity/plot: 1-5 OS, 2-9 US, 1-7 Herb., 1-15 S&S, 2-5 Inv.

Most frequent trees: White Oak, American Holly, So. Red Oak, Yellow Poplar, Mockernut Hickory

Stand 1, in parcels A and B, is the largest of GHI's forest stands. As such, it has the least effect from residences and the "edges". Because of the acreage of the stand, and also to allow comparison between an area relatively near residences and an area deep in the woods, two CFI plots were installed in Stand 1. The stand is contiguous with large wooded areas owned by USDA and City of Greenbelt, as is the case with Stands 2, 3, and 4. Even so, there is a constant din from the area's highways heard in the stand.

The density of the stand is higher than optimal for best tree growth. Large trees will have moderate growth, and smaller trees will have fair conditions for growth until the canopy opens up. The canopy closure is 60-65%, with an understory closure of 30-35%. On most plots invasives are native and very minimal (less than 5%). They reach 20% only in small areas where oaks died or were girdled. Pests and disease in the stand include tent caterpillars, Gypsy Moth and a blue fungus. Overcrowding may cause greater susceptibility to pests and disease.

Past silvacultural activities were noted several places in this stand. There were stumps on plot 3, girdled trees on plots 8, 9, and CFI 1-A. Old orange flagging was seen in places, including plots 7, and 8. Apparently, there was selective cutting over a 5-10 acre area in 1994-95.

Although the soils on Stand 1 are not particularly erodible, there is apparently sufficient speed and volume of stormwater to have caused severe erosion and degradation of the stream that drains the stand to the northeast. The depth of the incised channel is 8-9 feet. Restoration of this stream would only be successful if the velocity and amount of runoff can be controlled upstream. There are numerous other small streams, dry gullies and washes in the stand that are only 5-7 inches in depth.

As in Stand 2, this stand has high priority for wildlife. It provides food, water, cover and habitat for many species. Forest interior dwelling birds have been sited in this stand. Although unverified at this point, FID's may also be present in Stands 2, 3, and 4 as they are connected to larger tracts of woodland. During the morning forest sampling activities, the air was alive with birdsong. Pileated and other woodpeckers were heard in this stand and their holes seen in trees. Gray squirrels and deer were also seen. Deer trails were noticed in many places.

Diversity was good in all layers of this stand. Although patches of Holly shade out herbaceous growth in places, there is generally a healthy, but not dense, amount of herbaceous growth, seedlings and shrubs throughout the stand.

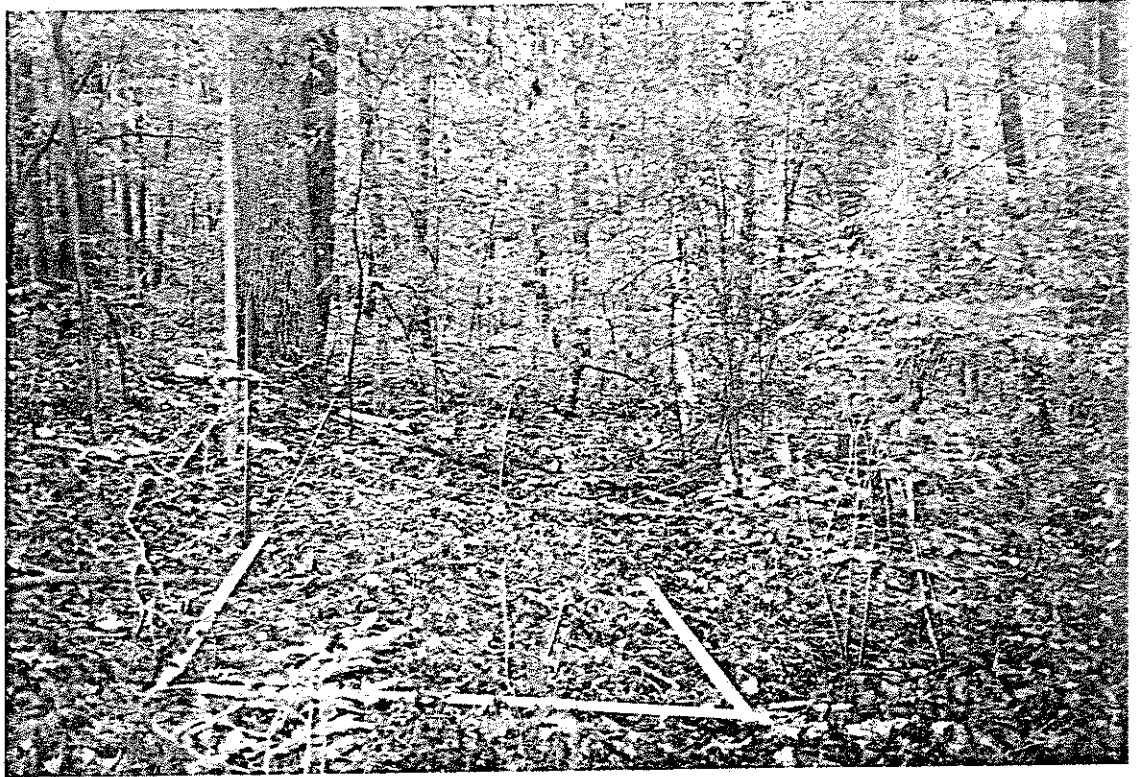
Recreational use of this stand should be encouraged in the areas closest to the residences, so there is minimal disturbance to the "deeper woods" wildlife areas. An assessment of the numerous existing trails should be made in the next few years, and a comprehensive plan should be developed for a trail system that minimizes erosion, minimizes impact on the interior forest, and provides unique or representational interpretive opportunities. If possible, the trails should follow contours, and perhaps be joined to trails in Stands 2, 3, and 4.

There is a moderate amount of downed woody debris, and about 17 standing dead trees per acre, of diameter 4-10 inches. Additional trees could be girdled, accomplishing 2 things: increase the number of den trees, and 2) allow for more regeneration gradually, so that large holes in the canopy do not result in a plethora of invasive species. An ideal number of large standing dead trees per acre is 10-20 small snags (less than 12" DBH) and 2-5 large snags (greater than 12" DBH).

Management Recommendations: (applicable goal numbers in parentheses)

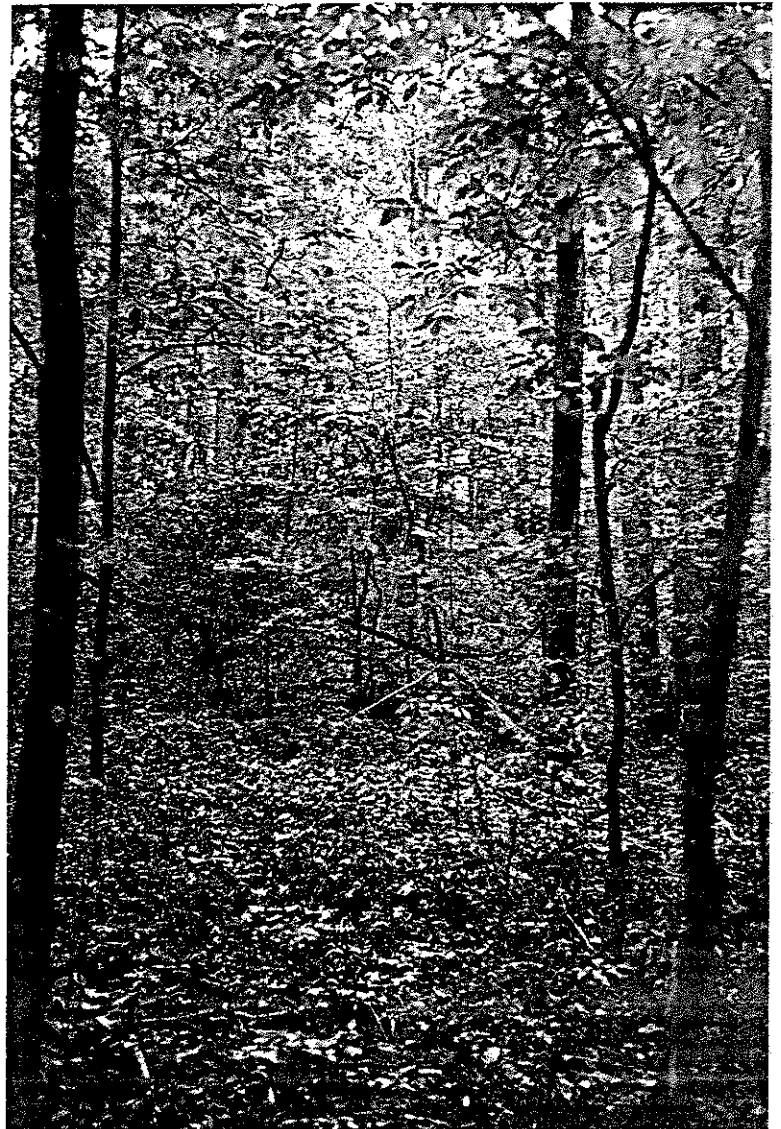
- inspect for erosion, trash/debris, pests and disease, and hazardous trail conditions annually (1B, 1C, 1G, 2A, 3E, 7B)
- locate CFI plots with GPS, and re-mark as necessary (6B)
- expand and integrate data collection at CFI plots to include birds, mammals, invertebrates, and insects (6A, 6B, 7B)
- continue identification of plant species in stand, adding to list above, and looking for rare, threatened and endangered species (4B, 5A, 5B, 6C, 7B)
- coordinate management goals and objectives with adjacent landowners (1D, 1F, 1I, 4A, 7B, 7C)
- stop stormwater problem and begin stream restoration (1C, 1E, 2A-E, 3D, 7B)
- inventory stand for standing dead trees, and increase # of den trees by girdling if necessary (5A, 6E)
- re-inventory standard CFI plot data every 5 years (6A)
- preserve woodland as part of the regional forest ecosystem (4, 6, 7)
- remove trash/debris near homes (1G, 7B)
- remove exotic invasive plants (3A, 3B, 5B, 7A-C)

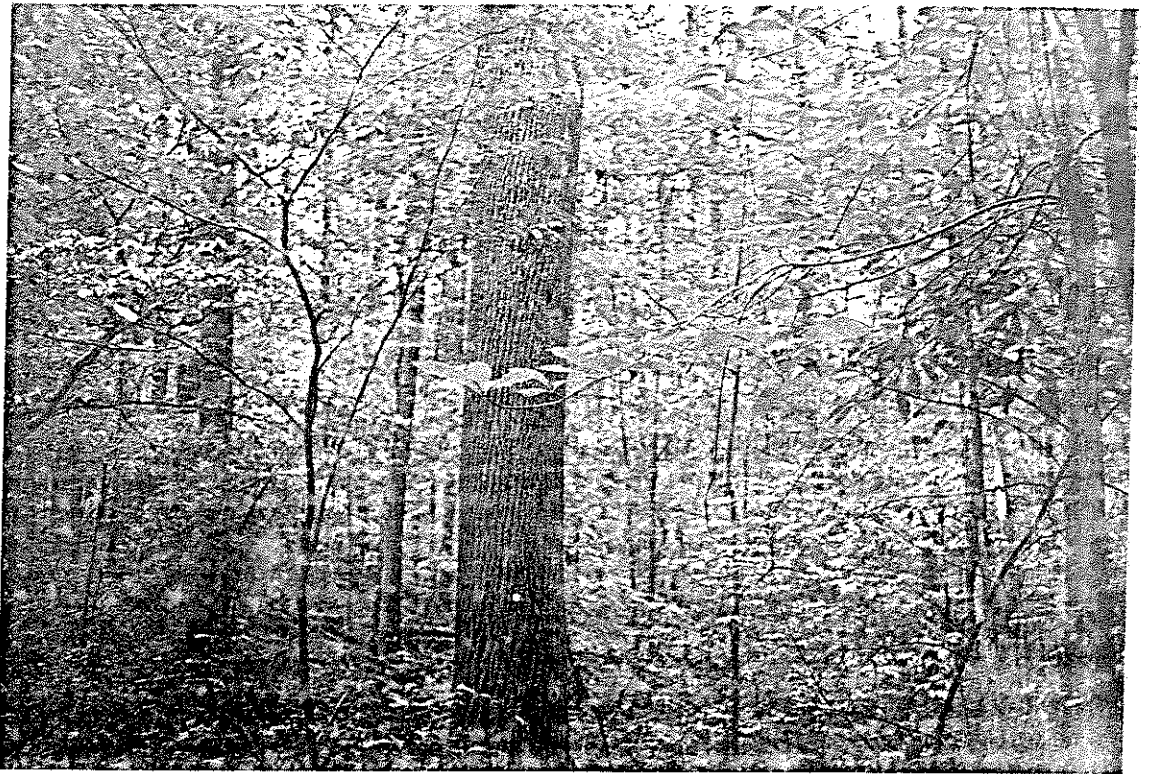
STAND 1 (Area near CFI 1)



(above)
Plot center and
regeneration plot
on CFI 1

(right)
Stand 1, looking
out from plot
center of CFI 1

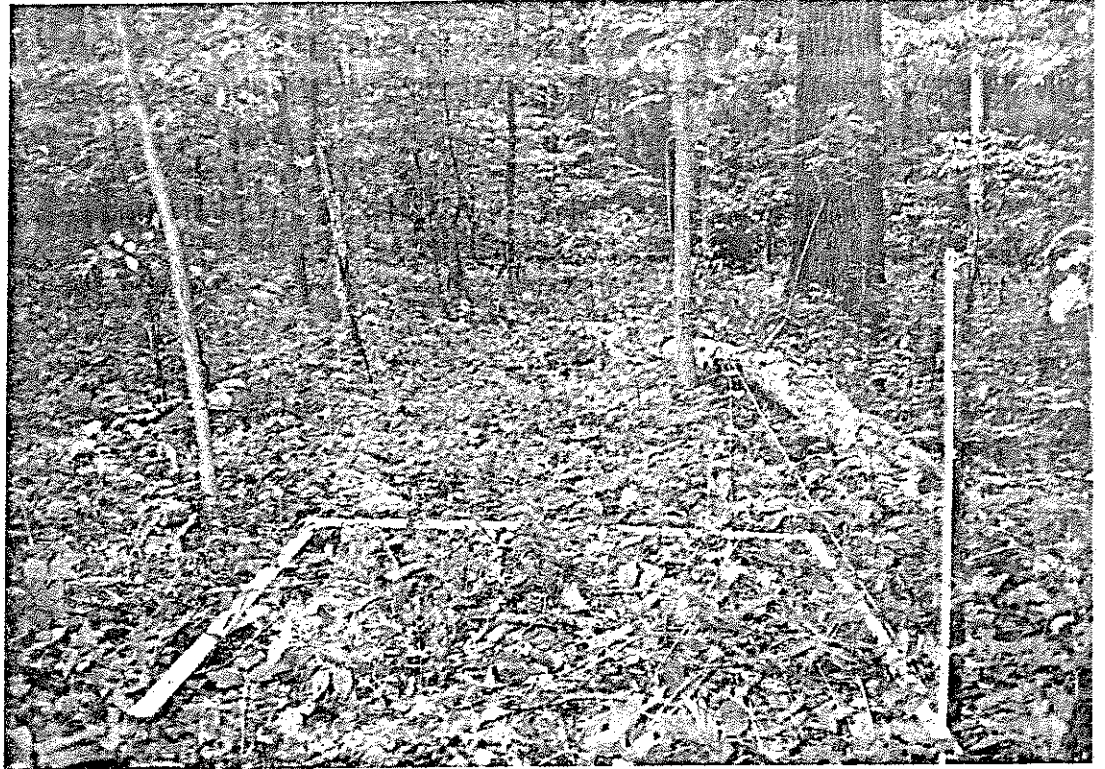




Views from plot center on CFI 1. Tree tags visible. Diseased tree below.



STAND 1 (Area near CFI 1-A)



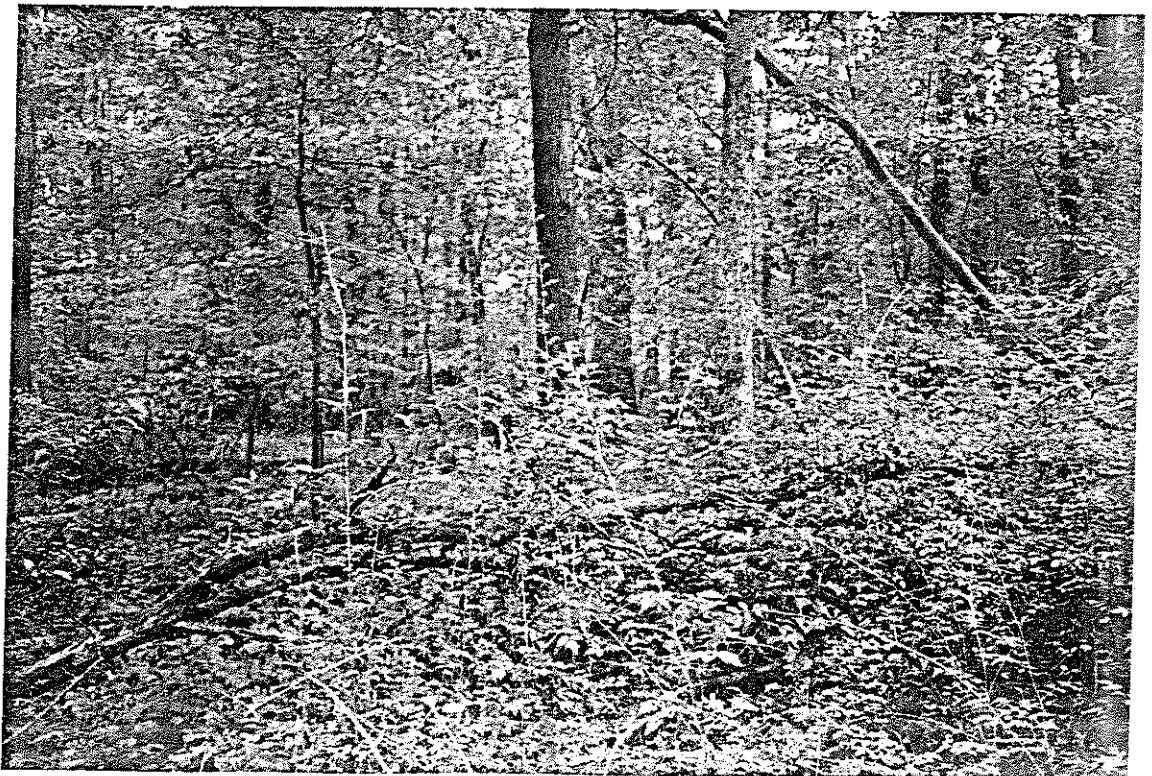
(above)
Plot center and
regeneration plot on
CFI 1-A

(right)
Plot center, CFI 1-A.
Notice large woody debris.





Girdled tree from past silvacultural treatment. On plot CFI 1-A.



Invasives gaining foothold under hole in canopy, CFI 1-A.

FOREST STAND 2

Forest Type: H3B

Acres: 15.1

Sample Point #'s: 10, 11, 12, 13, CFI 2

Location: Between Northway/Ballfields Road and Plateau Place, east of Ridge Road

Dominant Trees: White Oak, Sweetgum, Red Maple, Yellow Poplar, Black Gum (86% of the basal area)

Size of Trees: Large Sawtimber

Average Diameter: 17.5 inches

Trees per Acre: 250

Approximate Age and Successional Stage: 112; Mature

Soils: StC2, Bo

Slope/topography: Slopes to stream running west to east in center of stand; flat area on both sides of stream

Basal Area: 148 square feet/ac.

Relative Density: 108% of ideal density

Per-Acre Gross Volume: 12,435 board feet/ac., or 43 cords /ac.

Ave. Canopy Closure

Overstory: 65-70%

Understory: 30%

Understory Species: Black Gum, Sweetgum, Red Maple, Yellow Poplar, Black Cherry, Viburnum sp., Mockernut Hickory, Pignut Hickory, Dogwood, Arrowwood, White Oak, No. Red oak, Red Elm

Seedling & Shrubs: Red Oak, White Oak, Black Cherry, Willow Oak, Azalea, Blueberry, Barberry, Arrowwood, Red Maple, Yellow Poplar, American Holly

Invasive Plants: Greenbriar, Virginia Creeper, ground Ivy, Multiflora Rose, Grapevine, Poison Ivy, Japanese Honeysuckle, Amar Honeysuckle

Herbaceous Plants: False Solomon's seal, Swamp Dewberry, Unidentified (False Nettle?), Morning Glory, Partridge Berry, Grass, Cinnamon Fern, Wood Lily, Wood Rue, Unidentified sp.

Species in 1/1250 acre regeneration area: 26 White Oak, 1 Red Maple, 4 Arrowwood Viburnum, 3 Virginia Creeper, 4 Dewberry, 1 Grass clump, 13 unidentified sp.; 10% DWD

Downed Woody Debris: In general, a large amount of DWD

Standing Dead Trees/Ac: 22

Value for Wildlife: Very High

Value for Recreation: High

Diversity/plot: 1-5 OS, 4-8 US, 0-5 Herb., 3-7 S&S, 2-5 Inv.

Most frequent species: Sweetgum, White Oak, Red Maple, Black Gum

Stand 2 is a mature mixed hardwood stand, dominated by White Oak, Sweetgum, Red Maple, Yellow Poplar and Black Gum. The height of the overstory is 75-110 feet, with an understory of 40-50 feet in height. The density of oak species increases on the north side of the stream that bisects the stand from west to east.

Stand 2 is a mature stand that has a density well above the average maximum stocking for best growth. Growth of biggest trees is moderate and the smaller trees probably have poor growth. Mortality due to crowding and pest attack on stressed trees was noted. Most mortality was for Oaks, and for small diameter dogwoods. The health of the White Oaks in particular in the spring was not good due to Gypsy Moth feeding. As in most of the other stands, tent caterpillars were noticed in the Black Cherry trees. In general there is a large amount of downed woody debris and about 22 standing dead trees per acre, of DBH 3-16 inches. Additional girdling to create den trees does not seem necessary.

There is healthy amount of Red Oak regeneration in the stand. As light becomes available from dying trees in the canopy, these seedlings will be able to enter the understory. In the meantime, Hickory, Oaks and other understory trees provide a good diversity of species.

The forest floor is fairly open in Stand 2, with a low amount of herbaceous growth. The canopy closure is 65-70%, with an understory of 30%. Except on one plot, invasives occupied less than 10% of the forest floor. The invasives occur mostly in patches, where they got started after an opening in the canopy occurred, or they were carried into the stand in the stream.

This stand has a very high value for wildlife. Its braided stream and floodplain area provide water and a movement corridor. This is known as a "riparian zone". There is also a lot of food source, cover and habitat in Stand 2. Deer browsing and hoofprints along the stream are evidence of this.

A stream and its small floodplain bisect the stand from west to east. It has a braided drainage pattern, indicating larger spring time or storm event flow. Many of the channels were dry during the summer however. Some of the channels were incised about 2-3 feet.

In general, there is an abundance of diversity and seed sources in this stand. In many areas, the diversity is due to a natural thinning as White Oak dies out. In a few areas, the diversity may also be attributable to the thinning that occurred in 1990-91. Trees marked by a state forester were cut at that time, although the stumps were left a little too high. Some thinning occurred near plot 13, and old stumps were also noticed near plot 12.

The diversity of species and interesting plants is high in this stand. The southeast facing slope between plots 12 and 13 is striking in the spring, covered with blueberries and native azaleas. There was also a report of True Solomon's Seal in this stand. Pine was noticed in places as well.

As in the other stands, debris was noticed behind the residences, in the form of discarded items and yardwaste.

As a matter of interest, the trail from end of Plateau Place (extended) leads to a 5-acre burned area on City of Greenbelt property. Although time did not allow visitation of the site, it would be interesting to see what species are now occupying the burned area. This would indicate the pioneer species suited to the general area.

A recreational trail could be constructed away from the riparian zone, following the 160-175 foot contours. There is a trail existing for part of this area. Although there are slopes greater than 15% in Stand 2, the soils are mapped as Sunnyside, which are not particularly erodible. As long as trails follow the contours erosion should be minimal. An area of riprap was noticed along Northway, where an outfall had caused some erosion. The floodplain area has hydric soil.

Management Recommendations: (applicable goal numbers in parentheses)

- inspect for erosion, trash/debris, pests and disease, and hazardous trail conditions annually (1B, 1C, 1G, 2A, 3E, 7B)
- check for erosion and find solutions for problems before they get unmanageable (1C, 1E, 2A-E, 3D, 7B)
- remove exotic invasives from stream/floodplain and behind homes (3A, 3B, 5B, 7A-C)
- remove trash/debris near homes (1G, 7B)
- maintain trails, and plan for relocation, new construction, addition of interpretive features (1A-I, 2, 3D, 4A, 7E, 7B)
- locate CFI 2 plot center with GPS, and re-mark as necessary (6B)
- expand and integrate data collection at CFI plots to include birds, mammals, invertebrates, and insects (6A, 6B, 7B)
- continue identification of plant species in stand, adding to list above, and looking for rare, threatened and endangered species (4B, 5A, 5B, 6C, 7B)
- coordinate management goals and objectives with adjacent landowners (1D, 1F, 1I, 4A, 7B, 7C)
- re-inventory standard CFI plot data every 5 years (6A)
- visit revegetated burn area on City of Greenbelt property and note pioneer species (6)
- preserve woodland as part of the regional forest ecosystem (4, 6, 7)

STAND 2



Looking north from plot center of CFI 2

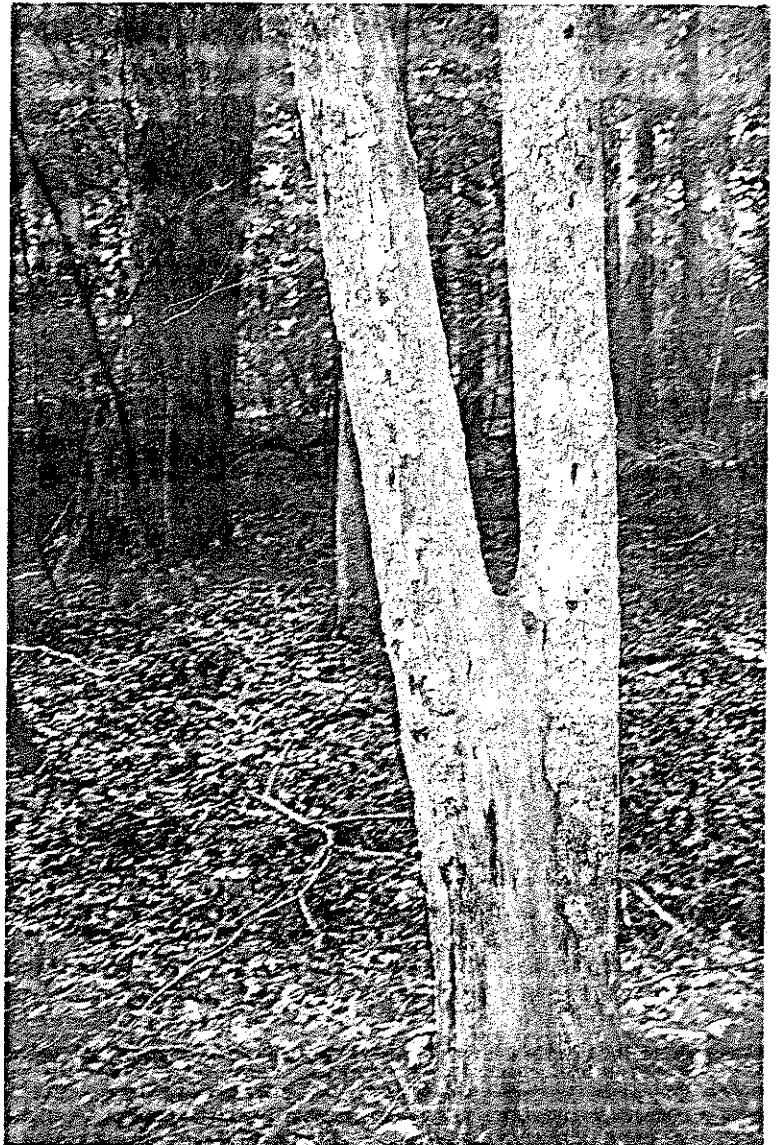


Barberry, Virginia Creeper, and Oak seedlings, CFI 2



(above)
Looking south from
CFI 2 towards stream
and floodplain

(right)
Dead Oak on CFI 2



FOREST STAND 3

Forest Type: H3B

Acres: 8.3

Sample Point #'s: 14,15, CFI 3

Location: Southeast of Intersection of Northway and Ridge Roads

Dominant Trees: No. Red Oak, So. Red Oak, White Oak, Yellow Poplar, Black Gum, Red Maple (92% of basal area)

Size of Trees: Small Sawtimber

Average Diameter: 12.8 inches

Trees per Acre: 287

Approximate Age and Successional Stage: 76 years; Mid to late maturity with small area of overmature trees

Soils: CcC3, StC2, SwB, SwC

Slope/topography: No steep or severe slopes

Basal Area: 133 square feet /acre

Relative Density: 97%

Per-Acre Gross Volume: 8373 board feet/ac. or 37 cords /ac:

Ave. Canopy Closure Overstory: 70% Understory: 20-25%

Understory Species: White Oak, Black Gum, Red Maple, Yellow Poplar, Sassafras, Red Oak, Arrowwood, American Holly, Pignut Hickory

Seedling & Shrubs: Black Gum, Black Cherry, Red Oak, Sweetgum, Aerate, American Holly, Sassafras, Azalea, Yellow Poplar, Blueberry

Invasive Plants: Greenbriar, Virginia Creeper, Multiflora Rose, Wisteria

Herbaceous Plants: Ferns, Cinnamon Fern, Oxalis, Dewberry

Species in 1/1250 acre regeneration area: 1 Black Gum, 2 No. Red Oak, patches of ferns, 1 Wood Lily, DWD 15-20%, 4-7" logs, sticks and twigs

Downed Woody Debris: Large amount

Standing Dead Trees/Ac: 35

Value for Wildlife: High

Value for Recreation: High

Diversity/plot: 2-5 OS, 5-6 US, 2-3 Herb., 5-7 S&S, 1-4 Inv.

Most frequent species: No. Red Oak, White Oak, Black Gum, and Red Maple

This forest stand is a mixed hardwood stand, located in Parcel D of the GHI ownership. It is in its middle to late stage of maturity, with approximately 26 years to full maturity overall. Stand 3 is dominated by Oaks, except for a pocket of large (20-26 inches diameter) Yellow Poplar. The species groups in the stand will mature at markedly different times. The most frequent species in Stand 3 are No. Red Oak, White Oak, Black Gum and Red Maple. The density of the stand is not optimal for the growth of the smaller trees.

The forest floor is relatively open in this stand, due to the average crown closure of 70% and understory closure of 20-25%. Only shade tolerant species can become established under such shady conditions in the lower layers of the forest. The amount of invasive plant cover is also low, generally less than 10%. There is a large amount of downed woody debris and a high amount of standing dead trees. About 2/3 of the standing dead trees are small in diameter. Some of this mortality is due to competition for sunlight, but some is due to Gypsy Moth and tent caterpillar feeding. It is interesting to note that the number of large "holes" in the canopy was minimal. As the stand matures, however, and large trees die, holes will open in the canopy, allowing more herbaceous, seedling and shrub growth.

A dry stream channel was noted in July. It was incised about 2 feet. Other than that, no erosional problems were noted for this relatively level woodland. This stand may be a good area for increased recreational use (trails) as long as they are located on the level areas of Sunnyside soils, and not on the Christiana soils. A trail exists at plot 15.

By itself, Stand 3 has a moderate value for wildlife, mostly as a food source and some amount of cover. However, this woodland is contiguous to the large wooded area owned by the City of Greenbelt to the east, and therefore becomes quite valuable in a regional context for wildlife.

Trash and yard wastes were noted behind residences and should be removed for reasons of aesthetics and to reduce fire hazard.

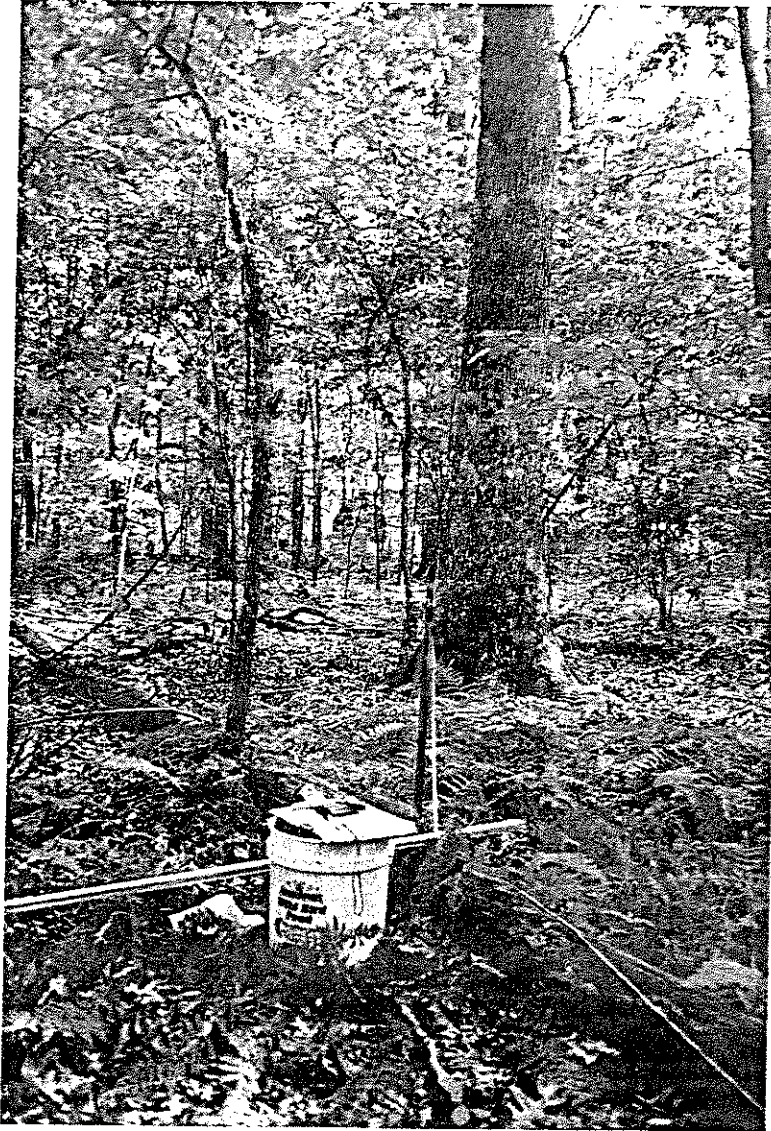
Under the previous Forest Resource Conservation Plan, there was to be a light timber stand improvement (TSI) cut here in 1997 to remove unhealthy oaks and Virginia Pine.

Management Recommendations (applicable goals in parentheses)

- remove exotic invasives (3A, 3B, 5B, 7A-C)
- inspect stand annually for erosion, trash/debris, pests and disease, and hazardous trail conditions annually (1B, 1C, 1G, 2A, 3E, 7B)
- if erosion is found, find solutions to problems before they escalate (1C, 1E, 2A-E, 3D, 7B)
- remove trash and yardwaste from behind homes (1G, 3B, 7B)
- locate CFI plot center with GPS (6B)
- expand and integrate data collection at CFI plot to include birds, mammals, invertebrates, and insects (6A, 6B, 7B)
- re-inventory standard CFI plot data every 5 years (6A)
- coordinate management goals and objectives with adjacent landowners (1D, 1F, 1I, 4A, 7B, 7C)

- continue identification of plant species in stand, add to list above, and look for rare, threatened and endangered species (4B, 5A, 5B, 6C, 7B)
- maintain trails and plan for relocation, new construction and/or addition of interpretive features (1A-I, 2, 3D, 4A, 7B, 7E)
- explore feasibility of trail expansion and connection to other trails (see above)
- inventory number and types of den trees and girdle additional trees (large Virginia Pine or Oak) for den trees, and to improve diversity, if necessary (5A, 6E)
- preserve woodlands as part of large regional forest ecosystem (4, 6, 7)

STAND 3



View to south from plot center of CFI 3



View to north from plot center of CFI 3



Canopy in Stand 3

FOREST STAND 4

Forest Type: H3A, with pocket of M2A

Acres: 5.7

Sample Point #'s: 16, CFI 4

Location: just north of Hamilton Place, behind GHI bldg.

Dominant Trees: Willow Oak, Virginia Pine, Red Maple, Sweetgum, 82% of basal area)

Size of Trees: Medium, sawtimber

Average Diameter: 13.6 inches

Trees per Acre: 305

Approximate Age and Successional Stage: 95 (mature section); one section is in early succession, one is late

Soils: StB2, StC2

Slope/topography: slopes gradually from south to north

Basal Area: 101 square feet /acre

Relative Density: 79%

Per-Acre Gross Volume: 6771 board feet/acre or 23 cords/acre

Ave. Canopy Closure Overstory: 75% **Understory:** NA

Understory Species: Black Gum, Red Maple, Dogwood, Sweetgum, Yellow Poplar, American Holly

Seedlings&Shrubs: Sweetgum, Red Maple, American Holly, Arrowwood, Azalea, Black Gum, White Oak, Barberry

Invasive Plants: Virginia Creeper, Barberry, Greenbriar, poison Ivy, Bamboo near building

Herbaceous Plants: Cinnamon Fern, Dewberry

Species in 1/1250 acre regeneration area: 1 Black Gum, 9 Greenbriar, 23 Dewberry, 21 Partridgeberry, 2 Virginia Creeper, 1 unidentified woody plant

Downed Woody Debris: a great amount, especially near plot 16

Standing Dead Trees/Ac: small sized (3-4") such as Sweetgum, 25/acre

Value for Wildlife: Medium to High

Value for Recreation: Medium to Low

Diversity/plot: 2-3 OS, 5 US, 0-2 Herb., 4-6 S&S, 2-3 Inv.

Most frequent species: Red Maple, Black Gum, Sweetgum, Yellow Poplar

This stand is part of Parcels 2 and E, and is located north and west of the GHI Corporate Building on Hamilton Place. The effective age of the stand is 95 years, with an estimated time to maturity of 14 years. Species groups will mature at markedly different times. The height of the stand is about 75-90 feet. In reality, the stand contains 2 quite different types of forest, one being mature mixed hardwood forest, and the other immature mixed wood (hardwood and softwood) forest. The younger portion of the stand occurs close the GHI building, where stump sprouts and pioneer species indicate previous disturbance.

In general the canopy closure is high, allowing few invasives to gain a foothold, except at the very edges of the stand. The herbaceous layer is fairly sparse as well, although in places where there is an opening in the canopy. Within the stand's interior, the invasive species that are present are native species, and occur at a frequency that does not disrupt the ecosystem very much. Of particular concern, however, is the patch of Bamboo next to the GHI building, which is a species with a reputation as a particularly tenacious exotic invasive.

The diversity of species is fairly low in all layers of this stand. The species tend to be those that are more shade tolerant.

Parts of this stand are within optimal range of density for individual tree growth. In these areas large trees should exhibit excellent growth, and medium and small trees should exhibit good growth potential, with low mortality overall. However, actual stand conditions show a large number of standing dead trees in the small diameter classes.

The topography across the stand is fairly level, gently sloping to the north. The soils are not erodible and no erosional problems were noticed.

Recreational use of this stand could be cultivated but may not be advisable. There is an existing small trail from the maintenance yard that crosses Stand 1, the adjacent Church property and ends in Stand 3. Expanded use of the trail would mean crossing another ownership, risking the increase of invasive plants carried into the woods, and increased pedestrian traffic near the corporate building.

Management Recommendations: (applicable goal numbers in parentheses)

- remove exotic invasives (3A, 3B, 5B, 7A-C)
- inspect stand for erosion, trash/debris, pests and disease, and hazardous trail conditions annually (1B, 1C, 1G, 2A, 3E, 7B)
- if erosion is found, find solutions to problems before they escalate (1C, 1E, 2A-E, 3D, 7B)
- remove trash and yardwaste from behind homes (1G, 3B, 7B)
- locate CFI 4 plot center with GPS (6B)
- discuss feasibility of trail system through this stand (1A)
- expand and integrate data collection at CFI plot to include birds, mammals, invertebrates, and insects (6A, 6B, 7B)
- re-inventory standard CFI plot data every 5 years (6A)
- coordinate management goals and objectives with adjacent landowners (1D, 1F, 1I, 4A, 7B, 7C)
- continue identification of plant species in stand, adding to list above, and looking for rare, threatened and endangered species (4B, 5A, 5B, 6C, 7B)
- preserve woodland as part of a regional forest ecosystem (4, 6, 7)

STAND 4



Plot CFI 4 center, looking north to edge of 1/10 acre plot



Plot center, behind large tree

FOREST STAND 5

Forest Type: H3A

Acres: 13.5

Sample Point #'s: 18, 19, 20, CFI 5

Location: West of "loop" joining the ends of Crescent and Ridge Roads

Dominant Trees: So. Red Oak, Yellow Poplar, Sweetgum, Virginia Pine, White Oak, No. Red Oak (87% of basal area)

Size of Trees: medium sawtimber

Average Diameter: 13.5 inches

Trees per Acre: 248

Approximate Age and Successional Stage: 105, Late (varies across stand)

Soils: BmB, BmC, CdC2, CdD2, CeD2, KpB2

Slope/topography: falls away in all directions from the homes on loop at end of Ridge and Crescent Roads

Basal Area: 147 square feet/acre

Relative Density: 90% of ideal density

Per-Acre Gross Volume: 12,780 Board Feet/acre or 42 cords/acre

Ave. Canopy Closure Overstory: 65% **Understory:** 32%

Understory Species: Sweetgum, Red Maple, Black Cherry, Black Gum, Mockernut Hickory, American Holly, So. Red Oak, Virginia Pine, Hornbeam, White Oak, Azalea, Pignut Hickory, Arrowwood

Seedlings & Shrubs: Mockernut Hickory, Red Maple, Black Cherry, American Holly, White Oak, Arrowwood, Sassafras, non-native Azaleas, Blueberry, unidentified exotic sp.

Invasive Plants: Barberry, Day Lilies, Greenbriar, Wisteria, English Ivy, Multiflora Rose, Virginia Creeper, Vinca, Poison Ivy, Grapevines

Herbaceous Plants: Cinnamon Fern, Swamp Dewberry, Viola sp., Pokeberry, Day Lilies, False Solomon's Seal, Wintergreen, unidentified (2)

Species in 1/1250 acre regeneration area: 1 American Holly, 1 Yellow Poplar, 2 unidentified herbaceous sp., 10% DWD

Downed Woody Debris: Large amount; Pines cut in recent years

Standing Dead Trees/Ac: 5

Value for Wildlife: High

Value for Recreation: Low

Diversity/plot: 4-6 OS, 5-10 US, 1-5 Herb., 3-7 S&S, 1-7 Inv.

Most frequent species: Sweetgum, Southern Red Oak, Virginia Pine, American Holly

This Stand occupies Parcels L and B, to the west of where Ridge and Crescent Roads loop together. Although it is a mixed hardwood stand, there is a larger softwood component (Pine) in this stand than the other stands. In general, the stand is at a late successional stage, with an effective age of 105. However, there is great variability of woodland conditions and habitat across the stand. The species, basal area and crown closure differed greatly between plots. This is partly due to Pine and Oaks mortality and partly due to the encroachment of humans. Density of stand is higher than optimal for tree growth. Moderate growth for larger trees and fair growth for smaller trees can be expected. The species groups across this stand will be maturing at markedly different times. There is a specimen Yellow Poplar near plot #20, and a Willow Oak near plot #18. Stand height is 80-110 feet.

Virginia Pine is a short lived species, and has been dying out naturally or has been weakened and affected by storm events. Several large pine were cut down and remain on the ground near plot 18. Successive attacks by Gypsy Moth caused some White Oak mortality as well. Surprisingly, there is a low number of standing dead trees/acre in this stand. Apparently, many of the weakest or dead trees already fell down or were cut. Indeed, the amount of downed woody debris was subsequently high in many areas, and in the 4-15" diameter range. A few older and smaller stumps were noticed near CFI 5.

Openings in the canopy due to mortality are causing the great diversity of understory species, and a healthy amount of regeneration in places. Shade tolerant species that were existing in the stand are being released at the same time that seeds and trees of sun-loving species gain a foothold. Although the CFI regeneration plot did not show much regeneration, due to its placement in a more stable part of the stand, other places in the stand had more tally in the seedling/shrub layer.

There is a real danger to the natural ecosystem in Stand 1 due to its ribbon-like shape sandwiched between rows of residences. There is a large amount of edge area in the stand. The amount and number of invasive species, many of which are exotic, are high in this stand. There was an alarming amount of English Ivy at the south end of stand near Westway. Invasive plant cover ranged from 10 - 90% of the forest floor on the plots, and were climbing the trees in places.

The variability in this stand makes it quite diverse and able to attract several species of songbirds as well as woodpeckers and small mammals. There is an intermittent stream near the CFI plot that adds to the wildlife habitat.

The shape of this stand, and its isolation from other woodland does not lend itself well to recreational possibilities. There are, however, several "cut-through" trails, and a large asphalt City of Greenbelt R/W that facilitate pedestrian travel between roads.

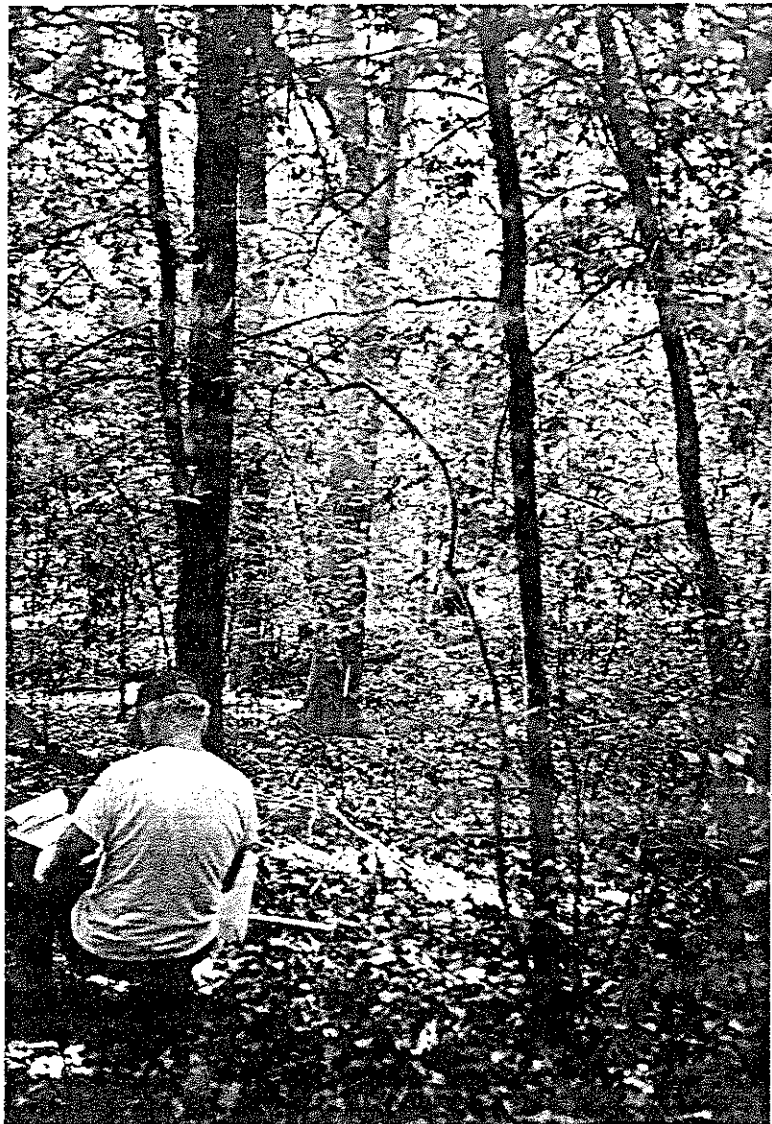
The presence of Christiana soils in this stand is of special concern. These are actually

clays that are extremely erodible, and also have severe shrink/swell characteristics as they get wet and dry out. The erodibility factor is worst on steep slopes, such as are found on Stand 1. These slopes should remain vegetated and as undisturbed as possible. The shrink/swell characteristic of the soil contributed to the higher number of species in this stand that can adapt to variations in soil moisture.

Management Recommendations: (applicable goal numbers in parentheses)

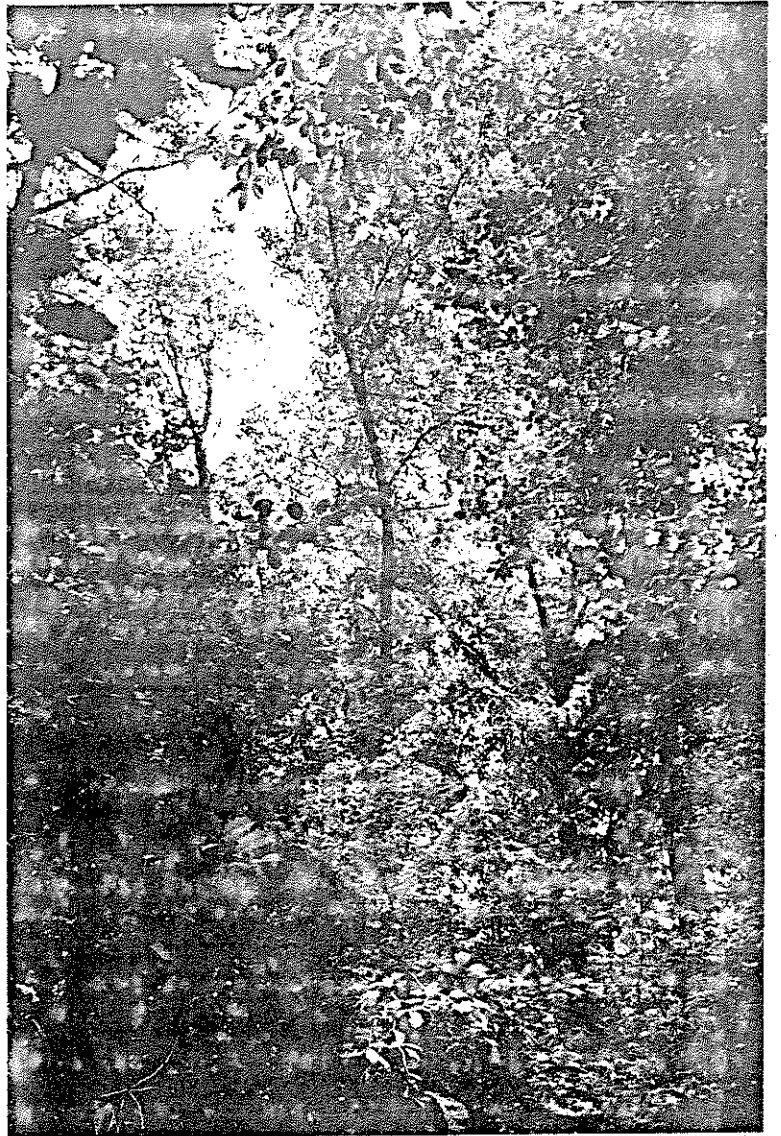
- remove exotic invasives (3A, 3B, 5B, 7A-C)
- inspect stand annually for erosion, trash/debris, pests and disease, and hazardous trail conditions annually (1B, 1C, 1G, 2A, 3E, 7B)
- if erosion is found, find solutions to problems before they escalate (1C, 1E, 2A-E, 3D, 7B)
- remove trash and yardwaste from behind homes (1G, 3B, 7B)
- locate CFI plot center with GPS (6B)
- expand and integrate data collection at CFI plot to include birds, mammals, invertebrates, and insects (6A, 6B, 7B)
- re-inventory standard CFI plot data every 5 years (6A)
- coordinate management goals and objectives with adjacent landowners (1D, 1F, 1I, 4A, 7B, 7C)
- continue identification of plant species in stand, add to list above, and look for rare, threatened and endangered species (4B, 5A, 5B, 6C, 7B)
- explore feasibility (low) of trail expansion and connection to other trails (1A)
- coordinate clean-up and invasive plant issues with Lakeside ownerships (3B, 4A, 5B, 7C)

STAND 5



Stand 5, plot center CFI 5

(right)
Canopy, showing
area of low canopy
closure



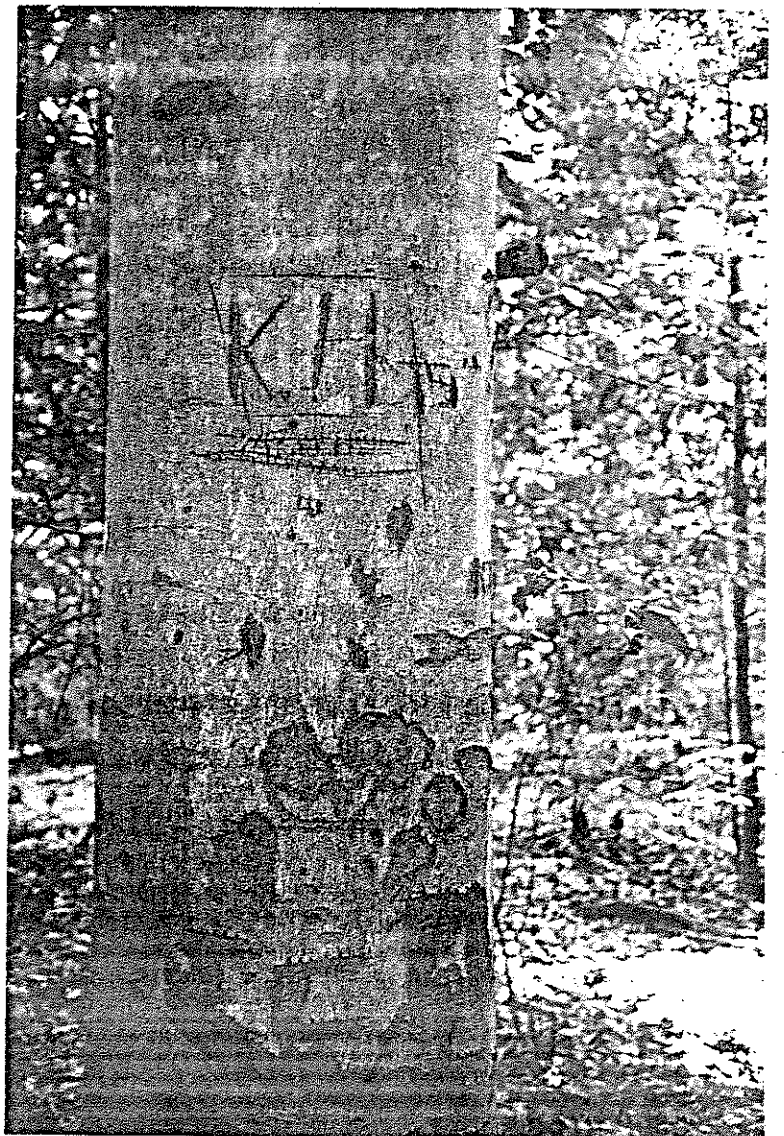
(below)
Plot center, CFI 5





(above)
Trail on CFI 5;
this area of stand 5
is relatively dense

(right)
American Beech;
tree #31 on CFI 5



FOREST STAND 6

Forest type: H3B

Acres: 9.7

Sample Point #'s: 1, 2, CFI 6

Location: Between Ridge and Hillside Roads

Dominant Trees: White Oak, Chestnut Oak, Red Oaks (87% of basal area)

Size of Trees: Small Sawtimber

Average Diameter: 13.0 inches

Trees per Acre: 203

Approximate Age and Successional Stage: 85-95, Mid to late succession

Soils: StC2, StE, SwB, SvD3

Slope/topography: slopes downhill from north to south

Basal Area: 111 square feet /ac.

Relative Density: 98% of ideal density

Per-acre Gross Volume: 7185 board feet/acre or 30.9 cords/acre

Ave. Canopy Closure:

Overstory: 58%

Understory: 43%

Understory Species: Black Gum, Chestnut Oak, White Oak, Sweetgum, Red Elm, Black Cherry, Red Maple, No. Red Oak, Virginia Pine, American Holly, Black Walnut, Sassafras, Azalea, Mtn. Laurel

Seedlings & Shrubs: Azalea, Arrowwood, Black Gum, Red Maple, Oaks, Sassafras, Laurel, Hickory, Black Cherry, Blueberry

Invasive Plants: Poison Ivy, Multiflora Rose, English Ivy, Greenbriar, Day Lilies, Winged Euonymus, Barberry, Virginia Creeper, Bamboo

Herbaceous Plants: Hepatica, Swamp Dewberry, Impatiens

Species in 1/1250-acre regeneration area: 1 Red Maple, 2 Sassafras, 1 Multiflora Rose, several runners of English Ivy, DWD 5-10% (twigs and small branches)

Standing Dead Trees/Ac: 25

Downed Woody Debris: Only a moderate amount

Value for Wildlife: High

Value for Recreation: High

Diversity: (number of species expected in each plot, by forest layer): 3-4 OS, 4-10 US, 0-3 Herb., 6-12 S&S, 1-8 Inv.

Most frequent species: White Oak, Chestnut Oak, Black Gum

This stand occupies portions of Parcels V and W. It is a mixed hardwood stand in its middle to late successional stage. The effective age of the stand is 88 years, with an estimated 29 years to total maturity. Growth of the large trees is probably moderate, and the growth of the smaller trees is probably poor. Mortality due to overcrowding or shade intolerance is to be expected. This is evident in the large amount of dead trees per acre, and the amount of downed woody debris. Gypsy moth infestation in past years has also contributed to mortality. Other pests include tent caterpillars, especially in the Black Cherry trees. Species of dead trees include White Oak, Virginia Pine, Black Cherry and Sweetgum. A pile of logs, and some tree stumps (9-15") are also evidence of past disturbance or silvicultural treatment in Stand 6.

There are areas within the stand where the basal area is lower, allowing the intrusion of sun-loving invasive species such as Poison Ivy and Multiflora Rose. However, a greater amount of invasive species are entering the stand from the residential area on the uphill edge of the stand. Exotic species such as English Ivy, Day Lilies, Winged Euonymus and Bamboo are quite thick in places, and are threatening the native ecosystem. Several runners of English ivy were tallied in the regeneration plot for CFI 6.

The stand height is about 100-115 feet for the overstory and 40-50 for the understory. The trees are rather tall for their average diameter and stand density. Perhaps this is attributable to the springs along the hillside providing a good source of water. There are no streams in the stand, and erosion did not seem to be a problem, even in light of the great amount of slopes greater than 15%. One small gully was noted in Parcel W.

Trails criss-cross the stand, taking advantage of its location between residential areas, and also the pleasant aesthetic appeal of the stand. The stand contains a large amount of a native azalea and also Mountain Laurel that bloom beautifully in the Spring. In the areas that are not affected by invasives and exotic plants, stand diversity is fairly good in the overstory, understory, and seedling/shrub layers. There is not a great diversity in the herbaceous layer, and the stand is generally fairly "open" under its canopy, both of which can be attributed to the high density and crown closure. There was a 30" Yellow Poplar specimen tree noted southeast of CFI 6.

This stand provides several good food sources for wildlife, and occasional patches of dense vegetation that could be used for cover by birds and small mammals. Several bird species were noticed in the stand, as well as squirrels. The standing dead trees will serve as natural den trees, such as for the woodpeckers observed in the stand.

Management Recommendations: (applicable goal numbers in parentheses)

- remove exotic invasives (3A, 3B, 5B, 7A-C)
- inspect stand annually for erosion, trash/debris, pests and disease, and hazardous trail conditions annually (1B, 1C, 1G, 2A, 3E, 7B)
- if erosion is found, find solutions to problems before they escalate (1C, 1E, 2A-E, 3D, 7B)
- remove trash and yardwaste from behind homes
- locate CFI plot center with GPS (6B)
- expand and integrate data collection at CFI plot to include birds, mammals, invertebrates,

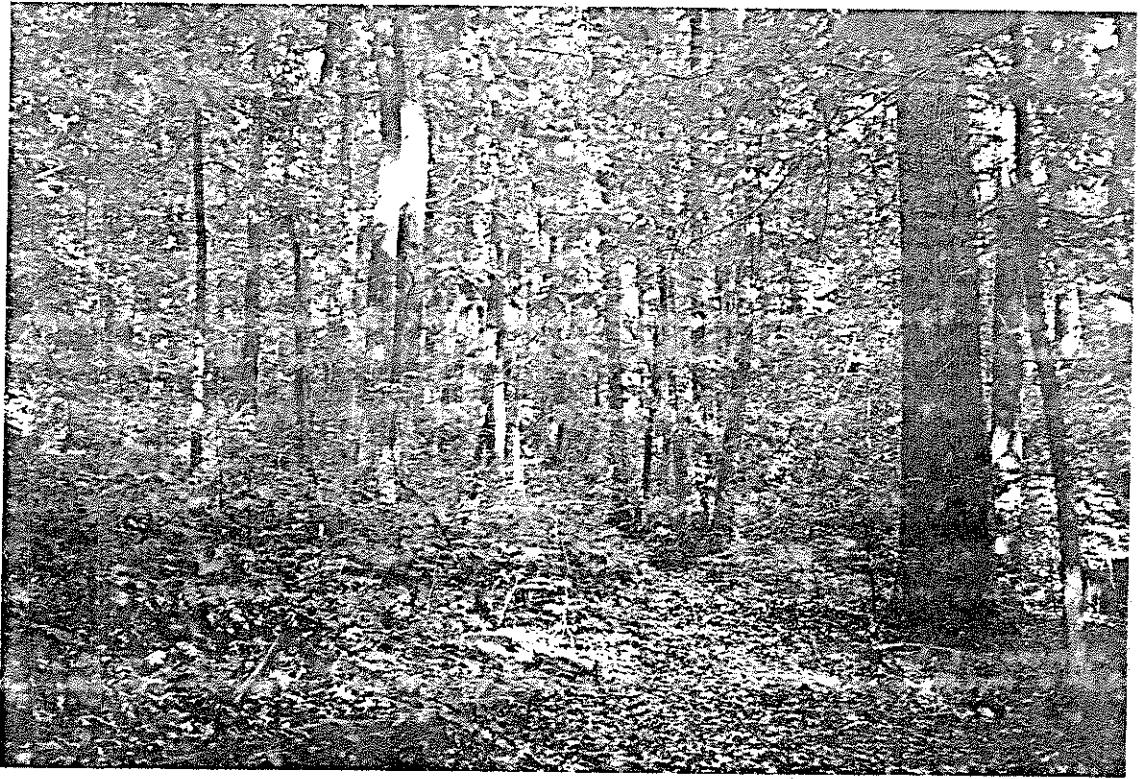
and insects (6A, 6B, 7B)

- re-inventory standard CFI plot data every 5 years (6A)
- coordinate management goals and objectives with adjacent landowners (1D, 1F, 1I, 4A, 7B, 7C)
- continue identification of plant species in stand, add to list above, and look for rare, threatened and endangered species (4B, 5A, 5B, 6C, 7B)
- maintain trails and plan for relocation, new construction and/or addition of interpretive features (1A-I, 2, 3D, 4A, 7B, 7E)
- explore feasibility of trail expansion and connection to other trails (1A)

STAND 6



View to north along trail near plot #CFI 6



View south along trail near plot #CFI 6; Azaleas in understory



Typical canopy and understory of Stand 6

IV. OBJECTIVES AND MANAGEMENT RECOMMENDATIONS BASED ON GOALS

GOAL 1 : To manage for low impact and passive recreation within the woodlands, and maintain trail system.

Objectives and Management Recommendations:

A. Create an overall trail system plan

- inventory existing trails on woodland/topographic map
- inventory condition of trails for safety and environmental sensitivity
- develop interpretive tools to educate trail users or enhance experience
- decide which trails should remain, be relocated, or connected to other trails or features, keeping in mind the other objectives listed below
- reestablish a nature trail, such as the one developed in 1975 (see Appendix L), but avoiding priority FID habitat, and other sensitive areas

B. Correct hazardous situations

- inventory hazardous conditions on trail system
- make schedule to correct, or decide on relocation of hazardous trail sections
- remove hazardous trees and blowdowns along trails annually

C. Control erosion

- locate or relocate trails to areas with slopes less than 15%, especially where there are erodible soils
- if necessary to cross streams, create crossings at right angles to the stream, using stones or structures

D. Minimize human intrusion; prohibit bikes and other vehicles

- promote a "stay on the trail" philosophy to the public
- remove or minimize trails in prime wildlife habitat
- install signs regarding no bicycle use, coordinating with City of Greenbelt

E. Use of natural materials and minimally obtrusive construction techniques to correct problems

- collect reference materials on construction techniques (example: wooden bridges that use concrete footings)
- decide on techniques that are aesthetically acceptable and incorporate into Stewardship Plan appendix

F. Explore option to connect to a regional recreation network

- decide if and how recreational use of GHI woodlands could connect to other ownerships
- contact BARC and City of Greenbelt to coordinate ideas for regional recreation

G. Control litter and yard waste on trails

- (see sections on native plants and community participation)
- have regularly scheduled litter pickup walk thru's

- H. Consider environmental impacts of recreation to ensure compatibility with vision*
- discourage recreation in areas where it would cause disruptions to priority wildlife habitat, cause erosion, or contribute to influx of exotic invasive plants
- I. Coordinate biomass recycling with City of Greenbelt to achieve the following:*
- chipping of woody materials, including Christmas trees, to use for trails
 - conversion of undesirable trees or removed hazardous trees to firewood
 - composting of yard wastes
 - collection point for Christmas trees, that can be chipped for use on trails, or bundled for use in stream restoration (provides habitat, and holds soil)

GOAL 2 : To control erosion within the woodland, including its streams and trails.

Objectives and Management Recommendations:

- A. *Inventory areas of erosion*
- mark areas of erosion on the topographic map by conducting a thorough survey
 - check each stand for erosion annually
- B. *Find source of stormwater runoff to these areas*
- using the topographic map, and field reconnaissance, outline the drainage area to the sites in question
- C. *Network with Prince George's County DER and NRCS*
- once inventory is complete, establish contacts at Prince George's County Dept. of Environmental Resources and the Natural Resources Conservation Service, and discuss possible solutions to the identified erosion problems
- D. *Discuss ways to minimize runoff*
- solutions often include reducing the channeling effect of curbs, gutters, and pipes by using riprap at the outfalls, or installing holding ponds or depressions
 - bioretention techniques such swales vegetated with native grasses and shrubs may be an option
 - a holding pond could be developed as wetland area or interpretive display
 - trees can be planted in areas of sheet flow that are not currently woodland
 - a reduction in the amount of impervious surface will reduce the amount runoff; Inventory areas that could be converted from an impervious to a vegetated surface (see appendix for information on these ideas)
- E. *Implement those that are feasible*
- small scale erosion control projects can be implemented by volunteer groups
 - a consultant should be hired to prepare a stream restoration plan for stand 1
 - once the source of runoff is controlled, stream restoration in stand 1 could take place
 - organize a volunteer force to implement stream restoration

(Controlling erosion on trails discussed in previous section)

GOAL 3 : To promote and maintain the health and character of the GHI forest using methods that are ecologically sound, and minimally intrusive.

Objectives and Management Recommendations:

- A. *Remove invasive exotic plants*
- become familiar with the exotic invasives occurring at GHI ; Appendix L contains the Maryland Department of Natural Resources List of the species that threaten native Maryland ecosystems
 - purchase plant identification books for the library
 - remove invasives using mechanical or chemical means, as instructed in the Appendix M, or from further research
- B. *Develop a public awareness program that will reduce the introduction of exotic invasives*
- promote the use of native plants by residents, especially at the edges of woodlands
 - distribute the Prince George's County Native Plant List
 - develop a program to reduce the piling of yard waste in the woodland through composting and chipping
 - remove yard wastes from behind residences
 - hold seminars on use of natives and eradication of invasives
 - revise landscape/local tree planting guidelines at GHI to include more native species and to delete exotic invasive species
- C. *Development of a forest fire protection plan*
- reduce the fire hazard by discourage the piling of woody debris in the woodlands
 - invest in a portable chipper to reduce existing brush piles and also to create wood chips for trails
 - create an fire emergency response plan (see Appendix N)
 - remove fire hazards caused by excessive blow downs etc., and sell the firewood to purchase books, create signs, etc.
- D. *Build a library of non-intrusive methods for erosion control, trail maintenance, and stream restoration*
- collect information on bioengineering that uses non-structural methods
 - collect information on bioretention
 - since GHI prefers volunteers and elbow grease, rather than mechanical methods, note which methods can be installed and maintained without heavy equipment, or with minimal use of heavy equipment
- E. *Continue the Gypsy Moth study group so that informed decisions can be made regarding the spray program every year*

GOAL 4 : To understand the role of GHI woodlands in the regional ecosystem and foster stewardship partnerships with adjacent landowners.

Objectives and Management Recommendations:

- A. Invite adjacent owners to become stakeholders in a regional stewardship strategy*
- City of Greenbelt (contact Terry Hruby) ; they have been considering placing their woodland in a conservation easement
 - Beltsville Agricultural Research Station (301) 504-8448
 - distribute Forest Stewardship Plan and discuss common goals
 - develop joint recreation plan
 - look for opportunities to share ideas at community meetings, etc.
- B. Research and coordinate regional wildlife issues:*
- contact Patuxent Wildlife Research Center (Deana Dawson 301-497-5642 regarding bird data and wildlife issues
 - contact the Maryland Heritage Program for information and advice regarding rare, threatened and endangered species
 - contact MDNR or hire a wildlife biologist to assist in an overall wildlife inventory and habitat mapping for GHI and adjacent properties (Glen Therres, MDNR)
- C. Research regional archaeology:*
- contact Don Creveling, MNCPPC, 301-218-9651, Tu-Sat 8:30 - 5:00 p.m. for information regarding County archaeology
 - contact Elizabeth Cole, OPS Archeological Services, Div. of Historical and Cultural Programs, 100 Community Place, Crownsville, MD. 21032-2023 (ph. 410-514-7600)
 - contact National Park Service, Steven Potter, Regional Archaeologist
 - write letters to these contacts asking for information on nearby sites, and probability of sites in GHI; include map of woodland
- D. Join Maryland Wildacres Program (application in Appendix J)*
- E. Establish contacts with, and put the GHI Woodlands Committee on the mailing lists for:*
- Chesapeake Bay Critical Area Commission
 - USDA Northeast Forest Experiment Station
 - USDA Southeast Forest Experiment Station
 - Maryland Cooperative Extension Service
 - These entities (and others) offer helpful forest stewardship publications
- (a list of conservation groups and agencies is included in the "Forest Management" folder)

GOAL 5 : To maintain and encourage biodiversity of native plant and animal species.

Objectives and Management Recommendations:

A. Wildlife conservation

- continue to inventory and make annual observation of wildlife species and habitat
- plan locations for, and install brushpiles (away from homes and gardens) to increase habitat for small mammals
- conduct annual bird counts at CFI plot centers
- calculate ratios, annually, between the types of bird species: FID's, edge species, neo-tropical migrants, native, non-native
- develop lists of mammals, invertebrates, and insects observed within each stand, and note which are native and/or non-native
- survey streams for macroinvertebrates every 5 years, as a measure of water quality
- increase cover for mammals using brush piles in areas far from houses, plant evergreen trees at forest edge when replacing exotic invasives (Eastern Red Cedar, American Holly, White Pine)
- install bird boxes (bluebird and owl boxes) in appropriate places (see in Appendix J)
- identify unique, rare, threatened and endangered species and preserve their habitat; locate using GPS for future reference
- once wildlife inventory is relatively complete, consult with the Maryland Department of Natural Resources regarding the re-introduction of natives that are missing from the landscape - an example might be turkeys
- calculate the edge ratio of the stands and compare this to the number and frequency of FID's; relate this information with that collected by the Patuxent Wildlife Research Station on adjacent properties.
- coordinate with adjacent landowners regarding wildlife conservation issues and strategies (see previous section)
- contract the assistance of a wildlife biologist to inventory habitat for species, and make further recommendations on stewardship activities

B. Native plants

- continue to develop the native plant checklist list for GHI (already started, and included in Appendix H)
- do a reconnaissance of the edge of each forest stand to check for exotic invasive species; map areas of concern
- establish a nursery to be used for outplanting; seedlings from State Nursery, or salvaged from development sites; or seeds collected locally; Concentrate on evergreen species such as Eastern Red Cedar, White Pine, Pitch Pine, American Holly; Deer deterrent methods would have to be used around nursery, such as an electric fence and tree shelters
- replace invasive exotics with native plants from GHI nursery or other sources as soon as the exotics are removed; this will discourage their re-establishment
- whenever encountered, remove invasive exotic tree species from woodlands, and treat

stumps immediately with Roundup or similar chemical; (note: most of these trees will be found at the woodland edge--no exotic trees were actually tallied in the stands, indicating that the exotics are still at the forest edge, but will be invading if left untreated)

- schedule a field trip with Maryland Heritage to visit Belt Woods to discuss old growth forests
- encourage the use of native plants by residents when landscaping near the woodland edge
- discourage disposal of yard waste in woods, especially if it contains debris from exotic invasives, by educating homeowners as to the potential problems, etc.
- increase public awareness of native plant issues
- learn to identify the exotic invasive species that threaten the natural ecosystem (see Appendix M); map areas (forest edges-near residents usually) where exotic invasives have become established; start eradication program, concentrating on a different forest stand each year; refer to Appendix M for species-specific eradication techniques
- establish a demonstration area near Hamilton Place of native woodland and edge species; or rehabilitate a highly visible area, using it as a tool to increase public awareness

GOAL 6 : To monitor and learn about the growth and change of the ecological system.

Objectives and Management Recommendations:

- A. *Remeasure CFI plots every 5 years*
- use procedure and format established with first inventory (1997) to allow comparison through the years
- B. *Build upon data collected for the permanent inventory plots (CFI plots)*
- inventory wildlife species, plants, insects, invertebrates, macroinvertebrates at CFI plots; repeat at regular intervals
 - perform bird counts annually on CFI plots
- C. *Build general GHI lists for birds and other wildlife, and update Native Plant List (in appendix H) as species are observed (year round)*
- D. *Contact surrounding forest owners--invite owners/stakeholders to be part of stewardship strategies*
- E. *Record annual and 5-year trends and changes in each stand and the resultant effect, including:*
- natural aging
 - storm events
 - invasive removal
 - tree girdling
 - pest and disease attacks
 - CFI measurements (5 year intervals)
- F. *Research historical trends of native woodland type and wildlife in the region*
- contact Maryland Heritage and BARC for information
- G. *Purchase materials for schools and library to foster awareness and participation on the part of the community*
- suggested topics include conservation biology, forest management, soil erosion and erosion control, wildlife and plant identification, wildlife management, and biodiversity.

GOAL 7 : To promote the knowledge gained about GHI's natural resources and their interrelationships to the community, and to encourage the community's participation in achieving these goals.

Objectives and Management Recommendations:

- A. *Write regular articles for news review about woodland stewardship theories, stewardship events, plant identification, etc.*
- B. *Solicit community involvement for management tasks*
- canvas residents for expertise on certain subjects related to the Stewardship Plan activities. Examples include people versed in identification of birds, plants and other wildlife, those who know about erosion and sediment control, or stream restoration, and those who are adept at trail layout and maintenance.
 - encourage other residents to get involved in those tasks of the Stewardship Plan that they are interested in learning or implementing. Note that there are both passive and active tasks.
 - volunteerism will allow knowledge of natural processes and succession.
 - use scouting groups as volunteers, and encourage the use of woodlands by schools classes for fieldwork and learning
 - establish stewardship "teams" for each forest stand, with a team leader that would keep records and coordinate with teams for other stands
- C. *Hold 2 or more seminars per year, perhaps in conjunction with City of Greenbelt and BARC*
- Suggested topics:
- Stewardship Plan
 - native vs. non-native plants
 - local wildlife and habitat needs
 - forest interior dwelling and neo-tropical migrants (birds)
 - landscaping with natives
 - composting
 - erosion control
 - plant identification
 - archeology
 - forest succession
 - community education and use
 - disease and pest control
 - fire prevention, response and control
- D. *Develop or encourage interpretive programs for schools that utilize the woodlands.*
- E. *Place interpretive signs on trails, and reestablish a nature trail*

VII. SCHEDULE OF STEWARDSHIP ACTIVITIES

The following table is a proposed schedule for accomplishing the stewardship activities listed in the previous chapter. The letters in the schedule refer back to the particular objectives and management recommendations developed for each stewardship goal. Dashes drawn between blocks in the schedule mean that the activity is a "process" that will span more than one year. If an activity is recommended annually, the corresponding letter appears in boxes across the whole 15-year lifespan of the Stewardship plan. Where there are several management activities listed under a particular objective in Chapter VI, such as for biodiversity, completion of at least a few of the tasks should be completed every year. It may be unreasonable to accomplish all the tasks every year, except for general inspection of the woodland.

It is extremely important that all tasks are documented upon completion. This is important for 2 main reasons:

- 1) This stewardship plan is based on an ecosystem approach, and therefore relies on records for the growth and change and interrelationships of the woodland.
- 2) In order to maintain a tax advantage for agricultural assessment under the Maryland DNR Stewardship Program, documentation of adherence to the approved plan is mandatory.

To facilitate stewardship activities in and between stands, the Woodlands Committee is considering the formation of teams for each stand. A leader would be assigned to each stand, and volunteers from nearby residences would be solicited for that stand. The leader would be responsible for record keeping, reporting to the Woodlands Committee, and coordinating activities for the stand.

An information collection sheet is in Appendix O, although GHI is encouraged to design some of their own, particular to certain goals and tasks.

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