FOREST STEWARDSHIP PLAN

For

Town of Washington Grove

P.O. Box 216

Washington Grove, MD 20880

(301)926-2256

PROPERTY LOCATION:

Washington Grove, MD

Tax map: GT 11, parcel 54

Liber/folio: 677/454

Sub-watershed(s): Seneca Creek- 02140208, Rock Creek- 02140206

In

Montgomery County, Maryland

On

83.1 acres forest

136 acres developed

TOTAL: 224 acres

Prepared by: Bill Bond, registered forester #324

Parkton Woodland Services Inc.

12001 Harp Hill Road

Myersville MD 21773

November 25, 2015

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ABSTRACT

The survey of the woodlands of Washington Grove was conducted during the fall of 2014 and early summer of 2015. The objective of the survey was to provide a current assessment on the health and composition of the woodlands with an emphasis on a more detailed inventory of both tree and herbaceous plant species present. The survey was also to provide a more comprehensive review of the non-native, invasive plants present and recommendations for their control.

Two forest stands were identified, the east woods and the west woods. The two stands have been identified in this way for almost 100 years. The east woods are an oak dominated forest type with white oak being the dominant tree in the over-story, comprising 60% of the stocking. It is characterized by the presence of a non-tidal wetland area that occupies the central portion of the stand. Within the wetland area is found swamp chestnut oak and pin oak. During the survey a large swamp white oak was located in the stand. After measurements of it were taken it was determined to be large enough to be listed on the Register of Champion Trees in Montgomery County. The west woods are a tulip poplar forest type. Tulip poplar comprises 80% of the over-story stocking. The most notable characteristic of the west woods is the impressive diameter size and height of the canopy trees. Both woods are mature, averaging 100+/- years in age. Both woods are showing some signs of "old age". In the east woods it is most evident with the die-off of some of the oaks. In the west woods the red, scarlet and black oaks are dying, most likely due to competition from the tulip poplar. Both woods have suffered from storm damage over the years. The understory composition in the two woods is markedly different. The east woods are dominated by non-native invasive species as well as native green briar. The west woods are dominated by the native spice bush, but do have a non-native invasive plant issue as well. The three most common invasive species in the east woods are Japanese stilt grass, wisteria vine and tear thumb (mile-a-minute). In the west woods the three most common invasive plants are Japanese barberry, wisteria vine and Japanese privet.

LOCATION AND GENERAL WOODLAND DESCRIPTION

The Town of Washington Grove is located in a very urbanized area in the heart of Montgomery County, Maryland. It is directly adjacent to the much larger city of Gaithersburg. The town was established in 1937 on what had been a Methodist church camp. As the town developed two wooded areas were left undeveloped. Of the 224 acres within town limits, 82 acres (approximately 40%) are wooded. They are commonly referred to as the east woods and west woods. The presence of the woods makes the Town very unique for an urban municipality.

The Town is bounded to the east and west by the woodland. Outside of the town limits the surrounding area is completely developed. The 82 acres of woodland are the only significant undeveloped area for several miles. The town has had several forest plans prepared over the decades. The most recent one was prepared in 2013 by the Maryland Department of Natural Resources, Forest Service. Like the previous plans, this plan identifies two forest stands: the east woods stand and the west woods stand. The term stand refers to a uniform grouping of trees based on a number of variables, the most common being species composition, age or location in the landscape. The two stands are markedly different in their composition. The east woods are dominated by mixed oaks with a large wetland area running through the middle of the stand. The west woods are dominated by tulip poplar on a well better drained site. A small first order creek originates in each of the stands. A small spring is also located in the west woods as well as a small pond. Based on some historical information provided, some timber harvesting most likely was performed in the stands during the 1920 to 1950 time period. Of particular note is a

document from 1924 that notes the dead or rapidly dying American chestnut trees. It notes that many have been removed and recommends their continued removal as the die. Logging was an activity that was common and very natural to the area as late as the mid 1970's. With the explosion of growth and development in the central part of the county over the past 30 years it is not a practical endeavor to undertake anymore. Commercial timber harvesting is NOT an objective of the Town.

LANDOWNER OBJECTIVES

The Town is interested in a forest stewardship plan that will provide them with a more comprehensive analysis of the forest, its current health and management recommendations to address some specific concerns. The primary objective is forest health, specifically the control of the non-native invasive plants that are beginning to overwhelm certain areas. The secondary objective is recreation/wildlife. Several walking trails are located in both stands and are used regularly by the residents. Wildlife is an issue because of its impact on the forest (deer), but improving the habitat for non game species is also of interest.

BOUNDARIES

Along the perimeter of Town limits the property lines are not marked in any official fashion. They are well defined by the adjacent development, which has been built up right to the edge of the woods (Town). The boundaries as currently defined may seem self evident, but marking the property in an "official" fashion is recommended. One recommendation is that the Town develops a simple weather resistant sign. The sign can be of any dimension, usually 8x12 or 10x16 inches. It should state the ownership, no trespass, no littering, etc. They should be placed around the exterior perimeter of each stand (two sides on the east woods, three sides on the west woods). They should NOT be nailed to trees, but installed on metal stakes. A six foot stake is recommended. Placement of the signs should be every 75 feet along the perimeter.

Rational: The town has had and continues to have issues with trespassers. Several observations were noted during the survey. In the east woods behind 9 Quantum Place was observed a camp site. In the west woods along the western boundary was observed what appears to be a party hangout (trash, beer cans, etc). Along the northern boundary there appears to be some yard trash encroachment from the neighboring development. Access to both stands is very good and is not overtly restricted by the Town. The east woods are bordered by the Town proper on two sides. A chain link fence runs along the north side where a condominium complex borders it. The west woods are not really bordered by the Town proper. Washington Grove Road, a county road, borders it along the south side, a public ball field/park is along the west side and development along the north and east sides. There is no fencing along any of the west woods borders. Entry from the county road is gated to prevent vehicles from entering, but anybody is free to walk through it. Maryland Code, section 6-402 outlines trespass and the posting of property in Maryland. Posting of property, be it private or public, is recommended by all law enforcement entities as a wise thing to do. In the natural resources realm it is always recommended for larger properties. The proper posting of both woods will provide some legal protections and act as a deterrent. It will not prevent all future trespassers, but will put them on notice that they should not be doing what they are doing. With no signage it is pretty much wide open. The actual cost of posting would be minimal (signs, stakes, labor), as with anything annual or biannual maintenance of the signs would be required.

SOILS AND TOPOGRAPHY

Washington Grove is located in the central Piedmont region of Maryland. The elevation is around 500 feet above sea level with rather flat topography. The range of elevations is no more than twenty-five feet. Six soil types are represented in the two stands. These are discussed in more detail in the appendix.

WATER RESOURCES

According to U.S. Fish and Wildlife wetland maps, about 12 acres of non-tidal wetlands are located in the east woods (see map, page 7). It is listed as a palustrine- forested (broad leaf deciduous), temporarily flooded wetland. The official U.S. Fish& Wildlife code designation is a PFO1A wetland. These wetlands are the most common wetland areas found in the Piedmont region. They are generally not very large in area and form in low swales or depression. They are either seasonally or temporarily flooded and are underlain by poorly drained (hydric) soils. The wetland soil is identified as Watchung silty clay loam. The most interesting feature associated with wetlands is the vegetation that is found growing in them. The most obvious example is two wet site trees species (swamp white oak and pin oak) found in the stand. Green briar is also common in wetland areas. There is an abundant growth of it in the stand. The wetland presence in the east woods is what makes it substantially different from the west woods. Although there are three water features found in the west woods, none of them are large enough to influence the vegetation as is the case in the east woods.

ENDANGERED AND PROTECTED SPECIES

A recent review by the Department of Natural Resources, Natural Heritage Division determined that there are no known endangered species or archeological/historical sites within the two stands (see appendix).

SITE CLASS/PRODUCTIVITY

Site class is a term used to classify stands by defining them as to their greatest potential to accomplish goals. Site class is closely related to site productivity. The site classes used for this plan are derived from observations and from soil productivity information obtained on the county soil maps. Site classes are closely related to available moisture. Generally, the better sites are located on soils that are deep and have good drainage and are capable of retaining adequate moisture throughout the growing season. Sites with shallow soils, poor drainage or soils prone to drought tend to be of lower productivity. Site class is usually expressed as the height which a dominant tree in the canopy will reach in a given number of years (usually 50 or 100 years). This is referred to as site index. Height growth is fairly constant on a particular well defined site (stand) regardless of the stocking levels (crowding). Diameter growth– on a particular site is more heavily influenced by stocking. No site index measurements were taken during the survey. Based on general observation of the tree height and quality, stand 2 is a very high productivity site, while stand 1 is an average productivity site.

SIZE CLASSES & FOREST TYPES

Since this plan was prepared by a forester, the use of forestry jargon is at times unavoidable. The inventory of each stand categorizes the trees by size groupings based on their diameter measured at 4.5 feet from the ground line (D.B.H.). While forestry terms tend to emphasize commodity use of the trees, non-commodity information is also derived such as forest maturity spices composition and the distribution of size classes.

Tree (timber) size is classified as follows:

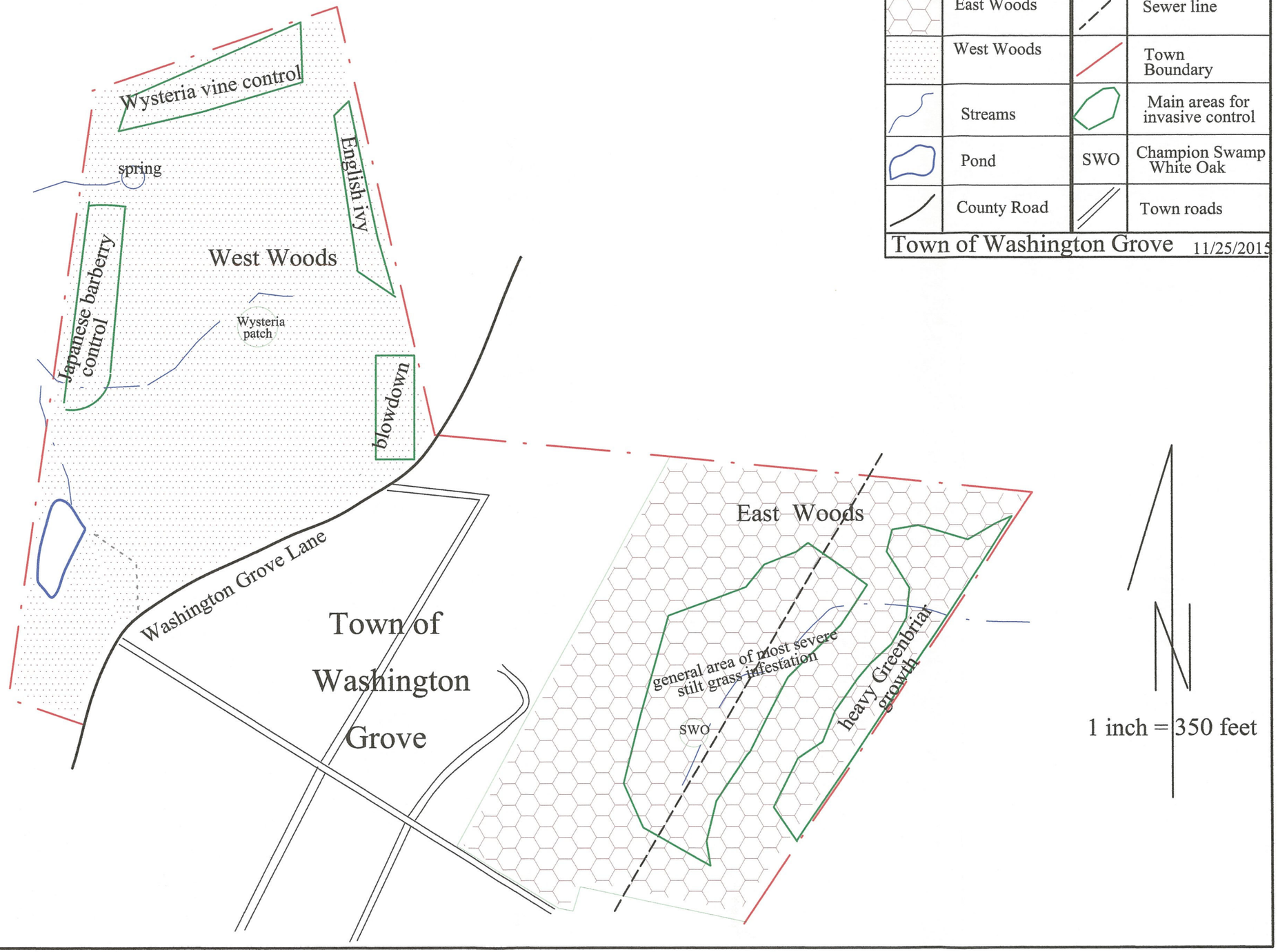
1. Saplings: <4.5" diameter (Non-merchantable for lumber)
2. Small pole-timber: 4.5" - 7.5" diameter (Non-merchantable for lumber)
3. Large pole-timber: 7.5" - 10.5" diameter (Possibly merchantable).
4. Small saw-timber: 10.5" - 13.5" diameter (Merchantable for lumber)
5. Medium saw-timber: 13.5" - 16.5" diameter (Merchantable for lumber)
6. Large saw-timber: >16.5"" (Merchantable stands with a mean diameter in this class are normally economically mature)

Over-story inventory data was compiled with U.S. Forest Service SILVAH software. The two stands on the property are in the large saw-timber size class. The east woods are typed by SILVAH as a mixed oak forest while the west woods are typed as a tulip poplar forest.

RECONNAISSANCE AND CRUISE INFORMATION COLLECTED

The forest over-story trees were inventoried using a variable plot sampling method (20 factor prism), with plots located on a 4x6 chain (250 feet x 400 feet) grid. Seventeen plots were sampled in the east woods. Twenty-three plots where sampled in the west woods. The information recorded at each plot were tree species, diameter classes, general health and quality of the tree, merchantable height (the portion usable for lumber), presence of any tree regeneration, dominant understory vegetation and any noteworthy observations. Plot locations were recorded with a GPS unit. The inventory was conducted in October-November of 2014 by Bill Bond.

A separate under-story survey was inventoried in July of 2015. This survey located plots on a 3x6 chain grid. Thirteen plots were located in the east woods and 14 plots in the west woods. This survey used a fixed radius plot method with each plot being 1/100 of an acre (11.6 foot radius) in size. Under-story vegetation falling within the plot was identified by species. The relative abundance of each species identified was also noted. The data collected was analyzed using the U.S. Forest Service NEDS software. The inventory was conducted by Steve Allgeier.

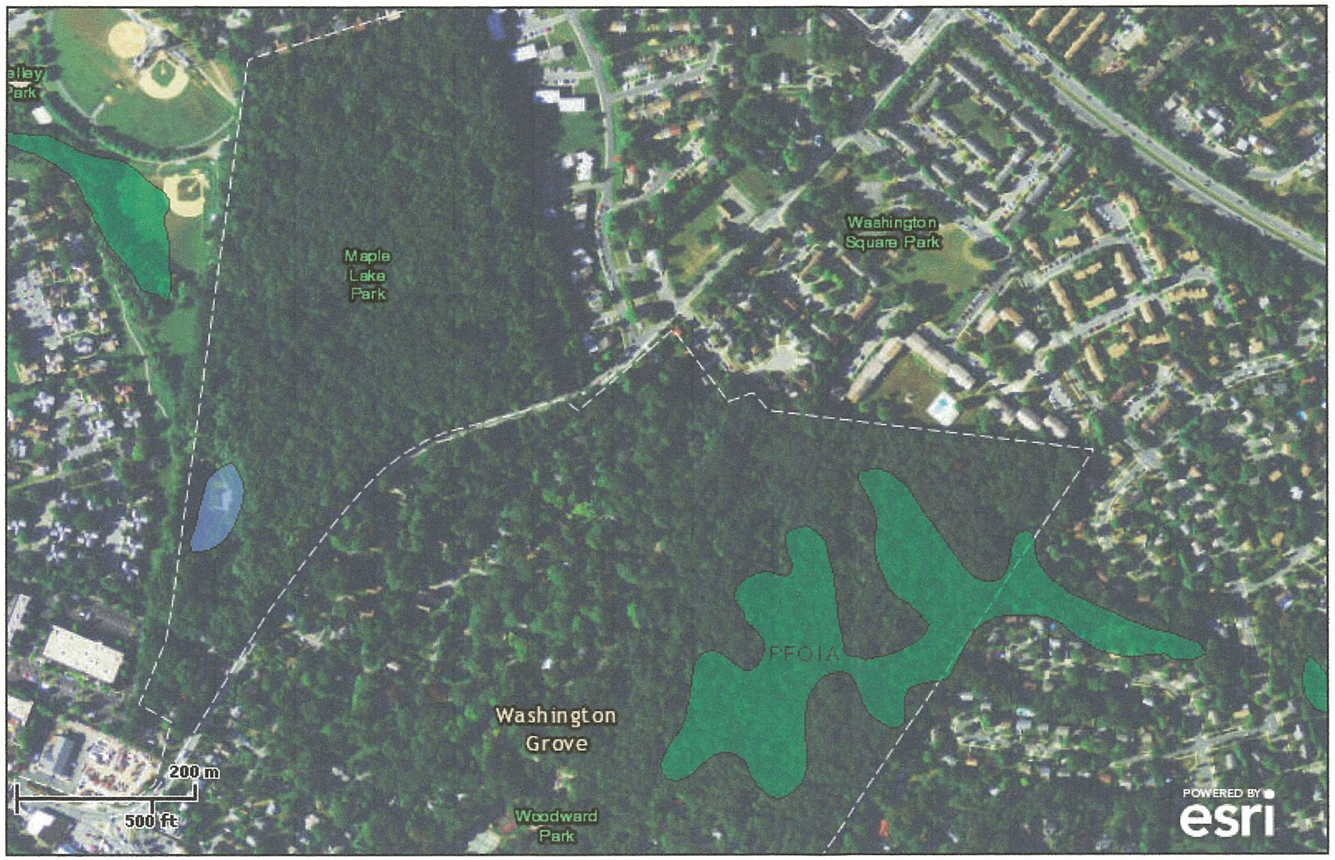

Wysteria vine control
spring
English ivy
West Woods
Japanese barberry control
Wysteria patch
blowdown
Washington Grove Lane
Town of Washington Grove
East Woods
general area of most severe stilt grass infestation
swo
heavy Greenbriar growth
East Woods
West Woods
Streams
Pond
County Road
Sewer line
Town Boundary
Main areas for invasive control
SWO
Champion Swamp White Oak
Town roads
Town of Washington Grove 11/25/2015
1 inch = 350 feet

U.S. Fish and Wildlife Service

National Wetlands Inventory

Washington Grove

Jul 29, 2015



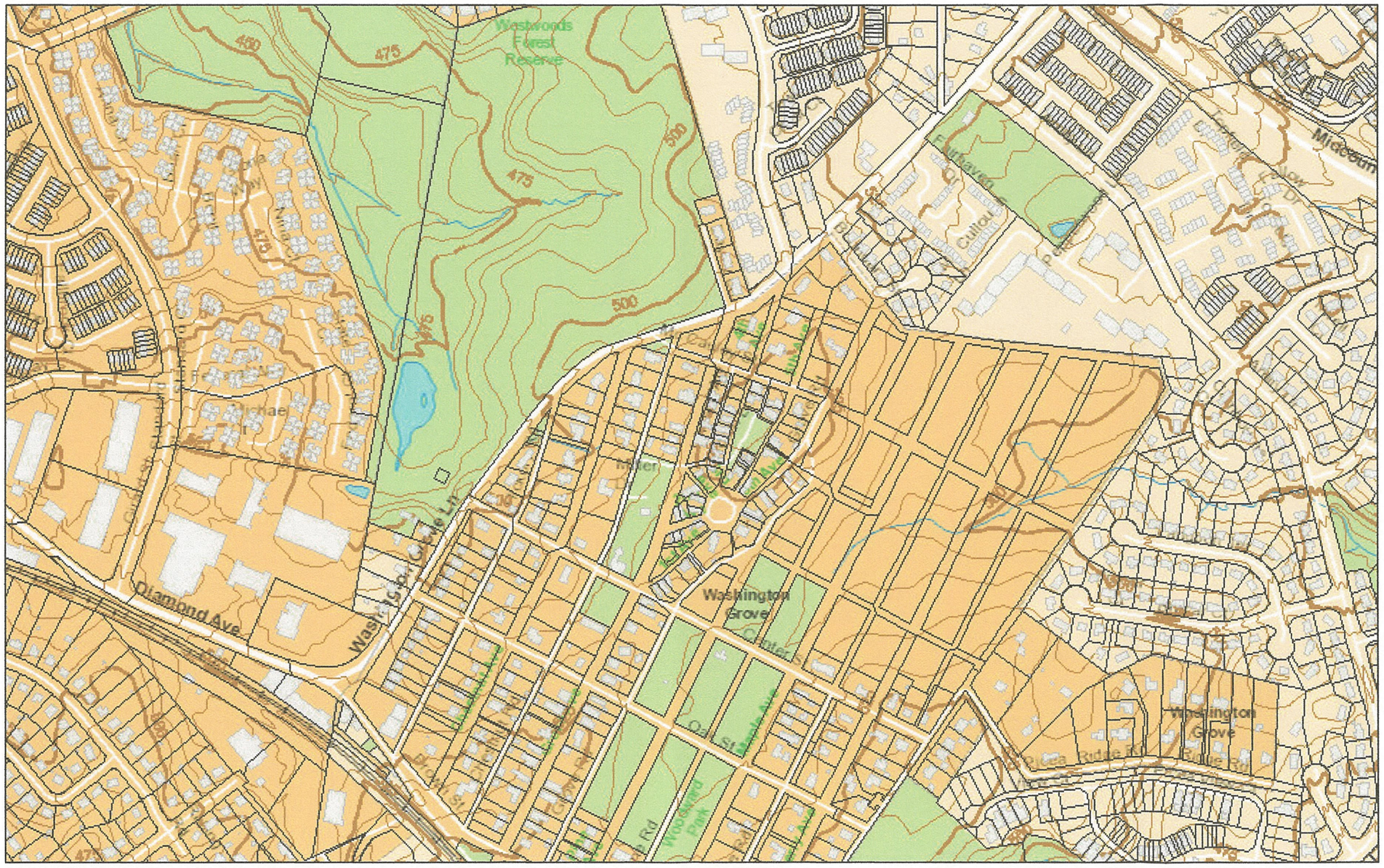
Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

User Remarks:

Non tidal wetlands

Montgomery County Mapviewer



August 10, 2015

1:9,028

0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

STAND MANAGEMENT DESCRIPTIONS & RECOMMENDATIONS

STAND: East Woods
ACRES: 38.6
FOREST TYPE: Mixed Oak- 78% of over-story stocking
SITE INDEX: No information available probably averages about 80.
SIZE CLASS: Large saw-timber
AGE: Even, average age estimated at 100
STOCKING: Basal area= 112 square feet per acre: Relative Density = 88% (higher than optimal)
ACCEPTABLE GROWING STOCK: 82% (good)
PRIMARY SPECIES: White oak (59%), Red maple (11%), Pin oak (9%), Swamp white oak (5%)
UNDER-STORY: Green briar, multi flora rose, Japanese stilt grass, wisteria spp., Rubus spp., Japanese barberry
REGENERATION: Advanced regeneration of trees is lacking. It is limited to small areas where the under-story is open, mainly white oak, black oak and hickory.

This is a large saw-timber stand of even age located on mostly poorly drained soils. The poorly drained area occupies the middle portion of the stand. Surrounding this is a narrow band of better drained soils on slightly higher elevation. Drainage is to the south via a very shallow intermittent stream. The poorly drained area is underlain by the Watchung silty clay loam soil type. It is classified as a non-tidal wetland according to the U.S fish & Wildlife Service. The stand does not appear to have ever been cultivated. This would seem to indicate that the stand is rather mature (estimated age 120+/- years). The forest has not always appeared as it currently is. One hundred or more years ago this area of the eastern Piedmont was likely dominated by American chestnut. At that time the forests were classified as an oak-chestnut forest. As the American chestnut died off from the Chestnut blight the oaks, primarily white, chestnut and black oak, assumed dominance. From a wood products perspective, Montgomery County has been known as a very good area for high quality white oak. White oak being the wood of choice for barrel staves.

The over-story is dominated by mixed oak species. White oak is the most common comprising 59% of the basal area stocking. Red maple (11%), pin oak (9%) and swamp white oak (5%) are the next most common species found. Tulip poplar (the dominant tree in the west woods) only comprises about 2% of the stocking. White oak and red maple are commonly found on both well drained and poorly drained soils. The pin oak and swamp white oak are common only on poorly drained sites. A very large swamp white oak was found during the survey. It is located roughly in the center of the stand in a low lying area. It measures 89 feet tall and 152 inches in circumference (over 4 feet in diameter). This makes the tree one of the largest swamp white oaks in Montgomery County. The average tree diameter for the stand is 18 inches D.B.H. The total basal area stocking of trees larger than 2 inches D.B.H is 112 square feet per acre. At this level the stand is considered to be well stocked with trees. This stocking level is not constant through the entire stand, however. There are several areas of low stocking. These low stocked areas appear to be either a result of storm related blow-down or the death of small groups of trees. It is not obvious what caused the death of the trees, but old age coupled with other factors (poor drainage/drought) is likely the cause. There were no obvious signs of insect or disease present in the stand.

Montgomery County champion swamp white oak (13.25 feet in circumference)

The understory is dominated by green briar, multi-flora rose, Rubus and Japanese stilt grass. Together these four species dominate 75% of the stand. In many areas they completely cover the ground excluding all other growth.

Swath of understory completely dominated with green briar.

Along with the above three species are Japanese barberry, Japanese bittersweet vine, English ivy, Japanese honey suckle and bush honey suckle. With the exception of the green briar, all of the above species are considered to be non-native invasive species. Consequently there is very little regeneration of young trees in the under-story. The only areas where undesirable species have not overwhelmed the understory appear to be in the northeastern end of the stand. This area is somewhat higher and outside of the wetland area. In this area there are small pockets of well developed, advanced tree regeneration under a well stocked oak canopy. This is what ideally should be found throughout more areas of the stand.

Japanese stilt grass dominates the understory through center of stand.

Northeast corner of stand with an open understory dominated by young oak and hickory saplings. Very few invasive species present.

Northeast corner, open understory NOT dominated by invasive plants, note young oak saplings.

The above two photos represent what should ideally be found in more areas of the stand. The lack of aggressive under-story competition is the reason trees are able to reproduce. The presence of areas of exposed soil, coupled with a good seed crop and some help from squirrels combine to create conditions favorable for tree regeneration. The dryer upland setting may also be a factor. Through most of the stand, the areas where the under-story competition is most severe seem to be in the wetland areas.

Summary review

In general, the stand is typical of mature woodlands that have not seen any significant disturbance (logging, fire). The current basal area stocking level is higher than optimal. The relative stand density is 88% of the average maximum stocking expected in similar undisturbed stands. To some extent the high stocking helps explain two issues that concern the Town. Issue one, the die off of individual trees or groups of trees. This is likely a result of the competition between the trees for space (stocking), coupled with tree age, that over time causes certain trees in the canopy to decline and ultimately die. Issue two, the lack of under-story tree regeneration. This is also linked to the over-story stocking. The regeneration of trees in the understory requires two main ingredients, 1) sunlight penetrating to the forest floor and 2) bare mineral soil on which the seed can germinate. Bare soil conditions are often created either through some human caused disturbance or fire. Both ingredients are missing in most areas of the stand. The practice of forest management (forestry) often involves controlling or manipulating the stocking to favoring certain species over others, thin a stand to provide more room for trees to grow or to create conditions favorable for the regeneration of trees.

Since the active management of the forest is not an objective of the Town, this brings us to issue number three (which is really issue number one): the overabundance of non-native, as well as some native species in the understory. Were it not for this problem, the stand would be in better balance. It is recommended that the Town begin a process of addressing small areas dominated by non-native invasive plants. Given that the invasive plants are so widespread in the stand, selecting the areas for control should prioritize areas of low over-story stocking (where trees have died or blown over). It is in these areas where the problem is most acute. The main invasive in need of control is Japanese stilt grass. Second in priority for control should be the wisteria vine. The vine is very common in certain areas, but remains somewhat scattered in the stand. However, left unchecked it could soon overwhelm certain areas making control more difficult (see appendix). The greenbrier is very abundant, but is a native plant common to wetland areas. For this reason widespread control of the greenbrier are not recommended.

Reforestation

The establishment or reforestation of young trees in existing woodland is a difficult undertaking. Over-story shading and competition for space, nutrients and water from the existing understory make success of understory plantings doubtful. There is also the issue of deer browsing. The Town has done some understory planting in the stand. This has been done on rather small areas using larger stock trees. The plantings have been fenced to prevent deer browsing, but the overall success or tangible benefit to the forest is questionable.

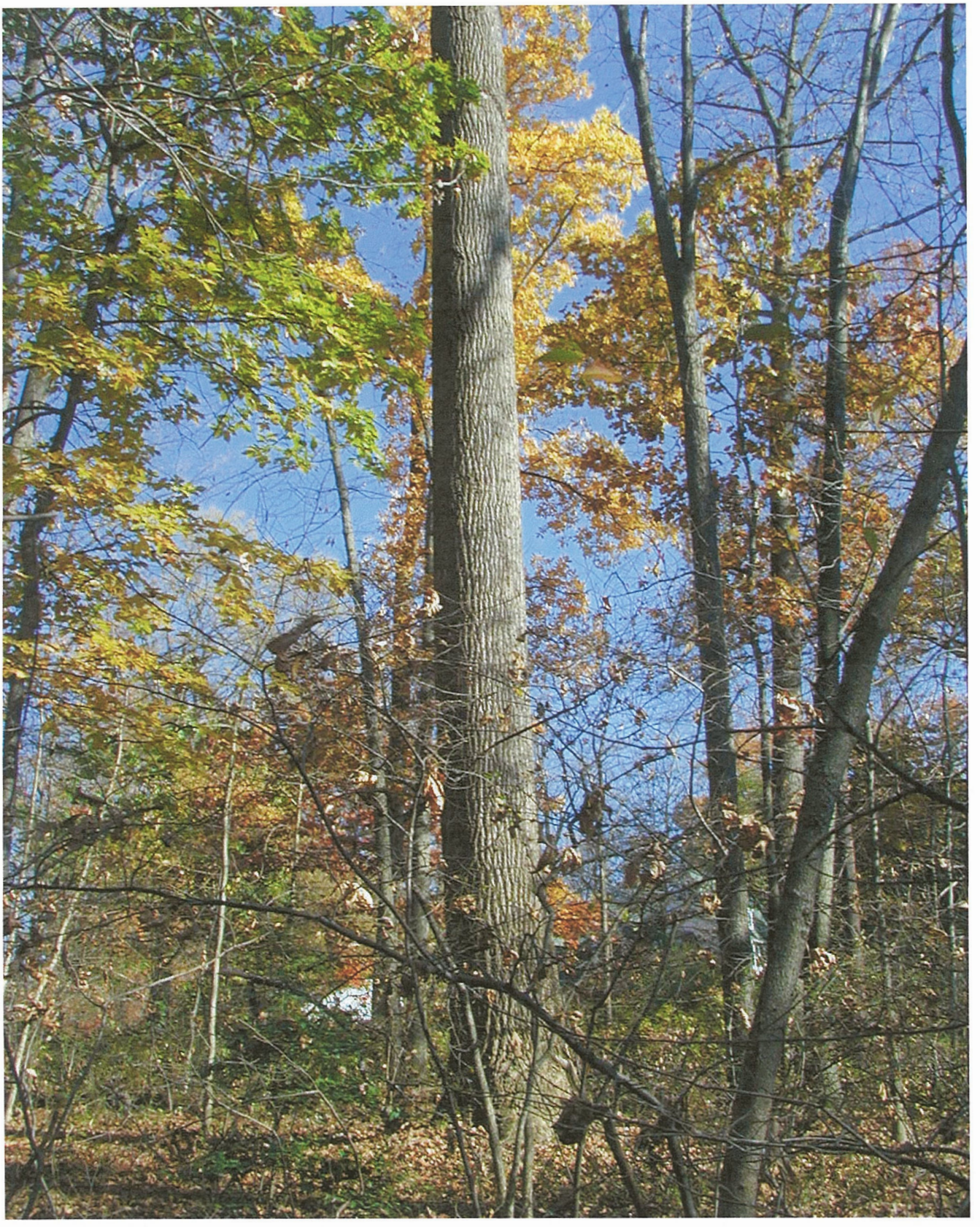
Three points regarding current efforts. 1) The species being planted should match what is found in the stand. The photo below is a willow oak. Willow oak is not present in the stand. It is a good growing tree found in wetland areas in Maryland. However, its native range is more in the coastal plain providence of Maryland (southern Maryland and the eastern shore). Several other off site species were also noted. Pin oak, swamp white oak or white oak would be more suitable selections that are native in the stand. 2) Before doing any more plantings proper site conditions must be established. Planting sites should be of a size large enough to receive adequate sunlight through most of the day and all competing vegetation, native and non-native, must be eliminated. 3) Better results may be achieved by using seedling stock at higher densities (300 trees/acre). Given the deer population fencing may still be required, but individual tree protection shelters should be used on the seedling stock.

A recently planted container grown willow oak inside deer exclosure fence. There are several examples of this in the stand. The long term success of this effort is unclear.

STAND: West Woods
ACRES: 44.5
FOREST TYPE: Tulip poplar- 80% of over-story stocking
SITE INDEX: No information available probably averages about 120.
SIZE CLASS: Large saw-timber
AGE: Even, average age 120
STOCKING: Basal area= 158 square feet per acre: Relative Density = 66% (optimal)
ACCEPTABLE GROWING STOCK: 80% (good)
PRIMARY SPECIES: tulip poplar (79%), Red maple (4%), hickory (4%), mixed oaks (9%)
UNDER-STORY: spice bush, multi flora rose, Japanese privet, Japanese stilt grass, wisteria spp., Rubus spp., Japanese barberry, American holly, English ivy, Japanese bittersweet vine
REGENERATION: Advanced regeneration of trees is for the most part non-existent.

The west woods is a very impressive forest possessing trees of exceptional size and quality not often seen in a forest setting in the mid-Atlantic region. This is a large saw-timber stand of even age located on mostly well drained soils. A small intermittent stream originates within the stand, draining to the west. A small spring head is located in the northwestern corner of the stand. The dominant soil types found within the stand are the Glenville and Glenelg silt loam. As stated, they're well drained, deep soils. The Glenelg type is somewhat better drained, having been formed in place from soft mica schist. The Glenville soil is somewhat less well drained occurring in upland flats and low spots. The stand does not appear to have ever been cultivated; however some of the historical reports indicate the presence of large Virginia pine in the stand. If this were the case then portions of the stand could have been pasture fields a long-long time ago. Virginia pine almost always indicates an old field setting as it is one of the first trees to colonize an area after abandonment. Regardless, the stand is mature (estimated age 100+/- years). Another historical influence that influenced this stand was the demise of the American chestnut tree. Eighty or so years ago this area of the eastern Piedmont was dominated by American chestnut. At that time the forests were classified as an oak-chestnut forest. As a result of the chestnut blight, the American chestnut died off. Oak species, primarily white, chestnut, scarlet and black assumed dominance. On the more fertile sites tulip poplar became a more dominate tree. One hundred years ago tulip poplar was not as common as it is today. It increased significantly with the demise of American chestnut, assuming co-dominance with the oaks. Tulip poplar dominated woodlands usually indicate a secondary stand (not virgin).

The over-story is dominated by tulip poplar which comprises 80% of the over-story stocking. Co-dominant trees in the over- story are red maple, hickory, scarlet oak, white oak and black oak. Together these five species only comprise 17% of the over-story stocking. Unlike in the east woods, no wet site species (pin oak, swamp white oak) are found in the stand. The average tree diameter for the stand is 23 inches D.B.H. This is quite high for most woodlots found in Maryland, indicating that the site is of high quality or productivity. The total basal area stocking of trees larger than 2 inches D.B.H is 158 square feet per acre. At this stocking level the stand is considered to be well stocked with trees. The stocking level remains fairly constant throughout the entire stand. There are some areas of storm related blow-down, but overall the stocking remains adequate. Pockets of dead oak trees are present in the central area of the stand. It is not obvious what caused the death of the trees, but age coupled with the high stocking and dominance of the tulip poplar is likely the cause. There were no obvious signs of insect or disease present in the stand.



Exceptional specimen: a 35 inch diameter tulip poplar. Tulip poplar makes up 80% of the stocking.

55 inch diameter tulip poplar near northern edge of stand. This may be the largest tree in the stand.

Over a majority of the stand the dominant understory specie present is spice bush (a very common native shrub). Other natives in the understory are American holly, black-haw viburnum, dewberry (Rubus) and paw-paw. There is very little in the way of tree regeneration in the understory. Unfortunately there is a large number of non-native invasive species in the understory also. The two most common are Japanese barberry and wisteria. Also found are Japanese privet, bush (Amur) honeysuckle, English ivy and Japanese stilt grass. The invasive problem in the west woods is not as bad as the problem found in the east woods. In the east woods the invasive plants dominate the understory through most of the stand. By far, the most dominant understory specie in the west woods is spice bush, a native shrub. While invasive plants can be found almost anywhere in the west woods, a majority of the problem is concentrated in two fairly localized areas in the stand. A large area of concentrated Japanese barberry is located along the western boundary of the stand, north of the pond. Approximately 80% of the barberry in the stand can be found in this area. Along the northern boundary, which borders a housing subdivision, is a large area dominated by wisteria. Wisteria is more difficult to quantify than the barberry, but a significant chunk of the overall population is in this area. Outside of these two areas are found plenty of invasive plants, but they tend to be in either small patches or scattered. Control efforts should begin with a focus on attempting to gain control over the concentrated populations of barberry and wisteria.

Typical understory found over a majority of the stand. A dense thicket of spice bush dominates with very little else under it. Over-story dominated by tulip poplar.

A thicket of Japanese barberry along western side of stand. Note, American holly in middle.

Patch of wisteria in central area of stand. Could be controlled fairly easily if action is taken soon.

View of understory along northern edge of stand. To the left side of photo is a spice bush dominated understory. Right side of photo shows wisteria dominating the understory. As one moves to the right (north) the wisteria becomes much thicker. Control efforts need to be implemented soon to check its spread.

Summary review

In general, the stand is typical of mature woodlands that have not seen any significant disturbance (logging, fire). The current basal area stocking level is high, but the relative stand density is only 66%. This number reflects the average maximum stocking expected in similar undisturbed stands. In contrast to oak dominated woodlands, poplar dominated woodlands often maintain themselves at a higher stocking level. This is simply due to the nature of poplar and how it reproduces and grows. Tulip poplar can tolerate a higher stocking level than the oaks can. To a great extent, the current stocking level in the west woods explains the die off of some of the oaks, particularly the northern red, black and scarlet oak. This appears to be a result of the competition between the trees for space (stocking), coupled with the age of the trees. Over time this competition begins a process where certain trees in the canopy begin to decline and ultimately die.

Single standing dead oak surrounded by mostly tulip poplar.

While the oak has died, the remaining trees now have more canopy space which will improve their ability to grow and compete. Overall stand stocking may be reduced slightly, but it is still adequate for the continued health and maintenance of the forest.

A group of four standing dead oak (black and scarlet). Surrounding live trees are mostly poplars.

This situation is somewhat different than the preceding one. The dead oaks all occupy the dominate canopy layer. They are most likely of very similar age. All of them are of the red oak group (red, black and scarlet oak). It is unlikely that a pest vector caused their death. Other environmental factors may have contributed. A lightning strike to one tree may cause the death of the tree, but sometimes can also cause the death of nearby trees (shock?). Drought will certainly have a negatively affect on trees, causing them to weaken. The the red oak group is more drought sensitive than the white oak group (white, chestnut, swamp white) and tulip poplar. Also, age related stress and dieback in oaks can result in root rot pathogens entering the dead trees. Some root rot fungi can then move into other nearby oaks that are under stress.

The combination of the root rot fungi coupled with age and other stress factors can result in the death of groups of oaks.

Given that the overall stocking level in the stand is adequate, the lack of any meaningful regeneration of tree species in the understory is to be expected. As stated earlier, the regeneration of trees in an under-story setting require sunlight penetrating to the forest floor and bare mineral soil. In a well stocked, closed canopy stand tree regeneration is not going to occur. There are some areas in the west woods that have been impacted by storm related blow down. The down trees have not decayed much indicating that the blow down occurred fairly recently (within the past 3 years). The largest area is in the southeast corner of the stand where up to 20 or more dominant poplars have been blown over. But even in this area there remain enough trees in the over-story to maintain adequate stocking. An option that may be considered in the areas where the blow down is elevated or stacked up would be to hire a professional tree company to saw or buck the trees into sections so they would lie on the ground. This would speed up their decomposing, reduce some of the hazard and maybe improve aesthesis somewhat.

A concentrated area of blow down in the southeast corner of the stand.

Photo show several large tulip poplars with large root masses blown over in southeast corner of stand. Note creation of vernal pool in stump hole. Vernal pools are valuable habitat for woodland invertebrates.

If a future storm event should blow over more trees in this area an under stocked condition could develop. This may lead to an increase in invasive plants. It was noted during the survey that numerous deer frequented this area. The down trees provide good cover habitat for them to bed during the day.

Reforestation

The situation in the west woods is quite different than that found in the east. In the east woods the openings created have left a severely under stocked condition allowing invasive plants, mainly Japanese stilt grass to move in and dominate. In the west woods the openings are much smaller with an adequate stocking of trees still in place. Native shrubs, principally spice bush, have retained dominance. The main invasive tends to be Rubus which is not nearly as bad as Japanese stilt grass. The wisteria vine is a concern however. Reforestation in this type of

setting is unnecessary and most likely futile, given the great prevalence of spice bush. Eliminating or reducing the occurrence of spice bush is not recommended. There is no need to perform any reforestation work in the west woods. .

Invasive Species Management Summary

Invasive species are a significant presence in both stands. As stated, the east woods have a larger problem than the west woods. In general, the larger the invasive plant the easier it is to control. With hard work and perseverance a property can be rid of scattered invasive woody plants. On the other hand, the herbaceous species are much harder to control. If implemented in a haphazard or poorly conceived fashion, control measures can exacerbate the problem, harm non-target species or be completely ineffectual. For this reason the Town must think through their plans before expending a lot of resources. Given the extent of the problem the primary control measures should be done by professionals. The use of herbicides as a means of control on targeted species should be strongly considered. That said mechanical control can also be very effective on small groups or isolated species. In the east woods the top five invasive plants are Japanese stilt grass, wisteria vine, Japanese honey-suckle, mile-a-minute and multi-flora rose. As stated earlier, the two that need to be focused on first are Japanese stilt grass and wisteria. It is estimated that at least a third to one half of the stand is covered with stilt grass. It is recommended that the effort be focused on areas overwhelmed by Japanese stilt grass. Because the stilt grass is so extensive, it is recommended that control efforts focus on small sections at a time. This will allow for better control and assessment of the success or failure of the effort. Also, the small area treatment may be followed up with some reforestation if the Town wishes. The wisteria vine is the other major problem. Control of this specie will require some perseverance. It is currently fairly widely scattered with many of the plants being young and difficult to see. It too should probably be controlled in smaller sections as opposed to a single widespread treatment.

In the west woods the top five invasive plants are Japanese barberry, wisteria vine, Japanese privet, English ivy and Japanese stilt grass. As stated earlier, the two that need to be focused on first are the Japanese barberry and wisteria. It is estimated that 70 to 80% of both populations are found in two rather concentrated areas. A well planed, multiyear effort should be able to achieve good control in the treatment areas. Other more selective control efforts can be directed toward the Japanese privet, English ivy and stilt grass.

Once a plan of attack is developed it should be carried out over a several year period. Any plan should include initial treatments, follow up treatments and monitoring of success as the main elements. Three years is recommended as a reasonable time frame to expect some results. For economic and logistical reasons it would make sense begin treatment in both stands simultaneously. The east woods are already rather overwhelmed and require action. Good results may be easier to achieve in the west woods given that the problem is not as bad. The sooner action is taken the higher the likelihood of success will be.

How does one evaluate success? This should be done in coordination with any contractor that would be hired as well as with the amount of money expended on the problem. Since success will never be the complete elimination of the problem species, the Town should establish some metrics to measure success by. Qualitative measurement (visual) or quantitative measurements (numbers) can be done depending on the type of treatment. Such measurement should probably be linked to the size of a specific treatment area and/or invasive species targeted for control. An example would be the Japanese barberry in the west woods. Define the area with flagging or stakes and set a goal of say 80% control of the barberry within that area by the end of year 2, the

entire barberry thicket being the area to treat. With the Japanese stilt grass or wisteria vine the treatment area may of a fixed size with maybe 50% control as the objective after year 2 (recognizing the greater difficulty of controlling these two species).

Control of Undesirable Vegetation and Herbicide Usage

Control of unwanted vegetation in a woodland setting is an important part of sound forest management. Undesirable vegetation can be any species of plant that competes against desirable species. The top five non-native invasive (based on abundance observed) plants present in the east and west woods of Washington Grove are:

- Multiflora rose (Rosa multiflora): This plant was introduced by the federal government during the 40's to help farmers combat erosion and as a "living fence" to increase wildlife habitat. It has since been declared a pest and in some states is considered illegal. Its wild growth habit and propensity to overwhelm fields and pastures makes it extremely undesirable. In large quantities, it is not good as wildlife habitat and does not control erosion very well. The bush spreads via root sprouts and its very prolific seeding ability. The fleshy seed is spread by birds. It is a woody, perennial shrub and is difficult to control. Control can be very effective with a foliar application of a systemic herbicide early in the growing season. If left unchecked, it will develop into large impenetrable thickets ten to 12 feet in height. In these situations mechanical means of control may be more effective in order to knock it back.

-Japanese Barberry (Berberis thunbergii): Barberry is a common yard shrub in suburban areas. It is a dense woody shrub with small thorns on the limbs. It is spread by birds and small mammals who feed on its fleshy red berries. It will also spread via root sprouts, forming dense patches that exclude all other growth around it. Some studies in done in Connecticut have shown an increase in tick populations in barberry infested areas (http://www.ma-eppc.org /Conference2009/SWilliams-TickLBR arberry.pdf). For this reason alone it warrants active control in a woodland setting. Control can be very effective with a foliar application of a systemic herbicide early in the growing season.

-Tear thumb or Mile-a-Minute (Polygonum perfoliatum): This is a vine that is found along the edges of woodland and in openings created in the woods. It favors disturbed sites particularly moist areas. It spreads very rapidly usually showing up within one growing season. The vine is believed to have been introduced from Japan on nursery stock. It is an annual plant in that it reproduces from seed every year and does not overwinter in a dormant state. The bright blue, fleshy seed is spread by water and birds. Because it is an annual as opposed to a perennial plant it can be easily controlled with herbicide applied during the growing season prior to the onset of the fruit. However, because it is an annual it can spread very rapidly showing up suddenly in an area where it was not present in prior years. This and its rapid growth make it very difficult to eliminate from the landscape.

-Wisteria (Wisteria spp.): Wisteria is a very common yard plant in suburban areas. It is a leguminous, woody vine that grows very rapidly. The bean like seed pods are filled with light winged seed allows it to spread very rapidly. It also spreads through sucker sprouts creating patches of very dense growth. If left unchecked, wisteria vines will completely engulf the forest floor and grow into the canopy of surrounding trees. This will result in poor growth, increased likelihood for storm damage and eventual death of the trees. Control can be very effective with a foliar application of a systemic herbicide during the growing season. To control larger vines that area growing into trees mechanical means are required (cutting the vines). Following up treatment of the cut surface should also be done.

-Japanese stiltgrass (Microstegium vimineum): Japanese stiltgrass is a non-native invasive annual grass. It is very shade tolerant, often found growing in wooded areas. It is spread by motor vehicle traffic, on the soles of shoes, on animals and often by logging equipment. It readily establishes itself in areas that have been recently disturbed (along foot paths, log trails and uprooted tree roots). It grows in patches so it is often rather confined. It does not readily spread into areas that have not been disturbed. Often it is observed lining the edges of trails five or six feet from the trail edge, but no further. However, if not controlled it will spread and form rather extensive patches of an acre or more. It flowers in late summer with seed produced following soon after. Unlike some of the other invasive plants that spread by root sprouts or birds, Japanese siltgrass is rather easy to control. Because it is an annual it will only spread upon seeding. If the seed production can be halted it will not spread. This makes it fairly easy to located and kill. Timely mowing before seed production or the application of an herbicide is usually enough to bring it under control. Control will be more difficult if it has spread over a large area or difficult landscapes.

Control of the above species does not mean their complete elimination from the landscape. It only reduces the amount present in a given area which may allow room for more desirable trees and native shrubs to become established. Herbicides are generally viewed as a more cost effective and less labor intensive way to control these species, however mechanical methods should be considered for woody plants or large impenetrable thickets. Any mechanical treatments should be followed up with an herbicide treatment to address possible re-sprouting. Mechanical treatments can usually be done at any time of the year. With herbicides the level of success depends on several factors. They are; 1) the timing of the herbicide application; 2)the correct selection of herbicide to control the particular plant in question; 3)the prevailing weather conditions at the time of the application and 4)the proper use of the herbicide according to the label instructions. Failure to adhere to any of the above factors may result in less than optimal control. Herbicide applications should only be done by a licensed professional applicator.

The following is a list of some of the more common herbicides used in woodland situations.

Accord- Used for foliar application during growing season. A non selective herbicide in that it kills anything it comes in contact with. Active ingredient- glyphosate.

Arsenal- Used for site preparation for conifers. It is selective in that it will kill only broadleaf vegetation. Apply during growing season. Active ingredient- imazapyr.

Oust- Used for site preparation. It is used as a pre-emergent so it is applied during dormancy for pre-emergent control of grass and dormant weeds. Can be over-sprayed on some conifer species, but, must be done during dormant season. Active ingredient- sulfomenturon.

Roundup- Used for foliar application during growing season. A non selective herbicide in that it kills anything it comes in contact with. Active ingredient- glyphosate.

Banvel- Used for cut stump, frilling or foliar spray. May translocated via root grafts to desirable trees. Active ingredient: dicamba.

Tordon RTU- Used for cut stump or frilling of woody vegetation. It may translocate via root grafts to desirable trees so care must be exercised when using it. Active ingredient- picloram.

Garlon- Used for cut stump, foliar, frill or basal bark spray on woody vegitation. It comes in two different forms, Garlon 4 and Garlon 3A. Best used for treatment of stumps, basal bark spray or frilling operations. Active ingredients- triclopyr amine (3A) or triclopyr ester (4).

These are only a few of the many herbicides available. The only way to use any chemical safely and effectively is to read the label prior to using it.

THE ABOVE INFORMATION IS FOR INFORMATIONAL PURPOSES ONLY AND IN NO WAY SHOULD BE CONSIDERED AN ENDORSEMENT OF A PARTICULAR PRODUCT. READ ALL LABEL INSTRUCTIONS PRIOR TO USING ANY PRODUCT.

STAND MANAGEMENT SUMMARY

East woods			West Woods		
Date	Practice	Acres	Date	Practice	Acres
Winter 2015-2016	Post boundaries- weather resistant signs, posted every 75 feet on six foot metal posts. Simultaneous to the posting should be an organized trash collection effort (volunteers).	38.6	Winter 2015-2016	Post Boundaries- weather resistant signs, posted every 75 feet on six foot metal posts. Simultaneous to the posting should be an organized trash collection effort (volunteers).	44.5
4/2016	Identify areas for invasive control. Solicit contractor to accomplish. Priority should be on Japanese stilt grass and the wisteria.	4.0+/-	4/2016	Identify areas for invasive control. Solicit contractor to accomplish. Full treatment of large area of Japanese Barberry along western side of stand. Begin treatment of wisteria along north side of stand.	5.0+/-
Spring/summer 2016	Contractor implements control measures.	4.0+/-	Spring/summer 2016	Contractor implements control measures.	5.0+/-
Summer/Fall 2016	Spot control of other undesirables as needed (mile-a-minute, wisteria). Evaluate success of treatments.	As needed	Summer/Fall 2016	Spot control of other undesirables as desired (privet, English ivy) Evaluate success of treatments.	As needed

Date	Practice	Acres	Date	Practice	Acres
Spring/summer 2017	Identify and have contractor implement control measures on new sites. If desired, develop reforestation plan to address areas treated in 2016.	4.0+/-	Spring/summer 2017	Retreat Japanese barberry along western boundary. Retreat and expand treatment of wisteria along northern boundary.	5.0+/-
Summer/fall 2017	Spot control of other undesirables as needed (privet, English ivy, wisteria). Evaluate success of treatments.	As needed	Summer/fall 2017	Spot control of other undesirables as desired (privet, English ivy, wisteria, Norway maple, Amur (bush) honeysuckle. Evaluate success of treatments.	As needed
Spring 2018	Identify and contractor implements control measures on new sites. If desired, implement reforestation plan on areas treated in 2015-2016. Plant trees (volunteers).	4.0+/-	Spring 2018	Spot control on an as needed/desired basis.	As needed
Fall 2018	Evaluate success of control efforts	38.6	Fall 2018	Evaluate success of control efforts.	44.5

Author

Appendix

Shrub/Herbaceous/Invasive Plant Study – Washington Grove

Data collection done in early July 2015 & report done by Stephen Allgeier, Carroll Eco Tec, Westminster, Maryland

NED data compilation by Jesika Wrabel, Mar-Len Environmental, Westminster ,MD

Ariel view of study areas:

Current Land Use – Forest- Recreation used by residents of the Town.

Scope of Work

The inventory consisted of sampling the understory of 80+ forested acres on two distinct parcels (east woods and west woods). The east woods is approximately 38 acres and the west woods is approximately 44.5 acres. Although the two stands over-story structure differs significantly, the shrub/ground layer has many common attributes, especially the invasive plant population and its composition. The purpose of this inventory is to provide a more detailed sample of the ground layer herbaceous and woody plants and also inventory the non-native invasive plant populations.

Inventory Collection Method

Detailed data was collected on the two sites using approximately a 6 by 3 chain grid pattern (400 feet x 200 feet) with each center plot flagged in pink. Thirteen plots in stand 1 and 14 plots in stand 2 were collected using the NED data sheet (U.S. Forest Service Northeastern Decision Model) for forestry. The understory data utilized a fixed radius plot of 1/100 of an acre (11.77' radius from center point). The shrub layer composition and density were also recorded. Dominant herbaceous plants were identified and recorded by the botanist. Data sheets used to collect information were developed by the U.S. Forest Service (USFS). Data was analyzed using NED-2 software, developed by USFS for use with data on forests in the United States.

East Woods

Species List

Species	Latin	Understory	Ground
creeping jenny	*Lysimachia nummularia*		X
wild yam	*Dioscorea villosa*		X
ground ivy	*Glechoma hederacea*		X
Mexican bamboo	*Fallopia japonica*		X
False Solomon's seal	*Maianthemum racemosum*		X
spotted ladysthumb	*Polygonum persicaria*		X
deertongue	*Dichanthelium clandestinum*		X
shallow sedge	*Carex lurida*		X
slippery elm	*Ulmus rubra*	X	
blueberry	*Vaccinium corymbosum*	X	
wineberry	*Rubus phoenicolasius*	X	
winged burning bush	*Euonymus alata*	X	
Asiatic tearthumb	*Polygonum perfoliatum*	X	X
wisteria	*Wisteria sinensis*	X	X
Virginia creeper	*Parthenocissus quinquefolia*		X
spicebush	*Lindera benzoin*	X	
blackberry	*Rubus sp.*	X	
privet	*Ligustrum*	X	
pin oak	*Quercus palustris*	X	
white oak	*Quercus alba*	X	
red maple	*Acer rubrum*		X

Species	Latin	Understory	Ground
tulip tree	***Liriodendron tulipifera***	X	
black cherry	***Prunus serotina***	X	
American holly	***Ilex opaca***	X	
Japanese honeysuckle	***Lonicera japonica***		X
multiflora rose	***Rosa multiflora***	X	X
greenbrier	***Smilax rotundifolia***		X
Japanese stilt grass	***Microstegium vimineum***		X
blackhaw	***Viburnum prunifolium***	X	
eastern poison ivy	***Toxicodendron radicans***		X
English ivy	***Hedera helix***		X
Counts		16	18

Understory Species Composition and Diversity

Species Occurrence and Abundance

This table combines all height classes (if applicable) into a statistical summary for the understory, sorted by importance value.

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
blackberry	161.54	23.86	23.08	12.00	2.85	16.44	17.44
blueberry	138.46	20.45	15.38	8.00	2.31	13.33	13.93
wisteria	7.69	1.14	7.69	4.00	5.00	28.89	11.34
wineberry	76.92	11.36	23.08	12.00	0.92	5.33	9.57
privet	84.62	12.50	23.08	12.00	0.62	3.56	9.35
spicebush	69.23	10.23	15.38	8.00	1.54	8.89	9.04
blackhaw	23.08	3.41	7.69	4.00	1.92	11.11	6.17
black cherry	38.46	5.68	15.38	8.00	0.38	2.22	5.30

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
white oak	7.69	1.14	7.69	4.00	0.77	4.44	3.19
multiflora rose	23.08	3.41	7.69	4.00	0.23	1.33	2.91
deertongue	7.69	1.14	7.69	4.00	0.38	2.22	2.45
winged burning bush	7.69	1.14	7.69	4.00	0.08	0.44	1.86
tuliptree	7.69	1.14	7.69	4.00	0.08	0.44	1.86
slippery elm	7.69	1.14	7.69	4.00	0.08	0.44	1.86
pin oak	7.69	1.14	7.69	4.00	0.08	0.44	1.86
American holly	7.69	1.14	7.69	4.00	0.08	0.44	1.86

Description of Table Items

- **Density** = Mean number of stems per acre, based on stems counted in each plot.
- **Rel Density** = Mean relative proportion or abundance of stems by species. The mean number of stems of a particular species divided by total number of stems.
- **Frequency** = The percentage of plots where this species was observed, based on the number of plots where species occurred divided by total number of plots.
- **Rel Frequency** = Relative frequency of occurrence, based on individual species frequency divided by the total of all species frequencies.
- **Percent cover** = Mean percent coverage. The mean proportion of area that is covered by a vertical projection of the foliage onto the ground surface for all stems or individuals of a given species.
- **Rel Percent cover** = Mean relative percent coverage, based on the individual species percent coverage or basal area divided by the total percent coverage or basal area for all species.
- **Importance Value** = Importance Value, a value computed by arbitrarily adding together the values for relative abundance, relative frequency, and relative dominance and dividing by three.

Ground Layer

There were seventeen species found in the ground plots, with the following abundances:

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
greenbrier	484.62	45.99	100.00	23.64	27.77	37.84	35.82
Japanese Stilt Grass	61.54	5.84	61.54	14.55	30.85	42.03	20.81
Japanese honeysuckle	130.77	12.41	53.85	12.73	1.92	2.62	9.25
Virginia creeper	92.31	8.76	30.77	7.27	1.77	2.41	6.15
Mexican bamboo	61.54	5.84	38.46	9.09	1.23	1.68	5.54
English ivy	46.15	4.38	30.77	7.27	0.46	0.63	4.09
wisteria	15.38	1.46	15.38	3.64	3.85	5.24	3.45
shallow sedge	7.69	0.73	7.69	1.82	3.85	5.24	2.60
eastern poison ivy	38.46	3.65	15.38	3.64	0.15	0.21	2.50
Asiatic tearthumb	30.77	2.92	15.38	3.64	0.31	0.42	2.33
multiflora rose	23.08	2.19	7.69	1.82	0.23	0.31	1.44
creeping jenny	15.38	1.46	7.69	1.82	0.23	0.31	1.20
red maple	15.38	1.46	7.69	1.82	0.08	0.10	1.13
ground ivy	7.69	0.73	7.69	1.82	0.38	0.52	1.02
spotted ladys thumb	7.69	0.73	7.69	1.82	0.15	0.21	0.92

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
wild yam	7.69	0.73	7.69	1.82	0.08	0.10	0.88
False Solomon's seal	7.69	0.73	7.69	1.82	0.08	0.10	0.88

Exotic (non-native species)
Ten exotic species found in data.

Species	Understory	Ground
counts	**7**	**6**
wisteria	X	X
Japanese honeysuckle		X
wineberry	X	
privet	X	
multiflora rose	X	X
winged burning bush	X	
Asiatic tearthumb	X	X
Japanese Stilt Grass		X
Black Jetbead	X	
Mexican bamboo		X

Dominant Herbaceous Species

The most common herbaceous species within the plots and transects are Japanese stilt grass and greenbrier. Both species had populations as high as 90% within the 100th acre plot.

Japanese Stilt Grass (Microstegium vimineum)

Characteristics: The leaves are pale green, lance-shaped, asymmetrical, 1-3 in. (3-8 cm.) long, and have a distinctive shiny midrib. Japanese stilt grass is especially well adapted to low light conditions. Japanese stilt grass is an inhibiting plant It threatens native plants and natural habitats in open to shady, and moist to dry locations. Where deer are over-abundant, they may facilitate its invasion by feeding on native plant species and avoiding stilt grass. Increasing oak dominance and density will lead to additional oak leaf litter which in turn can reduce Japanese stilt grass prevalence.

Special notes/features observed:

Numerous drainage patterns were observed through the stand. Several different age deer also observed in stand on days of data collection – approximately 20 individuals. Browse damage, to native plant species, from deer were observed in 2/3 of plots (both stands). Below- deer rub from very large buck.

- View of vine density from plot 13:

- Greenbrier patches in solitary patches and combined with other vines and shrubs made many parts of the stand almost completely impenetrable. While this vine has clearly overtaken large areas in the stand, inhibiting the growth of most other plants, it is a native species common to forested wetlands. It is most dominant in the area identified as wetland in the stand.

shallow sedge

- Picture of shallow sedge (***Carex lurida)*** observed out of data plot

- Black Jetbead, a less common invasive, was observed in data plots and in stand between data plots. This old fashion ornamental shrub species, tolerates a varieties of soils and light conditions. Large sweeps of this shrub are forming patches that inhibit native plant regeneration. See pictures below:

List of herbaceous species found in the east woods with minor representation in plots and observed in woodland out of plots:

- Jewelweed, *Impatiens capensis*
- Jack-in-the-Pulpit, *Arisaema triphyllum*
- False Solomon's seal, *Maianthemum racemosum*

West Woods

Species List

Species	Latin	Understory	Ground
clear weed	*Pilea pumila*		X
burrdock	*Arctium minus*		X
sensitive fern	*Onoclea*		X
Indian strawberry	*Duchesnea indica*		X
chokecherry	*Prunus virginiana*	X	
Amur honeysuckle	*Lonicera maackii*	X	
partridgeberry	*Mitchella repens*		X
skunk cabbage	*Symplocarpus foetidus*		X
New York fern	*Thelypteris noveboracensis*		X
American red raspberry	*Rubus idaeus*	X	
log fern	*Dryopteris celsa*		X
slippery elm	*Ulmus rubra*	X	
garlic mustard	*Alliaria petiolata*		X
wine raspberry	*Rubus phoenicolasius*	X	
Asiatic tearthumb	*Polygonum perfoliatum*		X
wisteria	*Wisteria*	X	
Virginia creeper	*Parthenocissus quinquefolia*		X
grape	*Vitis*		X
spicebush	*Lindera*	X	
sassafras	*Sassafras*	X	
blackberry	*Rubus*	X	X
privet	*Ligustrum*	X	
Norway maple	*Acer platanoides*	X	
tuliptree	*Liriodendron tulipifera*	X	
hickory	*Carya*	X	
blackgum	*Nyssa sylvatica*	X	
flowering dogwood	*Cornus florida*	X	
black cherry	*Prunus serotina*	X	
Japanese honeysuckle	*Lonicera japonica*	X	X
multiflora rose	*Rosa multiflora*	X	X

Species	Latin	Understory	Ground
sweet cherry	***Prunus avium***	X	
barberry	***Berberis thunbergii***	X	
greenbrier	***Smilax rotundifolia***	X	X
browntop	***Microstegium***		X
blackhaw	***Viburnum prunifolium***	X	
eastern poison ivy	***Toxicodendron radicans***	X	X
English ivy	***Hedera helix***	X	X
southern arrowwood	***Viburnum dentatum***	X	
Black Jetbead	***Rhodotypos scandens***	X	X
Counts		26	20

Understory Description

Species Occurrence and Abundance

This table combines all height classes (if applicable) into a statistical summary for the understory, sorted by importance value.

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
spicebush	878.57	37.61	100.00	24.14	39.71	54.46	38.74
barberry	278.57	11.93	50.00	12.07	7.86	10.77	11.59
wineberry	185.71	7.95	35.71	8.62	4.93	6.76	7.78
slippery elm	300.00	12.84	21.43	5.17	1.57	2.15	6.72
multiflora rose	92.86	3.98	21.43	5.17	1.50	2.06	3.73
privet	57.14	2.45	21.43	5.17	1.43	1.96	3.19
Amur honeysuckle	92.86	3.98	7.14	1.72	2.50	3.43	3.04
Black Jetbead	7.14	0.31	7.14	1.72	4.64	6.37	2.80

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
greenbrier	57.14	2.45	14.29	3.45	1.79	2.45	2.78
blackberry	50.00	2.14	14.29	3.45	0.93	1.27	2.29
chokecherry	50.00	2.14	14.29	3.45	0.57	0.78	2.12
blackhaw	14.29	0.61	14.29	3.45	0.71	0.98	1.68
black cherry	42.86	1.83	7.14	1.72	1.07	1.47	1.68
Japanese honeysuckle	42.86	1.83	7.14	1.72	0.71	0.98	1.51
hickory	28.57	1.22	7.14	1.72	1.07	1.47	1.47
tuliptree	14.29	0.61	14.29	3.45	0.14	0.20	1.42
sweet cherry	42.86	1.83	7.14	1.72	0.14	0.20	1.25
wisteria	35.71	1.53	7.14	1.72	0.36	0.49	1.25
Norway maple	21.43	0.92	7.14	1.72	0.36	0.49	1.04
blackgum	14.29	0.61	7.14	1.72	0.36	0.49	0.94
flowering dogwood	7.14	0.31	7.14	1.72	0.36	0.49	0.84
southern arrowwood	7.14	0.31	7.14	1.72	0.07	0.10	0.71
sassafras	7.14	0.31	7.14	1.72	0.07	0.10	0.71
partridgeberry	7.14	0.31	7.14	1.72	0.07	0.10	0.71

Description of Table Items

- **Density** = Mean number of stems per acre, based on stems counted in each plot.

- **Rel Density** = Mean relative proportion or abundance of stems by species. The mean number of stems of a particular species divided by total number of stems.
- **Frequency** = The percentage of plots where this species was observed, based on the number of plots where species occurred divided by total number of plots.
- **Rel Frequency** = Relative frequency of occurrence, based on individual species frequency divided by the total of all species frequencies.
- **Percent cover** = Mean percent coverage. The mean proportion of area that is covered by a vertical projection of the foliage onto the ground surface for all stems or individuals of a given species.
- **Rel Percent cover** = Mean relative percent coverage, based on the individual species percent coverage or basal area divided by the total percent coverage or basal area for all species.
- **Importance Value** = Importance Value, a value computed by arbitrarily adding together the values for relative abundance, relative frequency, and relative dominance and dividing by three.

Core Flora

The core flora is those species common to every plot cluster. For this stand, the core flora is represented by one species representing 4.2 percent of the total number of species found in all plots. The core flora is listed below.

- spicebush (*Lindera*)

Ground Layer

There are thirteen plot clusters in the stand.
The ground cover or ground flora includes plant species in the shrub, herb layer, and moss-lichen layers. Therefore, this report includes data collected on all herbaceous (non-woody) flora, as well as smaller woody stems and shrubs.

Species Occurrence and Abundance

This table combines all height classes (if applicable) into a statistical summary for the ground, sorted by importance value.

Ground Species Occurrence and Abundance - Live Stems Only

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
Japanese Stilt Grass	35.71	5.68	35.71	14.71	5.21	25.26	15.22
Japanese honeysuckle	121.43	19.32	35.71	14.71	1.93	9.34	14.46

Ground Species Occurrence and Abundance - Live Stems Only

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
greenbrier	64.29	10.23	14.29	5.88	2.14	10.38	8.83
Virginia creeper	100.00	15.91	14.29	5.88	0.93	4.50	8.76
English ivy	71.43	11.36	28.57	11.76	0.64	3.11	8.75
skunk cabbage	7.14	1.14	7.14	2.94	3.93	19.03	7.70
partridgeberry	7.14	1.14	7.14	2.94	2.86	13.84	5.97
garlic mustard	35.71	5.68	14.29	5.88	0.36	1.73	4.43
Black Jet Bead	42.86	6.82	7.14	2.94	0.36	1.73	3.83
blackberry	28.57	4.55	7.14	2.94	0.14	0.69	2.73
New York fern	7.14	1.14	7.14	2.94	0.71	3.46	2.51
multiflora rose	21.43	3.41	7.14	2.94	0.21	1.04	2.46
burrdock	14.29	2.27	7.14	2.94	0.36	1.73	2.31
sensitive fern	14.29	2.27	7.14	2.94	0.14	0.69	1.97
Indian strawberry	14.29	2.27	7.14	2.94	0.14	0.69	1.97
eastern poison ivy	7.14	1.14	7.14	2.94	0.36	1.73	1.94
grapevine	14.29	2.27	7.14	2.94	0.07	0.35	1.85
log fern	7.14	1.14	7.14	2.94	0.07	0.35	1.47
Asiatic tearthumb	7.14	1.14	7.14	2.94	0.07	0.35	1.47

Ground Species Occurrence and Abundance - Live Stems Only

species	Density	Rel Density	Frequency	Rel Frequency	Percent cover	Rel Percent cover	Importance Value
Black Jetbead	7.14	1.14	7.14	2.94	0.00	0.00	1.36

Description of Table Items

- **Density** = Mean number of stems per acre, based on stems counted in each plot.
- **Rel Density** = Mean relative proportion or abundance of stems by species. The mean number of stems of a particular species divided by total number of stems.
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- **Importance Value** = Importance Value, a value computed by arbitrarily adding together the values for relative abundance, relative frequency, and relative dominance and dividing by three.

Dominant Herbaceous Species

– Many plots lacked or had extremely low amounts of herbaceous plant cover. Clearweed, *Pilea pumila* was, statistically dominant.

Exotic (non-native species)
Eleven exotic species found in data.

Species	Overstory	Understory	Ground
counts	**0**	**9**	**7**
wisteria		X	X
Japanese honeysuckle			X
wineberry		X	
privet		X	

multiflora rose		X	X
Winged burning bush		X	
Asiatic tearthumb		X	X
Japanese Stilt Grass			X
Garlic Musturd			X
Norway Maple		X	
English Ivy		X	X

Special notes/features observed:

Spring in northwest corner of stand.

Box turtle in Japanese Stilt Grass

Patches of Japanese stilt grass found in many data plots in stand. Although present in most plots it is not as widespread as found in the east woods.

- Large patches of wisteria along northern boundary in the west woods as well as several isolated patches. It needs to be controlled before it grows into the tree crowns.

Spicebush, while native, has such dominance in some plots that it appeared to inhibit other native shrubs and tree species regeneration. The large deer population, probably avoids browsing this plant – leading to it prevalence in many parts of both woodlands.

Extremely dense spicebush and wineberry(rubus):

Large canopy gap from storm damage to tulip poplars crowns had been produced in plot #7. The gap is approximately 1.5 acres and appears to have been produced 5+ years ago.

Vernal pool created by thrown tree, notice Japanese stilt grass on edge of pool:

Virginia stickseed found out of plots. This herbaceous species was prevalent but not found in data plots

List of herbaceous species found in west woods with minor representation in plots and observed in woodland out of plots:

- Enchanters nightshade, *Circaea lutetiana Canadensis*
- Indian pipe, *Monotropa uniflora*
- Virginia stickseed, *Hackelia virginiana*

DEER

As everyone is aware, the deer population in Maryland is abundant and has a very direct impact on woodland habitat. This is particularly evident in urban suburban areas where hunting is not present and contrary to popular misconceptions, there is still a great deal of suitable habitat for deer to survive and thrive. In a woodland setting the most direct impact deer have on the habitat is their browsing of desirable vegetation, trees and native shrubs specifically. When populations are too high the ability of trees to reproduce is greatly diminished due to the ability of deer to identify young succulent vegetation and eat it before it has a chance to become established. A simple test to see if deer populations are too high is to observe the browsing habits. If re-sprouts are browsed back to the stump or less desirable food sources (spice bush, multi-flora rose) are being browsed heavily then in all likelihood there are too many deer occupying the available habitat.

A large spice bush that has re-sprouted only to be repeatedly browsed back by deer.

For Washing Grove the options available to effect the present deer population in a way that would somehow improve the composition of the woodland are limited. The standard approaches to deer management are: 1) Hunting. Most state wildlife biologist consider hunting (with firearms) to be the most effective means to directly impact deer numbers. Given the very urbanized nature of the Washington Grove area hunting is either not allowed at all or is limited to bow hunting. Bow hunting within Town limits is a possible option, but usually does not result in a significant taking of animals and does have its risks and drawbacks (wounding of animals). 2) The controlled culling of animals under State direction. This is done in urban settings (larger parks, military installations, etc) but would not be workable within the confines of Washington Grove. 3) Keeping the deer out with deer fence. This a very common method used by forest managers in many states. Pennsylvania uses deer fencing extensively in very remote areas to exclude deer from woodlands. This is done in designated areas to allow them to regenerate back into trees. This would probably be the most logical option for the Town to take, but would cost some money. In Pennsylvania most fencing that is erected in forested setting is designed to be removed after a period of time. Any fence in Washington Grove would most likely have to be permanent. This would increase the cost significantly. It would also be somewhat unsightly, be an ongoing maintenance cost and not necessarily be 100% effective. Deer do get inside fenced areas and would eventually need to be removed, somehow. 4) Control via birth control measures. This is not commonly done and is not practical over a large area. It is very expensive and frankly does not work very well. It tends to be undertaken in very urban areas where the issue of deer and what to do about them is very political.

Recommendation:

Deer are native, they do need a place to live and they do provide some enjoyment to many of the users of the forest. The forest of Washington Grove currently provides some necessary habitat for deer. It is recommended that the Town continue to coexist with the deer. Any effort regarding deer fence should be limited to small areas as discussed in the plan.

HISTORY

Below is a 1924 report prepared by F.W. Besley, the first Maryland State Forester, prepared in 1924 for Washington Grove. Of interest is his comment regarding the presence of the many dead American chestnut trees. In all likelihood the forest at the turn of the 19th century was dominated by the American chestnut, but by 1924 most had died. His report was apparently focused on the developed area of the Grove. Also, of interest are his recommendations regarding the burning of the leaves. It was common to burn back then, but obviously things got out of hand and some trees were burned. His recommendation on the treatment of the fire damaged trees were common back then (concrete and all) but are not recommended anymore.

The second document is dated 1944 from the district forester at the time. By 1944 the Maryland Forest Service had grown from only a handful of men covering the entire state and led by F.W. Besley, into a larger operation with district offices, Laurel being the district office for central Maryland. The report is quite detailed. Of interest is the mention of the pine presence in the west woods and the possible use of the trees of forest products to help in the war effort.

of the bark, as this will enable the new wood to push out over the scar in the healing process. This work, however, should not be undertaken by the inexperienced.

It was also noted that in the cutting of branches from the large trees, that in most cases it was improperly done, leaving stubs which decayed at the ends and the decay is working down into the tree. This can be entirely avoided by cutting the branches close to the trunk and painting over the exposed surfaces to prevent infection. In the case of vigorous trees like those under consideration, the cut surface would heal leaving but a slight scar. In making cuts, however, care should be taken to prevent the bark from splitting. This is done by either sawing off the limb some little distance away, then cutting nearer, or by first making an undercut a few inches from the trunk of the tree.

The removal of trees along some of the avenues has made openings, whereas shade is needed. The question of planting is therefore one of immediate consideration. It is believed, in view of the character of the soil, that a reasonably quick growing tree is needed, yet one that will last for a long time and be in keeping with the surroundings. The American elm is the most satisfactory tree. These can be obtained from nurseries and should be planted early in the spring.

Examination of Trees at Washington Grove

BY

F. W. BESLEY, State Forester

July 29, 1924

At the request of Mr. Robert McP. Milans, a member of the Washington Grove Association, the writer, accompanied by Mr. Milans, examined the trees in the developed portion of the Grove. The purpose of the examination was to ascertain the condition of the trees and to determine what was needed for their care and protection.

The property is owned by an association of stock holders, operating under the control of a board of directors. There are some one hundred cottages on the property, a few occupied by permanent residents, but the majority are used only during the summer.

The Grove is a part of the original forest and consists of large sized trees, about 50% white oak, 20% black oak, and the remaining 30% various species such as scarlet oak, hickory, maple and gum. In the main open places a considerable amount of planting has been done, including shade trees and fruit trees.

The Grove as a whole is in excellent condition. The trees show good color, thrifty condition, and a surprisingly small amount of dead wood, considering the age of the trees. The chestnut trees have either died or are dying rapidly from the chestnut blight. Many of the dead trees have been removed, and the others should be removed as rapidly as they become unsightly or dangerous.

The hickory trees appear to be affected by the hickory borer, which has killed a few of them, and is likely to injure others. This borer works under the bark, and it is practically impossible to control it. Nothing can be done except to remove the trees when they die.

Several specific cases were called to the attention of the writer, and recommendations made on the spot. (1) Large double oak tree struck by lightning and partially dead inside of one of the yards: Since this tree is partially dead, is along one of the main avenues and is unsightly, it should be removed and one or more trees planted in its place. (2) A large black oak leaning over one of the cottages in the circle thought to be dangerous: The tree appears to be very sound and thrifty, and apparently there is no danger of its falling down or endangering the cottage. (3) Two or three white oak trees, one projecting through a portion of the porch roof, and with others forming a large group around the cottage where the shade is too dense to permit sunlight: It would be desirable to remove the three trees in order to extend the building and let in more light. Since there is an abundance of shade trees in the vicinity, there is no good reason why he should not be permitted to remove these trees. (4) A large scarlet oak standing near the old hotel property, leaning over the avenue toward a group of cottages: This tree is badly decayed in the heart, showing an unhealthy condition in the top branches and is considered unsafe. The tree should be removed.

Other unfavorable conditions were noted which need careful attention. It has been the custom for many years to rake up the fallen leaves and brush in the Grove and burn it. In past years, apparently those who have done the burning were not careful to keep away from the trees, and as a result many of them show bad fire scars. This was noted particularly near the old hotel. Fire that is hot enough to burn through the bark kills the cambium or living tissue of the tree. This protective covering removed, decay soon starts working into the tree, resulting in cavities and hollow trees. Once decay gets started, it works progressively into and up the stem of the tree reducing its vitality and weakening its trunk causing premature death or breakage. In burning the leaves they should be carefully raked away from the trunks of the trees, and the care-taker of the property should be especially cautioned.

Where fire has scarred the tree, but decay has not gotten started, it will be sufficient to remove the dead bark to the edges of the living wood painting over the sound surfaces with coal tar or some good lead paint. This would apply also to any injury to bark of trees that exposed the wood.

In the cases where decay has progressed to any extent, it will be necessary to chisel out the decayed wood down to sound tissue, then treat with an antiseptic such as Bordeaux mixture. Fill the cavity with cement, preserving the contour lines of the trunk, but only extend the filling to the inner edge

MARYLAND
DEPARTMENT OF STATE FORESTS AND PARKS

[redacted]
STATE FORESTER

THIS DEPARTMENT REPRESENTS THE INTEREST OF THE STATE
IN FORESTS, PARKS AND SHADE TREES

RALPH H. HERSHBERGER
DISTRICT FORESTER

October 10, 1944

OFFICE OF DISTRICT FORESTER
LAUREL, MD.

Irving L. McCathran,
Suite 304-305 McLachlen Bldg.,
10th & G Streets Northwest,
Washington-1, D. C.

Dear Mayor McCathran:

Enclosed herewith you will find a report of the woodland examination which I made of the woodland tract owned by the Town of Washington Grove on September 25th, 1944. It is regretted that the pressure of other work did not permit my forwarding this report at an earlier date.

If there are any further questions concerning the treatment for the timber I will be glad to discuss them with you and if it is desired to have the timber marked and estimated, in accordance with the recommendations contained in the report, please advise this office and we will put the request on our list and make arrangements to do the work as soon as possible.

Very truly yours,

R. H. Hershberger,
District Forester.

RHH/bh

Return to Roy

REPORT OF WOODLAND EXAMINATION

County	Montgomery
Owner	Town of Washington Grove
Mayor	Irving L. McCathran
Address	Washington Grove, Maryland
Examined by	R. H. Hershberger, District Forester
Date	September 25, 1944
Area	Approximately 75 acres
Location	Washington, Grove, Maryland

Description

The town has two tracts of woodland: one on the East side of the town containing approximately 25 acres, and the other on the West side containing approximately 50 acres.

The Eastern tract is roughly rectangular in shape with the long sides extending in a Northeast-Southwest direction. It is bounded on the South by Center Street, on the East by Ridge Road, on the North by fields and on the West by McCauley Street.

The Western tract is also rectangular in shape with the somewhat longer sides extending in a Northeast-Southwest direction. It is bounded on the East by the Washington Grove-Laytonsville Road and on the other three sides by fields.

Topography and Soil

The Eastern tract is almost level while the Western tract is nearly level in its Eastern section but slopes gently toward the West in the Western portion. These gradual slopes are cut up by two or three shallow gullies.

The soil appears to be clay loam, well drained.

Tree Species

The woodland is made up mainly of White Oaks, Red and Black Oaks and Tulip Poplar. Considerable Virginia Pine, some Black Gum, Red Maple, Pitch Pine, Hickory and a few Elm and Wild Cherry were seen.

Diameters & Heights

The diameters of the trees range from 3" to more than 26" D.B.H., with the mature timber averaging approximately 15" D.B.H.

The heights of the trees vary between 20' to about 80', with the mature trees averaging approximately 50'-55' in height.

Condition of Stand

These two tracts vary to some extent with regard to composition and condition.

Condition of Stand (Cont'd)

The Eastern tract consists of a pure stand of Hardwoods. The right of ways of three proposed streets have been cut through the tract dividing it into three sections. The Western section consists of a stand of mature trees of which a high percentage is White Oak 12" to 26" D.B.H. There is little reproduction between 2" - 10", but a rather thick understory of hardwoods 1" in diameter and under has established itself underneath the practically complete canopy formed by the large trees. In the middle section the trees range between 6"-20" D.B.H., with most of them over 10" D.B.H. Evidently some areas here have been partially thinned leaving openings in the canopy. In some sections there is little reproduction 2", the ground being taken over by Honeysuckle, vines and weeds, while in other sections there is some reproduction under 2" in diameter. Some of the larger mature trees tend to be defective or decayent. The forms of the trees are only fair, and height growth is only average. The timber in the Eastern section also varies with respect to condition. In some areas the trees range from 6"-26" in diameter with the understory being fairly open. Other sections contain mostly reproduction up to 8" in diameter with only occasional larger trees growing above the young trees. One or two small sections support stands of trees 2"-8" in diameter which show evidence of thinning.

While Hardwoods with the Oaks and Tulip Poplar most numerous, predominate in the Western tract, there is considerable Virginia Pine mixed with it in spots. Some of this Pine is 16"-18" in diameter. In the Northern section quite a number of large mature Tulip Poplar are in evidence. Some areas support a sparse stand of mature trees with a dense understory of reproduction 1"-6" in diameter. Other areas consist of reproduction 3"-12" D.BH., while still other areas are made up of reproduction 1"-6" in diameter through which are scattered larger trees 10"-14" in diameter. The mature trees are of better form and have attained better height growth on this tract. Considerable Dogwood occurs in the understory, and is still competing with the reproduction in those areas where the timber is rather young.

Wishes of Owner

To ascertain if the mature to overmature timber can be harvested to aid the war effort and yet retain enough of the healthy, well-formed trees for the development of the tracts in to grove or park-like areas for building sites and recreation.

Recommendations

In the Eastern tract many of the trees, especially those which are overmature, defective or decayent, over 16" D.B.H. could be removed. In sections where large trees are sparce and there is little reproduction of good size it may be desirable to leave large trees if they are sound healthy and thrifty to avoid creating too large an opening in the canopy. In other sections where a fair amount of reproduction 6"-12" occurs under or closely adjunct large mature trees, the larger trees could be removed. In those areas where merchantable trees are numerous, preference should

Recommendations (Cont'd)

be given White Oaks, Tulip Poplar, thinning out the less desirable Red Maple, Black Gum and Pin Oak. Of course badly deformed or defective trees of all species should be removed whenever possible. The objective here is to attain a park-like growth or healthy, good formed, well spaced trees with long life expentency.

In the Western tract many of the trees over 16" D.B.H. could be removed. However the groups of healthy Oaks near the recreational area and some of the large Tulip Poplar, if healthy, well-formed and thrifty regardless of size, could be retained for the esthetic value. All of the Pine and most of the less desirable species, such as Black Gum, Wild Cherry and Red Maple down to 10" D.B.H. could be removed to improve the quality and condition of the stand. The same would apply for the deformed or defective individuals of all species.

At the time the trees suitable for manufacture into lumber are marked, they could be measured to determine their value and volume for the benefit of the owner. This Department is prepared to render this service, if desired, provided that two helpers are furnished by the owner to assist the Forester in marking the timber.

Since there is a good market for firewood in this locality, it may be desirable to thin out some of the denser areas containing immature timber which is too small for lumber (under 10" DBH), especially on the Eastern Tract. In stands 4" -10" DBH where thinning is desirable White Oak, Red Oak and Tulip Poplar could be left at 12' - 16' spacing removing the intervening trees. The healthiest, straightest, best formed trees should be selected for retention. For selecting the trees to be reserved, all other things being equal, the following list is given in order of preference: White Oak, Tulip Poplar, Red Oak, Searlet Oak, Black Oak, Hickory, Red Maple, Black Gum, and Wild Cherry. The thinning process should aim at retaining the most valuable well formed trees and eliminating the less desirable or defective and in this way improve the quality and condition of the stand. This process would open up the stand to provide more room and food material for the development of the reserved trees and at the same time obtain firewood.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Montgomery County, Maryland
Survey Area Data: Version 9, Sep 30, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Montgomery County, Maryland (MD031)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1B	Gaila silt loam, 3 to 8 percent slopes	0.4	0.3%
1C	Gaila silt loam, 8 to 15 percent slopes	1.8	1.4%
2B	Glenelg silt loam, 3 to 8 percent slopes	12.3	10.0%
5A	Glenville silt loam, 0 to 3 percent slopes	25.3	20.4%
27B	Neshaminy silt loam, 3 to 8 percent slopes	50.2	40.5%
28A	Watchung silty clay loam, 0 to 3 percent slopes	6.8	5.5%
35B	Chrome and Conowingo soils, 3 to 8 percent slopes	24.1	19.5%
66UB	Wheaton-Urban land complex, 0 to 8 percent slopes	1.5	1.2%
66UC	Wheaton-Urban land complex, 8 to 15 percent slopes	0.7	0.5%
W	Census water	1.0	0.8%
Totals for Area of Interest		**123.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties

and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Montgomery County, Maryland

1B—Gaila silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: kx7m
Elevation: 100 to 2,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 255 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Gaila and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gaila

Typical profile

H1 - 0 to 8 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Minor Components

Baile

Percent of map unit: 5 percent
Landform: Flats

1C—Gaila silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: kx7n
Elevation: 100 to 2,000 feet

Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 255 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Gaila and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gaila

Typical profile
H1 - 0 to 8 inches: silt loam

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Minor Components

Baile
Percent of map unit: 5 percent
Landform: Flats

2B—Glenelg silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: kx8l
Elevation: 300 to 2,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 45 to 61 degrees F
Frost-free period: 110 to 235 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Glenelg and similar soils: 95 percent
Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glenelg

Typical profile

H1 - 0 to 8 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Minor Components

Baile

Percent of map unit: 5 percent
Landform: Flats

5A—Glenville silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: kx9v
Elevation: 250 to 1,050 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 120 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Glenville and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glenville

Setting

Landform: Drainageways, swales
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave

Across-slope shape: Linear
Parent material: Loamy colluvium derived from phyllite and/or loamy colluvium derived from schist

Typical profile

Ap - 0 to 8 inches: silt loam
Bt1, Bt2 - 8 to 30 inches: silt loam
Btx - 30 to 40 inches: loam
C1, C2 - 40 to 70 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 24 to 39 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 20 to 40 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C

Minor Components

Baile

Percent of map unit: 10 percent
Landform: Depressions, drainageways, hillslopes, swales
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave, linear

27B—Neshaminy silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: kx8d
Elevation: 400 to 1,600 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 155 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Neshaminy, very deep over gabbro, and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Neshaminy, Very Deep Over Gabbro

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from gabbro

Typical profile

A - 0 to 6 inches: silt loam
BE - 6 to 17 inches: silt loam
Bt1 - 17 to 32 inches: silt loam
Bt2 - 32 to 59 inches: channery silt loam
BC - 59 to 80 inches: very channery loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

28A—Watchung silty clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: kx8g
Elevation: 300 to 2,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 150 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Watchung and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Watchung

Setting

Landform: Flats

Typical profile

Ap - 0 to 9 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D

35B—Chrome and Conowingo soils, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: kx8s
Elevation: 330 to 1,000 feet
Mean annual precipitation: 35 to 52 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Chrome and similar soils: 50 percent
Conowingo and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chrome

Typical profile

H1 - 0 to 10 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

Description of Conowingo

Typical profile

H1 - 0 to 9 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 42 to 60 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D

66UB—Wheaton-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: kxb6
Elevation: 330 to 2,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Wheaton and similar soils: 50 percent
Urban land: 30 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wheaton

Typical profile

H1 - 0 to 6 inches: silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Minor Components

Baile

Percent of map unit: 5 percent
Landform: Flats

66UC—Wheaton-Urban land complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: kxb7
Elevation: 330 to 2,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Wheaton and similar soils: 50 percent
Urban land: 30 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wheaton

Setting

Landform: Hills, interfluves, knolls, ridges
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Human transported material derived from gneiss

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 68 inches: channery loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Minor Components

Baile

Percent of map unit: 5 percent
Landform: Flats

W—Census water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

GLOSSARY OF FORESTRY TERMS

ACRE - A unit of area used in land measurement equal to 160 square poles, 4,800 square yards or 43,560 square feet.

ADVANCE REGENERATION - Seedlings or saplings that are present in the understory prior to removal of any over story.

AGE CLASS - The grouping of trees in a forest that are of the same age.

ARTIFICIAL REGENERATION (reproduction) - Creation of a new age class by direct seeding, or by planting seedlings or cuttings.

AESTHETICS - The perception of beauty conveyed by a natural scene, a pleasant sight.

BASAL AREA - Total area of cross section of stems measured at breast height (WA feet above the ground), usually expressed in square feet per acre.

BEST MANAGEMENT PRACTICES - Guidelines establishing standards for all aspects of logging which have been developed to reduce sedimentation of streams.

BIOLOGICAL DIVERSITY - The distribution and abundance of different plant and animal communities.

CLEANING - A release treatment made in an age class not past the sapling stage in order to free the favored trees from less desirable individuals of the same age class which overtop them or are likely to do so.

CLEAR-CUT - An even-age method of regenerating a stand through the removal, in a single cut, of all trees larger than seedlings. In some situations, small numbers of trees may be left within the clear-cut opening for some special purpose.

CLIMAX FOREST - The final stage of forest succession.

COMPETITION - The constant demand of each organism for more growing space, light, nutrients and water.

COMPOSITION, STAND - The proportion of each tree species in a stand expressed as a percentage of the total number, basal area, or volume of all tree species in the stand.

CONDITIONING CUT - A harvest cut which is used to improve the overall health of the stand by removing mature, over mature, low vigor and poor quality trees. The result is a stand of better stocking, more vigorous and desirable species, increased diversity, quality and growth potential.

CONSERVATION - The wise-use of natural resources for future generations.

FLORA - Of or relating to plants, the plants of a particular region or time, a descriptive list of such plants.

FOREST HEALTH - Forest can be considered healthy when there is a balance between growth and mortality, and the forest has the resiliency to react and overcome various forest impacts. Potential forest stressors include insects, pathogens, weather, climate, pollution, and others.

FOREST PRODUCTIVITY - The ability of tree species to grow on a particular site; influenced by internal (tree physiology) and external (soil, climate) factors.

FOREST RESOURCES - Natural resources associated with forested ecosystems, included but not limited to; fish, air, clean water, wildlife, vegetation, soil, recreation and aesthetics.

FULLY STOCKED STANDS - Any stand containing a combination of basal area and sterns per acre sufficient to indicate optimum use of the available growing space.

GROUP SELECTION - A method of regenerating uneven-aged stands in which trees are removed, and new age classes are established, in small groups. The maximum width of the group is approximately twice the height of the mature trees, with these small openings providing micro environments suitable to regenerate shade intolerant tree species (requiring direct sunlight for growth). These areas are generally not more than one-quarter acre in size.

HABITAT - The specific combination of food, shelter, and water that is required to accommodate a species.

HARDWOOD STAND - Any forest stand in which the number of stems, basal area or volume consists of a majority of broad-leaf tree species.

IMPROVEMENT CUTTING - A cutting made in a stand past the sapling stage, primarily to improve composition and quality by removing less desirable trees.

INTERMITTENT STREAMS - Any water course which =Ties a visible flow of water periodically, usually depending on the season of the year, or the current and recent weather condition.

INTERMEDIATE TREATMENTS - A collective term for any treatment designed to enhance growth, quality, vigor, and composition of the stand after establishment of regeneration and prior to final harvest.

INVENTORY (forest) - The gathering of information on a forest to ascertain general forest health, site conditions, land area, composition, tree volumes, growth and mortality for purposes of providing for effective management planting.

LANDSCAPE - An area composed of interacting ecosystems that are repeated because of geology, land form, soils, climate, iota and human influences throughout the area.

MATURE FOREST- General statement regarding the age of a forest, indicating that a majority of the stocking is at an age where increase in volume growth will be minimal or negative.

NATURAL REGENERATION - A stand of trees created from natural seeding, sprouting, securing, or layering.

OLD-GROWTH FOREST - Forests that contain a wide range of tree sizes and ages, a deep, multilayered crown canopy, diverse shrub and for layers, and significant accumulations of coarse woody debris including snags and fallen logs Stands typically appear all-aged rather than even-aged. Large trees can be evidence that the old growth ecosystem has had sufficient time to develop diverse structure, although not all old growth stands have large trees, particularly on less productive sites. Large trees can exist in relatively young stands on very productive sites.

PARTIAL CUTTING - The removal of a specific segment or component of a stand in a single operation, followed by a series of operations which remove other components until a specific goal is attained.

PERENNIAL STREAMS - Any stream channel containing a visible volume of water throughout the year with the exception of drought periods.

PINE STAND - Any forest stand whose composition, based on number of stems, volume, or basal area, consists of a majority of pine species (trees with needles in bundles).

PRECOMMERCIAL THINNING - A thinning that does not yield trees of commercial value, usually designed to improve crop tree spacing.

PRESCRIPTIONS - The written instructions by a forester for the preparation and administration of a resource management practice.

PRUNING - To cut off or remove dead or living tree branches to improve tree growth, quality and commercial value of the tree.

RARE (species) - Species of a given region that are found in unusual habitats where local topographic or biotic factors provide conditions unfavorable for those species to have a more widespread distribution.

REGULAR UNEVEN-AGED (balanced) STAND - A stand in which three or more distinct age classes occupy approximately equal areas and provide a balanced distribution of diameter classes.

RELEASE - A treatment designed to free young trees from undesirable, usually overtopping, competing vegetation. Treatments include cleaning, liberation and weeding.

RESIDUAL STAND - The aggregate of trees remaining in a stand following a silvicultural practice or natural disturbance.

RIPARIAN ZONE - The immediate area influenced by the presence of a concentration of water, banks of streams, lakes or marshes.

ROTATION - The planned number of years between the regeneration of a forest stand and its final cutting.

SALVAGE CUTTING - The removal of dead trees or trees being damaged or killed by injurious agents other than competition, to recover value that would otherwise be lost.

SAPLING - A tree, usually young, that is larger than a seedling but smaller than a pole, generally between one and 5" in diameter.

SEDIMENTATION - The process of depositing soil particles through the movement of water creating a new soil strata.

SHADE INTOLERANT - A description assigned to any tree species whose seedlings are incapable of sustained development in low light.

SHADE TOLERANT - Plants that are more competitive in shaded environments through selection for low respiration rates, they also tend to have lower photosynthetic rates and hence grow slowly in all environments.

SHRUB - A woody plant of relatively low height, distinguished from a tree by having several stems rather than a single trunk.

SHELTERWOOD METHOD - A method of regenerating an even-aged stand in which a new age class develops beneath the partially-shaded micro-environment provided by the residual trees. In one or more succeeding harvests the residual stand is removed to fishy release the established regeneration.

SILVICULTURE - The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis.

SILVICULTURE SYSTEM - A planned process whereby a stand is tended, harvested, and reestablished. The system name is based on the number of age classes and/or the regeneration method used.

SINGLE TREE SELECTION - A method of creating new age classes in uneven-aged stands in which individual trees of all size classes are removed more or less uniformly throughout the stand to achieve desired stand structural characteristics.

SITE CLASS - A classification of site quality, usually expressed in terms of ranges of dominant tree height at a given age or potential mean annual increment at culmination.

SITE QUALITY (Productivity) - The productive capacity of a site, usually expressed as volume production of a given species.

SITE PREPARATION - Reduction of competing vegetation, the removal of physical obstacles to planting and the drainage of water toward or away from the planted trees - to insure successful establishment of new trees.

SITES - Areas considered by ecological factors with reference to capacity to produce forests or other vegetation; the combination of biotic, climatic, and soil conditions of an area.

SIZE CLASSES - Tree sizes recognized by distinct ranges, usually of diameter or height. SNAG - A standing dead tree from which the leaves and most of the branches have fallen.

SPECIES DIVERSITY - The amount of variety of life forms associated with an area. Often used as an indicator of the health of an ecosystem.

STAND - A contiguous group of trees sufficiently uniform in age, species composition, structure and growing on a site of sufficiently uniform quality, to be a distinguishable unit.

STAND DENSITY - A quantitative, absolute measure of tree occupancy per unit of land area in such terms as numbers of trees, basal area, or volume.

STAND IMPROVEMENT - A term comprising all intermediate cuttings made to improve the composition, structure, condition, health and growth of even or uneven-aged stands.

STAND PRESCRIPTIONS - A written evaluation of a forest stand including directions and guidelines to be applied in order to change the condition of the stand to some desired condition as expressed in the management plan.

STEWARDSHIP - The integration of managing, growing, nurturing and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat and aesthetics. A management ethic advocating practices designed to improve a resource.

STOCKING - An indication of growing-space occupancy relative to a pre-established standard. Common indices of stocking are based on percent occupancy, basal area, relative density and crown competition factor.

SUCCESSION (ecological) - A process of community development that involves changes in species structure and community processes over time.

SUCCESSIONAL STAGE - One in a series of usually transitory communities or developmental stages that occur on a particular site or area over a period of time.

SUSTAINABLE - To produce a steady predictable quantity of all resources over time.

THREATENED SPECIES - One which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. This species may be rare, but relatively stable in its population size, or it may be fairly common but declining rapidly.

THINNING - A cutting made to reduce stand density of trees primarily to improve growth, enhance forest health, or to recover potential modality.

TIMBER COVER TYPES - A descriptive classification of forest land based on present occupancy of an area by commonly recognizable combinations of tree species.

TIMBER SIZE CLASS - A descriptive classification grouping a broad range of tree sizes together based on the common utility of trees within that range.

TOLERANCE (SHADE) - The relative capacity of a plant to become established and grow in the shade.

TREE - A woody plant, distinguished from a shrub by having comparatively greater height and characteristically a single trunk rather than several stems.

TREE SHELTERS - A translucent plastic tube supported by a stake, placed around tree seedlings. Shelters protect seedlings from deer and small mammal damage and extremes in environmental conditions, thereby boosting the seedlings chances of survival and usually enhancing the growth rate.

TWO-AGED STAND - A stand composed of two distinct age classes that are separated in age by more than 20 percent of rotation.

UNEVEN-AGED STAND - A stand of trees of three or more distinct age classes, either intimately mixed or in small groups, separated in age by more than 20% of the rotation.

UNDERSTOCKED - A stand with any combination of basal area and stems per acre insufficient to optimally utilize the available growing space by the trees present.

WATERSHED - The landscape area contributing to the supply of a river or lake or drainage area. Or, the area of land upon which the excess water (runoff) enters a common stream.

WETLANDS - Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered with shallow and sometimes temporary waters, at least part of the year.

PROTECTING THE FOREST FROM WILDFIRE

Most wildfires in Maryland are caused by human activities: debris burning, arson, and children playing with fire.

The following regulations apply to activities occurring within 300 feet of woodland, or activities adjacent to flammable materials that could ignite and carry fire to woodland:

A person may not engage in open air burning except under the following conditions:

1. There is a natural or constructed fire break at least 10 feet wide, completely surrounding the material to be burned, which is free of flammable material.

2. Adequate personnel and equipment are present to prevent the fire from escaping.

3. At least one responsible person remains at the location of the fire until the last spark is out.

4. Burning occurs between the hours of 4:00 pm and 12:00 midnight EST, except when the ground is covered with snow, allowing burning to occur at any time as long as other requirements are met.

The effects of wildfire on woodland are complex. Fire damages larger trees by leaving wounds which heal slowly and provide a point of entry for insects and diseases. Fire endangers home and utilities in wooded settings. Beside the precautions listed above, a well-maintained road system also facilitates fire suppression, by creating a break and by providing access.

If you have further questions concerning the protection of forest land from wildfire, contact your loc

IN CASE OF FIRE CALL 911

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, *Governor*
Boyd K. Rutherford, *Lt. Governor*
Mark J. Belton, *Secretary*
Mark L. Hoffman, *Acting Deputy Secretary*

September 10, 2015

Bill Bond
Parkton Woodland Services
12001 Harp Hill Rd.
Myersville, MD 21773

RE: Environmental Review for Town of Washington Grove, east and west woods sites, Montgomery County, MD.

Dear Mr. Bond:

The Wildlife and Heritage Service has determined that there are no State or Federal records for rare, threatened or endangered species within the boundaries of the project site as delineated. As a result, we have no specific comments or requirements pertaining to protection measures at this time. This statement should not be interpreted however as meaning that rare, threatened or endangered species are not in fact present. If appropriate habitat is available, certain species could be present without documentation because adequate surveys have not been conducted.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2015.0952.mo

Addendum

Forest Stewardship Plan for the Town of Washington Grove
November 25, 2015

The following edits and corrections are noted:

Title Page – "Tax map: GT 11 parcel 54" is approximately the West Woods only. There are many other parcels depicted on Tax map GT 11 which collectively comprise the east woods and west woods. "Liber/folio: 677/454" is one of several deeds filed in the Land Records for the 1937 transfer of properties from the Camp Meeting Association to the new Town of Washington Grove. This deed is not specific to the east woods and the west woods.

Page 4, second line – "the" should be "they"

Page 4, last paragraph – "Washington Grove Road" should be "Washington Grove Lane"

Page 4, last paragraph – "There is no fencing along any of the west woods borders." is not correct. There is a chain-link fence along the Town's border with the Towne Crest development.

Page 5, last paragraph – "stand 2" should be "west woods"; "stand 1" should be "east woods"

Page 6, first paragraph – "spices" should be "species"

Page 25, last paragraph – "The the" should be "The"

Page 26, last sentence – "aesthesis" should be "aesthetics"

Appendix, page 1 – the arrow pointing to the west woods is misplaced.

It is recommended this addendum be filed and distributed with the document in lieu of reprinting.