

VEGETATION RESOURCE INVENTORY
FOR THE
HOME OF FRANKLIN D. ROOSEVELT NATIONAL HISTORIC SITE

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I INTRODUCTION

The Home of Franklin D. Roosevelt National Historic Site is located in Hyde Park, Dutchess County, New York on the east bank of the Hudson River. The Site contains 265 acres that lie between the Hudson River and U.S. Route 9. It includes the historic family home of F.D.R. and various other historic buildings, the F.D.R. Library, the F.D.R. rose garden and burial site, as well as about 175 acres of forested area.

Franklin Roosevelt was born, grew up, and lies buried on his Hyde Park estate. He initiated his own commemoration by donating to the federal government land for the F.D.R. library and for the National Historic Site. In 1939, Congress authorized the acceptance from Roosevelt of the 12 acres to be used as the site of the library. In 1943, the original portion of the historic site (33 acres) was conveyed to the U.S. by deed from Roosevelt. This was opened to the public as a National Historic Site on April 12, 1946, the first anniversary of the President's death. The rest of the area included in the present day historic site has either been donated to or acquired by the U.S. Park Service since that time.

The main purpose of this vegetation resource inventory was to survey the wooded area of this national historic site. The wooded area encompasses about 175 acres of the 265 acre site and does not include the fields, the orchard, the meadow, or the area around the historic buildings or library.

The objectives of this vegetation inventory are threefold: 1) to provide data needed to identify and preserve the natural resources of the site, 2) to identify relationships among these resources, and 3) to identify any resource related problems that could affect the preservation of this natural area. Optimal park management requires scientific data on the natural ecosystems of the park so that environmental deterioration can be minimized and visitor benefits from the resource can be maximized. Since baseline data on the vegetation resources of the park was completely lacking, this study was deemed necessary in order to provide the park with such data.

II METHODS

The objective of this vegetation inventory was to produce three products:

1) a vegetation map deliniating the vegetation types found on the Roosevelt property, 2) tables for each vegetation type listing the species composition with densities and dominance values for each species, and 3) a report describing each vegetation type and other important aspects of the resource such as Roosevelt's tree plantations, any legally protected species on the property, and the vegetational history of each type.

A field survey of the vegetation was conducted in order to gather data for the vegetation map and for the type descriptions. A sampling grid was laid out over the area establishing sample points 200 feet apart on north to south transects which were also 200 feet apart. There were a total of 143 sample points.

At each sample point, data was collected on plots of two sizes. For sampling the overstory vegetation a 1000 sq. ft. plot (18' radius) was used. On this plot the number of trees of each species was noted as a measure of density and percent cover of each species was noted as a measure of dominance. Percent cover was evaluated using six cover classes (see appendix) with each species being placed in one of these cover classes. This was based on the area of the plot covered by the foliage of that species if the crown boundaries were mentally projected vertically downwards on the plot.

A smaller plot of 1/100 acre (12 ft. radius) was used to evaluate the understory vegetation at each sample point. On this plot two aspects of the vegetation were evaluated separately: the shrub layer and the herbaceous layer. For the shrub layer (3 feet tall up to 3.5" D.B.H) data was collected in the same manner as was done for overstory: numbers and percent cover of each species under 3 feet tall were listed and the percent cover class of each species was evaluated.

Other data collected at each sample point included the general overstory stratum type (see appendix), the point basal area, the d.b.h. values of three trees (large, medium, and small), and an evaluation of any apparent successional trends

in the area of the plot.

Once this data on the species composition was gathered, it was used to map the various vegetation types on the property. The data was examined for differences in species composition between different areas. Aerial photographs of the area were also examined for vegetation differences. Using this combination of the field data and the aerial photographs, the property was divided into several vegetation types. These types were delineated on a clear acetate overlay over an enlarged aerial photograph.

The data from the vegetation survey was also used to make summary tables for each vegetation type. For each type, the species composition was summarized for the three strata: The overstory or tree stratum, the shrub and small tree (sapling) stratum, and the herbaceous (ground cover) stratum. For the overstory (all trees greater than 3.5 inches d.b.h.) and the shrub and small tree stratum, the density and cover value (dominance) was averaged for each species over all the plots in the vegetation type. These average density and average dominance values for each species were then used to calculate relative density and relative dominance values for each species:

$$\text{Relative density or dominance} = \frac{\text{density or dominance}}{\text{sum of densities or dominance values for all species}}$$

Relative density and dominance values serve to rate each species in a vegetation type on a scale of 100 so that the total of the relative density values for all species present adds up to 100.

In order to have one numerical value to represent the importance of each species in the stand, an importance value was calculated. The importance value was calculated by adding the relative density and relative dominance values for each species. Thus the species composition of any stratum can be evaluated by looking at the importance values (I.V.) for the species in the stand. The

species with the greater importance values are the species that are more important, based on their density and percent cover. The importance values for all species add up to 200 in any given stratum in any given stand.

For the herbaceous layer, the data were summarized a bit differently. Since only cover class (dominance) was evaluated for these species, one other measure was desired in order to evaluate the species importance. The frequency of each species was calculated to provide this second measure of species importance. Frequency is the proportion of the sample plots on which a species is found. Relative frequency was also calculated by dividing the frequency for each species by the total of the frequencies for all species. The importance value for the herbaceous layer was calculated by adding the relative dominance and relative frequency.

III THE VEGETATION RESOURCE OF THE FDR NATIONAL HISTORIC SITE

The vegetation on the property of the Franklin D. Roosevelt National Historic Site can be divided into six vegetation types. Each of these types differs from the rest in the dominant species present in them, the topographic location, and, in some cases, in the age of the trees within the type. Several of the types grade into each other so that the boundary between them is more of a gradual change than an actual boundary. In some cases the change from one type to the adjacent type is rather distinct. But for the most part the vegetation changes gradually in species composition from one area to the next.

The six vegetation types delineated on the property are 1) Hemlock, 2) Hemlock - Northern Hardwoods, 3) Mixed Hardwoods with maple dominant, 4) Mixed Hardwoods with oak dominant, 5) Early Successional Hardwoods, and 6) Chestnut Oak - Red Cedar. Several plantations of White Pine, Red Pine, Tulip Poplar, and Norway Spruce also occur on the property. These were planted by Roosevelt as part of the extensive reforestation that he practiced on his estate.

The vegetational patterns that occur in this area are closely related to the topography found here. There are several ridges running from north to south on the property; there are some lower areas of alternating dry hills and wetter hollows, and there are some bluffs that border on the Hudson River. The highest ridgetops are covered by the dry site Chestnut Oak - Red Cedar vegetation type. Much of the rest of the area is covered by the Hemlock type or the Hemlock - Northern Hardwoods type. There are also large areas of Mixed Hardwoods dominated by Sugar Maple. These areas change from being dominated by maple to being dominated by oak on some of the bluffs that border the Hudson River. These oak dominated areas were delineated as the Mixed Hardwoods - oak type. Certain areas of the property are covered by species characteristic of an earlier stage of forest succession. These areas of Early Successional Hardwoods have been disturbed in the recent past by clearing either for pasture or to provide a scenic vista to the Hudson.

The soil type of the area is also an important factor in determining the vegetation that occurs there. Soils are, in turn, associated with the topography. The soil on the property surveyed here is mapped by the U.S.D.A. Soil Conservation Service as "steep ledgy land (Wassaic and Staatsburg soil materials)". These soils are described as being seldom more than two feet thick over bedrock with numerous jagged ledges on steep slopes (30+% slopes). The bedrock here is calcareous sandstone or limestone bedrock which has frequent outcrops.

Mixed Hardwood - Oak vegetation type

The Mixed Hardwood - Oak vegetation type is found on a total of about four acres on the property on two bluffs that border the Hudson River and on another area along the southern boundary of the property. These areas are drier sites where Sugar Maple does not compete as well and where Red Oak competes better. The areas of Mixed Hardwoods - Oak are usually located adjacent to areas of Mixed

Hardwoods - Maple and are actually just a dry site variation of that type. The Mixed Hardwoods - Maple type changes from a Sugar Maple dominated forest to a forest where both Red Oak and Sugar Maple dominate in areas where the site becomes drier. These areas are what has been delineated as Mixed Hardwoods - Oak.

The species composition of the overstory in the Mixed Hardwoods - Oak type is a mixture of Red Oak and Sugar Maple along with some White Oak and White Ash. The stands are uneven-aged. The largest tree that was measured on each sample averaged 16.2 inches d.b.h. The medium-sized trees that were measured averaged 9.6 inches d.b.h., while the small trees averaged 5.6 inches d.b.h. These three d.b.h. values for large, medium, and small trees give an idea of the general diameter distribution of these Mixed Hardwood - Oak stands. The wide range in values from large to small indicates the representation of several ages in the stand.

The basal area of the Mixed Hardwoods - Oak type is about 113 sq. ft./acre. This is not very different from that of the maple dominated type or from most of the other types. In some portions of this vegetation type, however, the stands are rather open with lower basal areas of 70 to 80 sq. ft./acre. These lower density stands are typically located on the edges of the bluffs that border the river.

The understory stratum of shrubs and tree saplings (from 3 feet in height up to 3.5 inches d.b.h.) in the Mixed Hardwoods - Oak type is dominated by Sugar Maple regeneration. Sugar Maple saplings are the most important species in this stratum in terms of numbers and percent cover. This fact would seem to indicate that the species composition of this stand is changing from being oak dominated to maple dominated. Since there is abundant Sugar Maple regeneration here but very little oak regeneration, it seems likely that any openings in the canopy created by the death of a tree will be filled by sugar maple. It must be considered,

however, that even though there are not very many oaks present, this species is capable of responding to canopy openings a bit faster than Sugar Maple. So one oak sapling may be able to out compete several Sugar Maples for a place in the canopy. It also must be recalled that since these Mixed Hardwoods - Oak stands occur on drier sites, the Red Oak is going to be able to out compete the Sugar Maple because of its adaptation to such site conditions. This means that although there is a lot of Sugar Maple in the regeneration of these stands, many of these may not survive to a very large size if competing with oak.

Besides Sugar Maple, the shrub and small tree stratum in this vegetation type also includes Spicebush, Maple-Leaf Viburnum, Witch Hazel, and Hornbeam. Most of the plots in this vegetation type have an understory cover class rating of 5 indicating a fully developed stratum here. In places, particularly in the wet spots, Spicebush may form a very dense understory stratum, making movement through these areas difficult. Although in typical oak-dominated communities Maple-Leaf Viburnum may form a dense understory layer, in this area it does not occur at such high densities. This may be an indication of the similarity of this Mixed-Hardwoods Oak type to the Sugar Maple dominated forest and its lack of similarity with the mixed oak forests typical of the New York-New Jersey-Connecticut area.

The herbaceous layer in these Mixed Hardwoods - Oak stands (3 feet in height and lower) is dominated by False Solomon's Seal, Sugar Maple seedlings, Aster, and Goldenrod. This herbaceous layer is relatively dense, usually covering about 3/4 of the plot. The sample plots for this type have an average cover class rating of 4.5 for the herbaceous layer.

There are several components of the herbaceous layer here that, although they only have 1% cover or less, are still of special interest. One of them is Helleborine (Epipactus helleborine) a member of the Orchid family all of which ^{is} are legally protected. Another species found here is Bloodroot (Sanguinaria

canadensis) which is also legally protected. These two species with less than 1% cover on any of the plots that they're found on, both have frequencies of 13.3 indicating that they are found on 13.3% of the sample plots in this type. A third species, Squawroot (Conopholis americana), is found more frequently than the other two species; it has a frequency of 20% of the plots. Squawroot is an interesting species in that it is a parasitic plant feeding on the roots of trees, especially oaks.

Mixed Hardwoods - Maple vegetation type

The most prevalent vegetation type on the Roosevelt property is the Mixed Hardwoods - Maple vegetation type. There is about 85 acres of this type in which Sugar Maple is by far the most common species in terms of numbers and percent cover. There is one large area of this type of vegetation in the northwestern corner of the property and another large area in the southeastern corner. These areas are relatively flat topographically compared to the ridges and ravines that cover the rest of the property.

Besides Sugar Maple, the most common species in the overstory are White Ash and Black Birch. In any given area there are usually several species present, one of which is almost always Sugar Maple. There is a total of seventeen species found in the overstory stratum in this vegetation type.

The canopy in these stands is relatively dense, not allowing much light to pass through to the forest floor. This is due to the tendency of the crowns of Sugar Maple to spread out in such a way that they occupy all the available space, while the crowns of other species tend to be thinner and not as spreading. The average basal area of these stands is about 97 sq. ft./acre which is about the same as in the other vegetation types.

These stands are uneven-aged in structure with trees of several age classes present. There are not many larger trees (trees greater than 20 inches d.b.h.)

present. The largest tree on each plot averages 15.0 inches d.b.h. This scarcity of large, mature trees would seem to indicate that the stand was cut over at some time in the past. This must have been some degree of partial cutting that removed enough of the larger trees to allow a new age class to come in and left enough smaller trees to grow into the mature trees that are present today. The average of the medium sized trees on the plots is 8.6 inches d.b.h., while the small trees have an average of 5.2 inches d.b.h.

The shrub and small tree portion of the understory in the Mixed Hardwoods-Maple type is well developed. It is strongly dominated by Sugar Maple saplings just as the overstory is dominated by mature Sugar Maple. Other important species here are Witch Hazel, Bladdernut, and Spicebush. There is a total of 24 species found in this stratum, most of which do not have very large importance values. This stratum is characterized by a few species that are common and many other species that occur less frequently.

The herbaceous portion of the understory is quite diverse in species composition. There are a total of 59 species found here. Most of them, as was the case in the shrub layer, occur only infrequently while a few are relatively common. The most important species in this stratum are False Solomon's Seal, Sugar Maple, Virginia Creeper, Aster, and Solomon's Seal. These all have relatively high importance values. Again, Sugar Maple is an important component of the vegetation.

In the Mixed Hardwoods - Maple vegetation type, the composition of the overstory is similar to that of the understory in terms of tree species. In some of the other vegetation types there are species that are important in the understory (tree regeneration) which are not as important in the overstory. This is an indication of a possible future change in the overstory species composition, since the new generation of trees (the regeneration) is of a different species. In this vegetation type, however, the situation is different. Sugar Maple, the

dominant species in the overstory, is also the dominant species in the understory. This leads to the conclusion that the species composition here will not change very much in the future. The present vegetational composition is probably close to the climax vegetation for this type of site.

Hemlock vegetation type

The Hemlock vegetation type consists of about 32 acres located on the steeper, rocky areas and on the areas of swales and hollows. These stands, dominated by Eastern Hemlock, have quite a different appearance than the other vegetation types. They are much more open underneath, having less understory cover. There seems to be fewer large trees here also. Many of these stands are located along the streams or in ravines in areas that provide a cooler, moister environment for plant growth.

In addition to Hemlock, which is the species with the greatest density and dominance in this vegetation community, Sugar Maple and Black Birch are also important. Several other species are found in these stands in lower densities than the maple and birch. Hemlock is the most obvious and distinctive component of the stands, however. The deciduous component of these stands may make up as much as 50% of the overstory cover, with the remainder consisting of hemlock.

Another distinctive characteristic of this overstory is that it has a higher basal area per acre than any of the other vegetation types. The average basal area in the Hemlock vegetation type is 140 sq. ft./acre. This is quite a bit greater than any of the other vegetation types. This indicates that these Hemlock stands may have a denser overstory canopy than many of the hardwood stands. Also, the foliage of a coniferous canopy tends to filter out light of a different spectral quality than that filtered out by a deciduous canopy. This means that, even if the coniferous crowns themselves do not appear denser than

the deciduous crowns, they will result in a darker understory. For this reason, a stand with a high basal area in Hemlock will tend to have less light available for plant growth.

The shrub and small tree layer in the Hemlock stands is evidence of the lack of light available in the understory for plant growth. This stratum is not nearly as well developed as in the other stands. The cover class values for the plots in these areas are usually 3's (25 to 50% cover) and often 2's (5 - 25% cover), the average being 2.9. In comparison to the Mixed Hardwoods types, the Hemlock type does not have the distinct, well developed shrub and small tree layer that the hardwood types have. This gives the Hemlock type a more open appearance and allows greater visibility through the stands. These stands, consequently are much easier to walk through than the shrubby hardwoods stands.

The shrub and small tree layer is dominated by Sugar Maple, Hemlock, Maple-Leaf Viburnum and Spicebush. It is interesting to note that the Sugar Maple here is greater in density and dominance than the Hemlock. Although there is more Sugar Maple in the understory than Hemlock, this does not necessarily indicate a change in species composition toward more Sugar Maple in the overstory. Hemlock is able to survive under a dense overstory for longer periods than Sugar Maple. So, although there are many Sugar Maple saplings, many of them will not survive long enough to reach an overstory position.

2. Therefore, the species composition of the overstory here is not changing and most likely will not change much in the future. The species composition of the overstory is probably close to the climax vegetation for the area.

The herbaceous stratum of the overstory is also less well developed than that in the hardwood stands. The cover class value on many of the plots is 3 which represents 25 to 50% ground cover. A visual inspection shows this lack

of development to be rather obvious. The ground vegetation is sparse with patches of bare ground in places. As with the shrub and small tree stratum, the lack of development of this stratum can be at least partially attributed to the higher density of a coniferous canopy which allows less light and light of a lower spectral quality to pass through to the forest floor. Other factors contributing to the lack of ground vegetation may include the greater acidity of the soil due to the evergreen litter from the Hemlocks. This may make these sites less favorable for the growth of most species.

The species most important in the herbaceous stratum of the Hemlock vegetation type are Spinulose Wood Fern, Sugar Maple, Maple-Leaf Viburnum, and Asters. In addition to these four species, there are many others which can be found in these stands making the total number of species found here 37.

One species of interest found in the Hemlock stands is Helleborine (Epipactus helleborine), a member of the Orchid family. This plant, like all members of the Orchid family, is protected in New York State. It is about 8 inches to a foot tall with leaves having parallel venation and several greenish-yellow flowers along the main stalk. It is found only infrequently in the Hemlock type on about 10% of the plots with usually only one or two plants found per plot (less than 1% cover).

Hemlock - Northern Hardwoods vegetation type

The Hemlock - Northern Hardwoods vegetation type is a transitional type which is halfway between the Hemlock type and the Mixed Hardwoods type in terms of species composition. It consists of about 36 acres located throughout the property usually between areas of Hemlock and areas of Mixed Hardwoods.

The species composition of the overstory is dominated by Hemlock which has a lower importance value here than in the Hemlock vegetation type (88.1 as opposed to 98.0). Sugar Maple and Red Oak are the second two most important

species here. Sugar Maple has a slightly greater importance value here than in the Hemlock type. The main difference between the Hemlock and the Hemlock - Northern Hardwoods types is that Red Oak is more important in the Hemlock - Northern Hardwoods type, whereas Black Birch is more important in the Hemlock type. This indicates a site difference between the two types: Black Birch is a species of moist environments while Red Oak is a species of drier sites.

Another characteristic which distinguishes these stands from those of the Hemlock type is the basal area. The average basal area of the Hemlock - Northern Hardwoods stands is 119 sq. ft./acre. This is closer to the basal area of the Mixed Hardwoods and other types than to the Hemlock type. The lower basal area here should allow for a greater development of the understory layers than in the Hemlock type due to greater light penetration through a less dense canopy with fewer evergreen trees.

The shrub and small tree portion of the understory in these Hemlock - Northern Hardwoods stands is moderately well developed with the cover class values on the 29 plots averaging 3.5. This is greater than that in the Hemlock stands, as was expected, due to the lower basal area here and the consequently more open canopy. These stands do not have the open appearance of the Hemlock stands, but rather have a moderate degree of shrub and small tree development.

The most important species in this stratum is Sugar Maple, just as in the Hemlock type. The next three most important species are Hemlock, Maple-Leaf Viburnum and Witch Hazel. The species composition here is very similar to that in stands designated as Hemlock. One difference is that there are a total of 22 species found on these plots compared with 15 found on the plots in the Hemlock type.

The herbaceous layer of the understory, however, is different in species composition from that in the Hemlock type. The number of species found in the

herbaceous layer is similar but the species that are important there are different. As in the Hemlock type, Aster, Sugar Maple, and Maple-Leaf Viburnum are all important. But in addition, in these Hemlock - Northern Hardwoods stands three other species also have relatively high density and dominance values: Christmas Fern, Solomon's Seal, and False Solomon's Seal.

In addition to the species composition difference, the herbaceous layer here also differs from that in the Hemlock stands in terms of cover class of the stratum as a whole. Whereas many of the stands in the Hemlock type are rather sparse in terms of ground cover, the plots here tend to have more well developed ground cover. The average cover class for the herbaceous stratum here is 3.0 which is equivalent to 25 to 50% cover.

Species of interest found here include Striped Maple and Rattlesnake Fern. Both of these have less than 1% cover on the plots where they're found. Striped Maple is a species of the birch-beech-maple forests found further north and is not common in this area except in mountainous areas. The Rattlesnake Fern is a relatively uncommon species that is found occasionally throughout the property. It is a protected species in New York State just as are most of the ferns. Helleborine (Epipactus helleborine) which is also found in the Hemlock type, is also found in the Hemlock - Northern Hardwoods type.

Early Successional Hardwoods vegetation type

The Early Successional Hardwoods vegetation type covers about 15 acres on the Roosevelt property. These are young stands where a disturbance has occurred within the past 50 years which has resulted in the regeneration of a new stand.

The species found in the overstory here are species typical of stands in the earlier stages of forest succession: Elm, Black Locust, and Ailanthus (tree-of-heaven). These are species that are capable of taking advantage of

the open conditions in an abandoned field or recently cut over area and becoming established there. Elm and Black Locust are intermediate and intolerant, respectively, in terms of shade tolerance. This means that although they grow quickly under open canopy conditions, they cannot survive under a closed canopy and will eventually give way to more shade tolerant species unless seedling establishment is favored by heavy cuttings. Ailanthus, or the ~~tree-of-heaven~~^H, is an introduced species capable of invading sites unfavorable to many other species and can grow very quickly. It is, in fact, one of the faster growing species in the area.

Sugar Maple, a shade tolerant species, is also an important component of these stands. Its presence in the overstory of these stands indicates that their species composition is in the process of changing from Elm, Black Locust, and/or Ailanthus to Sugar Maple. This is because of the shade intolerance of these early successional species which makes them unable to compete successfully with the shade tolerant maple for a space in the canopy.

The shrub and small tree layer of the understory is fairly well developed in most of these stands, with an average cover class for all plots of 4.3. Sugar Maple is by far the most important species here, with Spicebush, Ailanthus, and Elm of secondary importance. The high density and dominance values of Sugar Maple in the understory here support the theory that these stands are succeeding to Sugar Maple. The abundance of the shade tolerant Sugar Maple regeneration and the scarcity of the other, less shade tolerant, species suggests a change toward a greater proportion of Sugar Maple in the future stand.

The herbaceous layer of the Early Successional Hardwoods type is also relatively well developed, having an average cover class of 3.9. Most of the plots have ground cover that covers 75% or more of the plot (cover class of 5), although a few have a rather sparse cover of 5 to 25% (cover class of 2). The

most common species of this stratum are Garlic Mustard, Jack-in-the-Pulpit, Poison Ivy, False Solomon's Seal, Sugar Maple, Enchanter's Nightshade and Spicebush. No one of these species has a greater average density or dominance, but all of these along with others are common in the early successional stands.

There are two types of stands that are classified as Early Successional Hardwoods here: stands that were formerly fields and stands where the disturbance was compound. The two areas of Early Successional Hardwoods located at the northern boundary of the property of about one acre each are both former fields or pastures. These stands are characterized by very definite boundaries, a composition of mostly Black Locust, Elm, Tulip Poplar, and Sugar Maple, and are about 25 years old. It appears that they were either farmed or pastured in the past and then abandoned probably about 25 to 30 years ago. Since abandonment, these areas have slowly been invaded by the early successional forest vegetation. It is difficult to tell whether this area was a pasture used to graze animals or whether it was tilled. Examination of old aerial photos, however leads to the conclusion that these two areas were part of one contiguous, irregularly shaped area that was not tilled but may have been used either for pasturing or for hay.

The area of Early Successional Hardwoods found toward the southern part of the property has been formed by more than one disturbance. Most of the area was once part of an area that was field or pasture like the areas described above, probably being abandoned sooner than those areas were, thus making the forest here about 30 years old. Portions of this area, however, have been disturbed repeatedly to provide a vista to the Hudson River. One area, a strip stretching from the Roosevelt home to the cove, was cleared in 1960 by the Park Service to maintain this scenic vista. Most of the area is presently occupied by *Ailanthus*.

So, this southern section of early successional hardwoods is a mosaic of stands some of which represent a slightly later stage of forest succession than the northern boundary stands and others which are more recently disturbed and are now occupied by Ailanthus.

Chestnut Oak - Red Cedar vegetation type

The Chestnut Oak - Red Cedar vegetation type consists of about seven acres found on the tops of the ridges that run from north to south on the property. These ridges are steep and rocky with elevations of 100 to 200 feet above sea level. The Chestnut Oak - Red Cedar vegetation which covers them is rather sparse in terms of overstory stratum cover. The average percent cover value for the overstory is 4 which represents from 50 to 75% cover. The basal area is 70 sq. ft./acre which is quite low, the lowest of any of the six vegetation types found on the property. These open stands are situated on the ridge tops which are generally rocky and exposed, often with large areas of bare rock outcrops. Other species found in the overstory are White Ash, Red Oak, Hornbeam, and Mockernut Hickory. There are fewer species here than there are in the overstory of any of the other vegetation types. This is evidence of the less favorable site conditions found here. Most of the components of the vegetation here are adapted to drier sites, particularly the dominant Red Cedar and Chestnut Oak. This is the only vegetation type on the property in which Sugar Maple, a more demanding species is not a component of the overstory.

The shrub and small tree stratum on these ridge tops is relatively well developed (average cover class of 4.3) often being dominated by Shortstalk Arrowwood. This shrub often occurs in dense clumps and is characteristic of dry areas. Other species common in the understory are White Ash, Sugar Maple, Oaks, and Mockernut Hickory. Although Sugar Maple is present in the shrub and small tree stratum, it cannot compete well enough

with the Red Cedar and the oaks to grow into the overstory. The presence of White Ash here and its relatively high density and dominance values is rather unexpected. This species tends to be demanding and is usually found on more moist sites as opposed to the dry sites as we have here. But since White Ash is a relatively important component on several of the plots in both overstory and understory layers, it must be finding favorable growing conditions in sheltered or less exposed areas where the soil is deeper such as in cracks or spaces between rocks.

Because of the dry, exposed conditions in this vegetation type, the species composition would not be expected to change very much. The species here represent an edaphic climax which is adapted to these conditions that are unfavorable to other species. Other species, such as Sugar Maple and White Ash, which are part of the general climax vegetation on more mesic sites are not able to compete well enough under these dry, exposed conditions and therefore will never become components of the overstory here.

The herbaceous layer on these ridge tops is generally well developed, although on some plots the rock outcrops prevent the establishment of ground cover vegetation. These rock outcrops generally occur on the very tops of the ridges, with ground cover being better developed as you go down the slopes of the ridge. The main components of the herbaceous stratum here are Common Polypody, Marginal Wood Fern, Virginia Creeper and False Solomon's Seal. One interesting species that occurs relatively frequently in the Chestnut Oak - Red Cedar vegetation type is the Prickly Pear Cactus (Opuntia humifusa). This cactus is often found growing in large groups of several square feet on the very tops of the ridges in the open rocky areas. This species is the only wide spread cactus in the east and it gives these ridge tops a definite dry site appearance.

IV LEGALLY PROTECTED PLANTS ON THE FDR NATIONAL HISTORIC SITE

One of the objectives of this study was to determine if there are any plant species on the property that are listed as rare, threatened, or endangered. If any such plant species were found on the property, knowledge of their location would be desirable in order to help protect them and to add to the documentation of rare plants in New York State.

Out of the total of 132 plant species found on the sample plots, none of them were species listed as rare in New York State (1). Although no rare species were found on the sample plots, it should be noted that it is still possible that rare species may occur on areas that did not fall within sample plots. Also, since the tidal marsh areas along the western boundry of the property were not sampled, it is possible that rare species may be found here. In fact, this cove area along the Hudson River, which is a tidal estuary as far north as Albany, provides a type of habitat in which rare species have been found in other localities. It may be desirable, therefore, to have the tidal marshes on the property sampled at some later date by a botanist specializing in aquatic species. This would provide the desired information for the park on whether or not there are any rare plants within its boundaries.

Although there are no plants on the sample plots that are listed as rare, several species were found that are legally protected in the state. The New York State list of protected plants is a list of plants that botanists in the state have determined should be protected from commercial exploitation and from gathering for decorative purposes or cultivation. It was created to discourage the indiscriminant collection of certain plants on state and private lands without permission. This list was enacted into law in 1974 with the law stating that no person may pick or otherwise remove any of

the listed plants without the permission of the owner of the land.

There are sixteen species found on the Roosevelt property that are legally protected species (see appendix). The significance of this for the park is not that great, since it is illegal to pick or gather plants within the park without permission. There is some significance, however, in knowing that there are plant species on park property that botanists have determined to be in need of legal protection. The park, with its prohibition on the picking of any plant, provides a type of sanctuary for these species as well as all of the other species found here.

V ANTHROPOGENIC IMPACTS TO THE VEGETATION RESOURCE

An important factor to evaluate in analyzing the vegetation resource at FDR National Historic Site is man's influence and impact on the resource. Any such impacts and effects must be minimized in order to meet the park's objective of preserving the resource here in the state in which it was left by FDR at his death. Before this goal can be met, these impacts must be identified and their threat to the goal of preservation evaluated.

Several anthropogenic impacts have been identified in the park as possible threats to the resource. The first and most serious of these is the presence and spread of exotic species which are not native to the vegetation here. An exotic species is defined here as any species which has been introduced by man, either accidentally or intentionally, to an area where it is not a part of the natural vegetation. Introduction of exotics can occur in several ways. For example, a species may spread from an area of cultivation (garden, plantation, yard, etc.) into a natural area nearby. Examples of this on the FDR property are Tulip Poplar and Japanese Barberry.

Tulip Poplar (Liriodendron tulipifera) has become established in the

natural area from seed dispersed from Tulip Poplar in FDR's tree plantations. Tulip Poplar is found in many locations in the natural area. It becomes established readily since Dutchess County, where Hyde Park is located, is part of this species natural range. Tulip Poplar is considered an exotic here because, although this is part of the northern limits of its range, it is not a component of the natural vegetation here. It's presence here is due to man's influence: The planting of trees in plantations.

Japanese Barberry is another exotic that has escaped from cultivation. This species is often planted as an ornamental shrub. Several individuals have been located in the natural area where they have most likely been introduced by birds that eat the berries.

There may be many other exotic species in the natural area that were not located in the sampling. The tidal marshes are a favorable habitat and may harbor many additional exotic species.

In addition to escape from cultivation, exotic species are often introduced in other ways. An example of an exotic species that was not introduced by escape from cultivation is Ailanthus or the Tree-Of-Heaven (Ailanthus altissima). This is a weedy species and has spread very rapidly and widely in North America since its introduction, probably in the early 1800's. Native to China, it has been introduced widely in Europe and was brought to the U.S. by way of England where it was used for silk worms and similar species and this may have been the reason for its introduction here. It is a species that is able to grow quickly and survive under adverse conditions. Thus, after its introduction, it spread so rapidly that it has become quite widespread. In the past it has been planted as an ornamental, but it has come to be considered a pest. The male flowers produce an objectionable odor, the roots get into drains and wells, and the trees sprout prolifically after cutting.

Ailanthus is an example of an introduced species which has become a threat to other species and to whole plant communities. On disturbed sites it becomes established to the exclusion of the native pioneer species. In areas on the Roosevelt property which have been disturbed in the past, Ailanthus has become established in large numbers. There are areas which are dominated totally by Ailanthus. This represents a destruction of the natural vegetation and can be considered quite a threat to the preservation of the resource.

Much of this Ailanthus has become established in areas that were cleared by the Park Service in 1960 in order to re-establish FDR's scenic vista. Ironically, this activity, which was intended to help preserve the resource in the way it was left by Roosevelt at his death, has actually destroyed the character of this portion of the natural vegetation. This represents a serious threat to the vegetation resource of the Historic Site.

Besides the presence of exotics, there are a few other anthropogenic impacts worth noting on the property. One is the soil compaction that may be occurring along side the trails. Any place where there is a trail, there is the possibility of soil compaction where people may wander off the trail. Soil compaction makes conditions unfavorable for plant roots and this restricts plant growth and plant establishment. Since the trails on the Roosevelt property receive only light to moderate use at the most, it is doubtful that very much soil compaction is occurring now. The only place where this process was even slightly evident was near the Roosevelt Ice Pond where a bench provides a resting spot for visitors who are walking the interpretive trail through this area. This would be expected in any area used for interpretation.

Other impacts which should be considered here as possibilities are air and water pollution and past timber harvesting. There was no evidence

of air or water pollution on the property but these exist as possibilities of future problems. Water quality of both the Hudson River and the small stream which feeds the ice pond is important in the maintenance of a healthy environment on the FDR property. Past timber harvesting is important in the study of the successional stages of the present vegetation, since any removal of trees in the past may have resulted in the present occurrence of early successional forest vegetation. Whether or not there has been any timber harvesting on the property in the past is a matter that must be ascertained from the study of old records or old maps which may or may not be easy to locate. Although this would be valuable information to acquire in the study of the vegetational history here, there was not enough time for this within the limits of this project.

VI FDR'S SCENIC VISTA TO THE HUDSON RIVER

One of the most significant resources at the Home of Franklin D. Roosevelt National Historic Site is the scenic view which exists from the bluff where the home is located to the Hudson River. The significance of this "resource", which is not a physical resource in the usual sense, lies in its importance to FDR in his lifetime. He spoke of this vista often, with its view of Ulster County across the river, the Shawangunk Mountains, and the Mid-Hudson Bridge in Poughkeepsie. One of the objectives of the Park has been to preserve this vista in the state it was in when FDR died in 1945, along with the rest of the historic resource.

In spite of the Park's objective of maintaining the scenic vista, the view to the river is presently obstructed by the trees immediately to the southwest. Very little of the river is visible and the Mid-Hudson Bridge is not visible at all. In 1960, the park cleared a pathway to try and improve the vista, but this has not solved the problem or at least did not solve it

for any length of time. In order to try to return the vista to its state at the time of FDR's death, it is necessary to try and discover the original location and extent of the cleared area that provided this vista.

Aerial photographs taken during the summer are a useful tool in examining this problem. Old aerial photographs were studied showing the Roosevelt property at earlier dates going back to sometime before his death. The oldest of these photos depicts the property at some unknown date. This was determined to be prior to the president's death, due to the absence of the tomb from the rose garden in back of the home. On these photographs there is a large area of field or meadow to the south and west of the home. This area appears to be well maintained and is more extensive than the meadow area present there today. It seems that this area is what provided the scenic vista to the river during Roosevelt's lifetime by leaving open enough of the area on the slope to the river.

Another set of aerial photographs depicts the property in 1947, two years after the President's death. On these photographs the same meadow or field area is still evident, although it appears to be filling in with shrubs from a lack of maintenance. Its boundaries are less well defined than those on the earlier photograph.

The next set of photographs is dated 1960. These show quite a change from the 1947 photographs. In the 1960 photographs, only a small portion (about $\frac{1}{4}$) of the original open area still remains open. The remainder has filled in completely with vegetation due to the natural process of ecological succession which has occurred in the absence of field maintenance. One feature that is found on the 1960 photos that is not found on the other photos is a narrow strip of cleared area that extends from what remains of the meadow to the cove at the edge of the Hudson River. This is the area where vegetation was removed by the Park Service in 1960 to help maintain the vista. Because of the narrowness of this strip it is doubtful whether much of the original

vista was restored by this cut.

From examination of these photos it appears that the objective of maintaining FDR's scenic vista has not been met. The original field or meadow, which provided this vista has, for most part, become forest which is presently obstructing the view to the river. Although an attempt was made in 1960 to restore the view, this energy would have been better spent on maintenance of the field which provided this view rather than on creating a whole new cut. This new cut has only served to cause a disturbance to the natural vegetation allowing the entrance of the weedy *Ailanthus* into the area. This is quite unfortunate since it defeats the purpose of maintaining the area in the way in which it was left by FDR at his death.

In order to meet the objective of maintaining FDR's scenic vista to the Hudson River, the original open area of field would have to be maintained. In its present state this would mean the removal of the early successional hardwood forest present there now. This would be an extensive project and may or may not be feasible. But the former scenic vista to the Hudson River still remains an important part of the historical resource at the FDR National Historic Site. Its restoration would definitely add to the interpretive value of the site.

VII FDR'S TREE PLANTATIONS

Throughout his life and career, Franklin Roosevelt expressed an avid interest in trees, forestry, and conservation of natural resources. During his boyhood on his father's estate, young Franklin spent much time in the outdoors collecting birds and insects, horseback riding, and taking walks (2). He developed a love of trees at an early age and this appreciation influenced his activities both as a landowner and a politician. On the political side, Roosevelt is most well known for his New Deal plan, which was instated to lift

the country out of the depths of unemployment. Part of this plan, the Civilian Conservation Corps, undertook conservation projects involving forestry and reforestation and put people to work simultaneously. Roosevelt had a well-developed knowledge of the value of conservation and a strong belief that conservation should become part of permanent national policy (2).

Roosevelt's love of trees and belief in the value of forestry and reforestation was quite evident on his Hyde Park estate. Beginning in 1911, FDR planted many trees and plantations on his property. In the 1930's, Roosevelt initiated cooperation with the New York State College of Forestry at Syracuse University (presently the State University of New York College of Environmental Science and Forestry). These plantations were planned and carried out by foresters at the college and served as an example for the landowners of Dutchess County and New York State on proper silviculture and forest management. Roosevelt's objectives seemed to be twofold: trees were of aesthetic value as well as value for land restoration.

The estate during FDR's time was composed of 1250 acres, 450 of which were forested, on both sides of the Albany Post Road in Hyde Park. Presently the National Historic Site composes 265 acres on the west side of this road and, although most of Roosevelt's plantings were on the east side, several plantations are included in this present property.

There are several stands of trees large enough to be called plantations, along with several other smaller plantings, on the National Historic Site. Each of the larger stands was examined in order to determine their present state of health and their prognosis for future growth and regeneration. Descriptive data was also collected on the stands in order to provide documentation which could possibly be used for interpretive purposes in the park.

Roosevelt's favorite tree was Tulip Poplar (Liriodendron tulipifera) which he planted both in plantations and as individual shade trees on his

property. One of these plantations is located west of the library and rose garden and just to the south of the duplex house. This plantation appears to be two separate plantings because of an area in the center of it where trees have died. But, although there originally was another Tulip Poplar plantation, planted 11 years later, located just to the southwest of this one, the trees here are all part of one planting. The two sections of trees here were measured separately because it was believed at the time that they were two separate plantations. But examination of the site showed that even though one group had a greater average d.b.h. and height of dominant and co-dominant trees, this was due to a difference in site quality and not a difference in age.

This area of Tulip Poplar, which is actually one plantation, was planted in 1916 or 1917 after the seedlings had been held in a nursery bed for two years. The number of trees set out at the time of planting is unknown, as is the case with most of these plantations. But in 1931, when the plantation was examined and reported on by Professor Svend O. Heiberg from the College of Forestry at Syracuse, there were 741 trees here. Presently, there are 84 Tulip Poplar trees here in the two sections, the large section being 173 feet by 44 feet. The average d.b.h. is 14.9 inches in the larger section and 12.9 inches in the smaller. The height of dominant and co-dominant trees also varies. In the larger section a dominant tree measured 103 feet tall and a co-dominant tree measured 97 feet. In the smaller section the height measurements were 81 feet and 75 feet for dominants and co-dominants, respectively. Basal area in the two stands is variable throughout per acre for both sections.

Since the height of trees grown in an even-aged stand such as this is the best indicator of the site productivity, the difference in height between the two stands can be taken as a site quality indicator. The larger section, with height of 103 and 97 feet appears to have a greater site quality for tree growth. Here the soil was moist, probably moderately well-drained,

with a low, wet gully between the plantation area and the road. The soil did not appear to be rocky. The other section was located on slightly higher ground relative to the slight depression which the first section is located in. This would tend to make the site less moist and more well-drained than the larger section.

There does not seem to be any evidence of disease or insect damage in this stand. Overall, the trees appear healthy with vigorous crowns. Some trees are a bit poor in quality, though. Usually these are smaller (intermediate or suppressed) trees which are leaning or bent towards openings in the canopy. Some trees, both large and small, have dead branches (die-back) or broken branches. The cause of the broken branches may be ice damage, a factor that was mentioned in the 1931 forestry records from the College of Forestry at Syracuse. Most of the boles of the dominants and co-dominants are fairly straight, however. Basically, this stand is in fair to good condition.

Regeneration in this Tulip Poplar stand appears to be fairly good, being composed mostly of Sugar Maple with some Basswood, White Ash, Tulip Poplar and Hemlock. Eventually this stand will give way to a mixture of Sugar Maple and Hemlock, the natural vegetation of the area, with some White Ash and Tulip Poplar. The present stand, however, has many good years left in it and will probably be around for another 50 years or so. Its longevity could be extended and its growth and appearance improved, however, if a thinning were done. This would necessarily be a thinning from below in which smaller trees are removed to give more growing space and resources to the larger and more vigorous trees which have more growth potential. This would also be of interpretive value, since it is in keeping with Roosevelt's belief in good forest management practices.

Located across the road from the Tulip Poplar and along a relatively steep westward slope is a planting of Eastern White Pine (Pinus strobus) with some Scotch Pine (Pinus sylvestris). This plantation was planted in 1915

and pruned in 1930. It extends along the slope bordering the road which goes to the duplex and has dimensions of 250 feet by 66 feet. It consists of 103 trees mostly of White Pine with a smaller amount of Scotch Pine. It's boundaries are rather irregular with trees extending quite a ways north into the woods due west of the parking lot. The average d.b.h. here is 11.9 inches and the heights are 97 and 84 feet for a dominant and a co-dominant, respectively. The basal area is variable throughout the stand with the two samples taken averaging 185 sq. ft. per acre.

This plantation was studied as a part of a plantation survey undertaken by the College of Forestry at Syracuse in 1931. Plantations on several estates in Dutchess County were studied by Professor S.O. Heiberg and others from the college. Old records and notes from this survey yield information about the plantations. At the time of the survey the trees were estimated to be 22 years old (21 for the Scotch Pine). This conflicts with the date of planting of 1915 that some sources site, unless the trees were several years old when planted. The White Pine was noted to be infested with White Pine weevils and growing at only average rate. The Scotch Pine was noted to be rather crooked, as is typical of that species, and to have some top killings due to the European Pine-Tip Moth. Some trees were noted to be rather suppressed. Poison Ivy was noted in the ground cover.

So, it appears that these trees were in only average condition at best in 1931. Presently, their condition is probably worse than it was in 1931. The crowns of both species are thin, with very sparse needle distribution, appearing very poor in vigor. What remains of the Scotch Pine is of very poor quality, the trees being very crooked. Any trees that were described as being suppressed in 1931 are assumed to be dead. Some of the small trees appear to be acting as "whip trees", being easily blown around by the wind and thus preventing the expansion of the crowns of the neighboring trees.

No disease or insects were evident.

The site quality here is probably the reason for the poor conditions of the trees, in addition to the past weevil problems. The slope is rather steep and although it is not a rocky area, the surface soil appears to be sandy/stony. Poison ivy is abundant.

There is no White Pine regeneration present except for one seedling at the edge of the stand, next to the road where light is adequate. There is a fair amount of White Ash regeneration here, along with some Sugar Maple and a few Tulip Poplar. This stand will eventually regenerate to these species. Because of the low vigor of the trees, this may take place over the next 20 to 40 years.

Located down the road from the Tulip Poplar and Pine described above is a small planting of Norway Spruce (Picea abies). It is found on the edge of the meadow which lies at the base of the bluff on which the Roosevelt Home is situated. There are only 15 trees here in an area measuring 99 feet by 10 feet. They have an average d.b.h. of 15.2 inches and heights of 81 feet (dominant) and 68 feet (co-dominant). Basal area was not measured due to the small size of the planting.

These trees, planted in 1916, are located on a relatively flat, somewhat rocky site. Their overall vigor is good, although variable. Many of the trees have well-developed crowns, due to their open crown condition, while others are suppressed with small crowns, woodpecker holes, and poison ivy growing up the trunks. There is no evidence of insects such as the spruce gall aphids.

This plantation was also included in the 1931 survey. At that time it measured 200 feet by 40 feet and was estimated to be 22 years old. It was infested with spruce gall aphids and some type of weevil, according to the plantation survey records. These harmful influences are probably responsible,

at least in part, for the demise of the trees in this plantation since 1931.

In terms of regeneration, this planting differs from the previously mentioned plantation because of its small size and location in a meadow. Any seedlings which become established are probably killed in the process of mowing since the trees are surrounded on all sides by meadow. So, this "stand" will not be replaced by forest vegetation as the others will be.

Located on the south side of the home is another planting of White Pine. Planted in 1916, this planting starts on the bluff right next to the home where there are several trees on the lawn that have been pruned and well kept over the years. The planting extends down the slope here to the south and west. These pines cover about an acre of land, but there are areas of deciduous growth between. The average d.b.h. of these trees is about 12 inches and the heights measured are 97 feet (dominant) and 75 feet (co-dominant). There is a total of about 90 trees here (± 5). The basal area of the stand is quite variable due to the fragmentation and intervening patches of deciduous growth.

These pines are located on a somewhat drier site. Because of the steepness of the slope and the western aspect, probably not a lot of moisture is available for plant growth. There is a small stream running west down the slope and a lot of poison ivy and Rubus (blackberry) in the area.

Overall, the health of these trees is fair. Some trees are dead or dying others are very small with suppressed growth. Poison Ivy grows on the trunks of several of the trees. Some of the smaller trees are acting as "whip" trees. These "whip" trees, as was mentioned concerning some of the other plantations, are easily blown around in the wind and thus prevent the crowns of the other trees from expanding and growing to a larger size. The larger, dominant trees in the plantation do not appear to be

too vigorous, either. The plantation is most likely declining.

As these larger trees decline, the regeneration in the understory will take over the site. Regeneration here is abundant, mostly of sugar maple seedlings, saplings and a few pole-sized trees. There is some White Ash and Black Birch here but only a few individuals in spots that happen to be favorable for these species.

Although this plantation is declining, it will still remain for a few more decades. Because of its proximity to the home, it would be a good plantation to use for interpretive purposes. As visitors pass by to look at the home and the scenic vista, information could be provided on the details of this plantation (average d.b.h., heights, age, conditions) as well as on FDR's interest in forestry and conservation.

There is another plantation of White Pine located along the stream ^{section} that goes to the ice pond. This plantation, which has a selection of Red Pine mixed in with it, was planted in 1914 and pruned in 1930. It covers about an acre to an acre and a half, which is fragmented, with patches of hardwood regeneration. The average d.b.h. is about 12 inches and the basal area is variable, averaging about 200 sq. ft. per acre.

The plantation is located in a flat area alongside the stream. Although the soil does not appear rocky, is level, and is located near a water source, all qualities which should benefit tree growth, it may be rather shallow. A few windblown trees attest to this. Shallow soils result in shallowly rooted trees which are uprooted easily in strong winds. So in some respects this is a good site (flat, near stream), but other aspects of the site detract from this (shallowness).

This apparent variability in quality shows up in the vigor of the trees. Some trees look good with well-developed crowns and large diameters. In some areas, though, the trees are smaller with less vigorous crowns.

These whole patches of smaller trees and other patches where plantation trees seem to have died out and been replaced by deciduous saplings are indicators that in places the site quality is not as great as in other places.

This plantation seems to be in relatively good shape with fairly vigorous trees. It would benefit quite a bit from a good thinning. This would be a thinning from below where smaller, suppressed trees are removed to give the larger healthier trees with more potential more room to grow. This would increase the growth rate and extend the life of the remaining trees as well as increase the aesthetic value of the stand.

Regeneration is abundant on this plantation with Sugar Maple, Tulip Poplar and Basswood in a definite understory layer. The future stand will probably consist of these species with Sugar Maple being dominant. Because of the proximity to the river, it is likely that Hemlock will be a part of the vegetation here eventually.

Another plantation of White Pine is located along one of the woods roads that traverse the property, in about the center of the area. This plantation covers about one acre on the east side of the road. Planted probably in 1913, these trees average about 11 inches in d.b.h. and have a basal area of about 160 sq. ft. per acre.

This plantation is located in an area of rolling topography consisting of a series of small hills and adjacent depressions. In places it is rocky with small outcroppings of bedrock. In general it is a fair site.

The trees themselves appear to be in decent condition. In the depressions there seems to be fewer trees than there are on the high areas. The soil is likely too shallow in these low spots and this may have resulted in windthrow of some of the trees or their death at an early stage of development. Except for these depressions the trees look fair with the smaller trees acting as "whip" trees as in many of the other stand. One problem which is

evident here is damage from White Pine Weevils. There are crooks in many of the stems which is evidence of past weevil damage, as well as forked tops, evidence of more recent weevil damage. It appears that weevils have been a problem here throughout its history. This is not surprising, since many of the old forestry records kept by Mr. William Plog, FDR's property superintendent, mention problems with this insect and actions they took to correct it.

There is a well-developed understory layer in this stand consisting mostly of Sugar Maple. In the future, therefore, after the decline of this plantation, the vegetation will consist mostly of Sugar Maple. This new stand should become established over the next 20 to 40 years and, in fact, is already becoming established.

The last plantation to be described here is located along the north boundary of the property along side the road. This is a White Pine plantation planted at some unknown date by the owners previous to Roosevelt's purchase of the property in the 1930's. The plantation covers about an acre and has an average d.b.h. of about 11 inches. The area is a flat, low area between rocky hills, probably relatively moist and moderately well drained. Overall, this is likely a relatively good site for tree growth.

The trees here do not appear to be very healthy. Most of the crowns are not well developed and many of the trees look spindly. Because of this the overstory canopy is relatively open. There is not much evidence of weevil damage.

As a result of the sparseness of the overstory canopy here, there is a well-developed understory layer. Most of this consists of Spicebush, however, so will not provide future regeneration. There is some Sugar Maple present and this will provide some trees for the next generation, the future stand probably consisting of Sugar Maple with other hardwoods. This tree

regeneration may take longer to become established than it would otherwise due to the presence of Spicebush.

VIII FDR'S VIRGIN FOREST

FDR received much enjoyment from his woods, often driving through his property to look at "his trees". One feature of his property on the west side of the Albany Post Road which he often spoke of was an area he referred to as his "primeval forest". This area reportedly was dominated by large hemlocks and was thought to virgin timber. In 1931, Roosevelt had a forest management plan drawn up by Irving Isenberg, a recent graduate of the College of Forestry in Syracuse. Isenberg found 15.4 acres that he concluded to be "virgin forest":

"One compartment which, according to all reports and appearances, seems to be virgin has been designated as an ecological laboratory. The stand should remain untouched. Do not remove even dead trees. Do not build new roads. Thus it will be preserved just as nature always has treated it." (3)

Unfortunately, although Isenberg's report is still present and can be found in the FDR library, the maps which Isenberg presented with his report are missing. Thus the location of this tract that Isenberg called "virgin" is not known. From looking at the data collected on the sample plots for this project an attempt was made to determine just where this tract of virgin forest might be found.

Virgin forest can be defined as an area of forest that has never been cut to any degree. Since no trees have ever been removed from a virgin forest, such an area has never had any successional setbacks and has proceeded on an uninterrupted course towards a climax forest. A climax forest is one

which has reached a point, over an extended course of time, where its species composition will undergo no further changes. These species are usually longlived and shade tolerant. Barring any disturbances, they will hold onto the site indefinitely.

If there is an area on the FDR property that is actually virgin forest, there are several features of a virgin forest that should be evident.

A virgin forest will have a forest floor consisting of a series of hummocks and depressions which are the result of trees being wind thrown. A forest with a forest floor that is relatively flat is usually not virgin, especially in an area such as this where the soil is rocky and shallow, encouraging windthrow. Also in a virgin forest, many old, rotted logs and stumps will be evident. In a forest that has been cut, trees often will have been removed before they die so that few are ever left to die naturally.

On the FDR property there are many areas in the Hemlock and Hemlock-Hardwoods areas that may be virgin stands. There are many larger trees which are probably relatively old, there are many areas with a hummock and depression topography, and there are frequently old, rotted logs and stumps. In addition, the topography here is rather rough with many rocky ridges and ravines. This sort of area would be very difficult to harvest timber from. There are many sections of the property which undoubtedly have never been harvested due to the topography.

In order to actually delineate the area of virgin timber on the FDR property a more extensive study would be necessary than was feasible here. The Hemlock and Hemlock - Northern Hardwoods areas would have to be surveyed for the indicators of virgin forest mentioned above. Also it would be necessary to research old land survey and property ownership records and maps to determine if any timber harvesting took place on the property. The presence of sawmills and pulp mills at anytime in the past history would give clue as to the probability of harvesting having taken place.

→ It is quite likely that part of the forested area here is virgin forest.

It would be of significant value to research and document this. Tracts of virgin forest are not very common in the Hudson Valley because of its past of clearing and farming. Identification of a tract of virgin forest here would give the park responsibility for a very significant natural resource for the area.

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APPENDIX

TABLES OF DENSITY AND DOMINANCE VALUES

For each vegetation type in this vegetation resource inventory values were calculated for the density and the dominance of the various species in the three strata. So for each vegetation type there is a table for (1) the overstory stratum, (2) the shrub and small tree portion of the understory stratum, (3) the herbaceous portion of the understory stratum, and (4) the species found in the herbaceous stratum with less than 1% cover on any given plot they occur on. Relative density and relative dominance values are on a percent basis. Importance Value (I.V.) is the sum of relative density and relative dominance.

PERCENT COVER EVALUATION

These cover classes were used to evaluate the dominance of species on overstory and understory plots.

<u>Cover Class Rating</u>	<u>Condition Of Cover</u>
r	rare, a single plant, cover insignificant
+ t	sporadic, few plants scattered in plot, cover less than 1%
1	cover from 1 to 5%
2	cover from 5 to 25%
3	cover from 25 to 50%
4	cover from 50 to 75%
5	cover from 75 to 100%

EVALUATION OF TYPE OF OVERSTORY STRATUM

Decid -	broad leaved, deciuous; 24% conifers in terms of % cover
Decid-Conif-	broad leaved, deciuous; 25-49% conifers in terms of % cover
Conif-Decid-	Conifers 50-74% with the remainder broad leaved deciduous
Conif-	Conifers over 75-100%

These four categories were used in evaluating the overstory tree stratum on each plot. The percent cover of all the trees in the canopy directly above the plot was evaluated.

MIXED HARDWOOD - OAK TYPE

OVERSTORY

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density(%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Red Oak	1.40	7.1	2.47	28.6	35.7
Sugar Maple	1.33	6.7	1.93	22.3	29.0
White Ash	0.53	2.7	0.73	8.4	11.1
White Oak	0.33	1.7	0.73	8.4	10.1
Black Oak	0.27	1.4	0.40	4.6	6.0
Shagbark Hickory	0.20	1.0	0.40	4.6	5.6
Black Birch	0.13	0.7	0.33	3.8	4.5
Hemlock	0.13	0.7	0.33	3.8	4.5
Chestnut Oak	0.13	0.7	0.33	3.8	4.5
Tulip Tree	0.13	0.7	0.20	2.3	3.0
Flowering Dogwood	0.07	0.4	0.20	2.3	2.7
Red Maple	0.07	0.4	0.20	2.3	2.7
Hornbeam	0.13	0.7	0.13	1.5	2.2
Ailanthus	0.07	0.4	0.13	1.5	1.9
Beech	0.07	0.4	0.07	0.8	1.2
Elm	0.07	0.4	0.07	0.8	1.2
Totals	5.06		8.65		

of sample plots in vegetation type - 15
average basal area on sample plots - 115 ft²/acre
average diameters: largest tree - 16.2 inches d.b.h.
medium sized tree - 9.6 inches d.b.h.
small tree - 5.6 inches d.b.h.

MIXED HARDWOOD - OAK TYPE
SHRUB AND SMALL TREE LAYER

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density(%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance(%)</u>	<u>I.V.</u>
Sugar Maple	5.87	33.4	2.87	31.6	65.0
Spicebush	2.47	14.0	0.60	6.6	20.6
Witch Hazel	1.87	10.6	0.80	8.8	19.4
Maple-Leaf Viburnum	1.60	9.1	0.93	10.3	19.4
Hornbeam	1.13	6.4	0.87	9.6	16.0
White Ash	1.00	5.7	0.53	5.8	11.5
Shortstalk Arrowwood	1.33	7.6	0.27	3.0	10.6
Flowering Dogwood	0.53	3.0	0.47	5.2	8.2
Ironwood	0.33	1.9	0.47	5.2	7.1
Chestnut Oak	0.40	2.3	0.27	3.0	5.3
Grey Dogwood	0.40	2.3	0.13	1.4	3.7
Red Maple	0.13	1.4	0.20	2.2	3.6
Shagbark Hickory	0.13	0.7	0.20	2.2	2.9
Basswood	0.13	0.7	0.13	1.4	2.1
Elm	0.13	0.7	0.13	1.4	2.1
White Oak	0.07	0.4	0.13	1.4	1.8
Mockernut Hickory	<u>0.07</u>	0.4	<u>0.07</u>	0.1	0.5
Totals	17.59		9.07		

MIXED HARDWOOD - OAK TYPE

HERBACEOUS LAYER

<u>Species</u>	<u>Ave. Dominance</u>	<u>Relative Dominance(%)</u>	<u>Frequency</u>	<u>Relative Frequency(%)</u>	<u>I.V.</u>
Maple-Leaf Viburnum	1.60	11.5	66.7	6.9	18.4
Sugar Maple	1.53	11.0	66.7	6.9	17.9
False Solomon's Seal	1.53	11.0	60.0	6.2	17.2
Aster	0.93	6.7	66.7	6.9	13.6
Goldenrod	0.73	5.3	80.0	8.3	13.6
White Ash	0.80	5.8	53.3	5.5	11.3
Spicebush	0.93	6.7	40.0	4.1	10.8
Wild Sarsaparilla	0.80	5.8	46.7	4.8	10.6
Solomon's Seal	0.67	4.8	46.7	4.8	9.6
Sedge	0.67	4.8	40.0	4.1	8.9
Virginia Creeper	0.20	1.4	60.0	6.2	7.6
Shortstalk Arrowwood	0.33	2.4	33.3	3.4	5.8
Jack-in-the-Pulpit	0.27	1.9	33.3	3.4	5.3
Wild Geranium	0.27	1.9	26.7	2.8	4.7
Marginal Wood Fern	0.33	2.4	20.0	2.1	4.5
Gooseberry	0.33	2.4	20.0	2.1	4.5
Common Polypody	0.27	1.9	13.3	1.4	3.3
Meadow Rue	0.13	0.9	20.0	2.1	3.0
Bladdernut	0.07	0.5	20.0	2.1	2.6
Perfoliate Bellwort	0.13	0.9	13.3	1.4	2.3
Bedstraw	0.13	0.9	13.3	1.4	2.3
Round-Lobed Hepatica	0.13	0.9	13.3	1.4	2.3
White Wild Licorice	0.13	0.9	13.3	1.4	2.3
Christmas Fern	0.20	1.4	6.7	0.7	2.1
Baneberry	0.07	0.5	13.3	1.4	1.9
Horse-balm	0.07	0.5	13.3	1.4	1.9
Flowering Dogwood	0.07	0.5	13.3	1.4	1.9
Spinulose Wood Fern	0.07	0.5	6.7	0.7	1.2
Black Cherry	0.07	0.5	6.7	0.7	1.2
Grey Dogwood	0.07	0.5	6.7	0.7	1.2
Greenbriar	0.07	0.5	6.7	0.7	1.2
Early Low Blueberry	0.07	0.5	6.7	0.7	1.2
Violet	0.07	0.5	6.7	0.7	1.2
American Hazelnut	0.07	0.5	6.7	0.7	1.2
White Baneberry	0.07	0.5	6.7	0.7	1.2

MIXED HARDWOODS - OAK

HERBACEOUS LAYER

Species with less than 1% cover

<u>Species</u>	<u>Rating</u>	<u>Frequency(%)</u>	<u>Relative Frequency</u>
Squawroot	+	20.0	14.3
Helleborine	+	13.3	9.5
Bloodroot	+	13.3	9.5
Groundnut	+	6.7	4.8
Rattlesnake Fern	+	6.7	4.8
Basswood	+	6.7	4.8
Garlic Mustard	+	6.7	4.8
Shining Clubmoss	+	6.7	4.8
Blue Cohosh	+	6.7	4.8
Wild Ginger	+	6.7	4.8
Rose	+	6.7	4.8
Mockernut Hickory	+	6.7	4.8
Ebony Spleenwort	+	6.7	4.8
Chestnut Oak	+	6.7	4.8
Triangle Grape Fern	+	6.7	4.8
		140.3	

MIXED HARDWOODS - OAK

Herbaceous Layer

Species with Less Than 1% Cover

<u>Species</u>	<u>Rating</u>	<u>Frequency (%)</u>	<u>Relative Frequency (%)</u>
Squawroot	+	20.0	14.3
Helleborine	+	13.3	9.5
Bloodroot	+	13.3	9.5
Groundnut	+	6.7	4.8
Rattlesnake Fern	+	6.7	4.8
Basswood	+	6.7	4.8
Garlic Mustard	+	6.7	4.8
Shining Clubmoss	+	6.7	4.8
Blue Cohosh	+	6.7	4.8
Wild Ginger	+	6.7	4.8
Rose	+	6.7	4.8
Mockernut Hickory	+	6.7	4.8
Ebony spleenwort	+	6.7	4.8
Chestnut Oak	+	6.7	4.8
Triangle grape fern	+	6.7	4.8
Total		140.3	

MIXED HARDWOODS - MAPLE DOMINANT

OVERSTORY

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density(%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Sugar Maple	2.82	56.6	3.51	50.9	107.5
White Ash	0.43	8.6	0.65	9.4	18.0
Black Birch	0.37	7.4	0.39	5.7	13.1
Hemlock	0.18	3.6	0.37	5.4	9.0
Red Oak	0.20	4.0	0.33	4.8	8.8
Basswood	0.18	3.6	0.29	4.2	7.8
Ailanthus	0.18	3.6	0.20	2.9	6.5
Chestnut Oak	0.12	2.4	0.22	3.2	5.6
Hophornbeam	0.08	1.6	0.14	2.0	3.6
Red Maple	0.06	1.2	0.12	1.7	2.9
Elm	0.06	1.2	0.12	1.7	2.9
Tulip Poplar	0.04	0.8	0.14	2.0	2.8
Yellow Birch	0.08	1.6	0.08	1.2	2.8
Shagbark Hickory	0.06	1.2	0.10	1.4	2.6
Black Cherry	0.06	1.2	0.08	1.2	2.4
Sycamore	0.04	0.8	0.10	1.4	2.2
White Oak	<u>0.02</u>	0.4	<u>0.06</u>	0.9	1.3
Totals	4.98		6.9		

of sample plots in vegetation type - 49
 average point basal area - 97 sq.ft./acre
 average: largest tree - 15.0"
 medium sized tree - 8.6"
 smallest tree - 5.2"

MIXED HARDWOODS - MAPLE
SHRUB AND SMALL TREE LAYER

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Sugar Maple	7.47	55.7	3.10	48.1	103.8
Witch Hazel	1.41	10.5	0.69	10.7	21.2
Bladdernut	1.32	9.8	0.53	8.2	18.0
Spicebush	1.14	8.5	0.41	6.4	14.9
Ailanthus	0.16	1.2	0.24	3.7	4.9
Hornbeam	0.18	1.3	0.22	3.4	4.7
Shortstalk Arrowwood	0.41	3.1	0.06	0.9	4.0
Basswood	0.12	0.9	0.16	2.5	3.4
Hackberry	0.12	0.9	0.14	2.2	3.1
Elm	0.16	1.2	0.12	1.9	3.1
Beech	0.08	0.6	0.12	1.9	2.5
Black Birch	0.14	1.0	0.08	1.2	2.2
Maple-Leaf Viburnum	0.18	1.3	0.06	0.9	2.2
White Ash	0.06	0.4	0.10	1.6	2.0
Hemlock	0.06	0.4	0.10	1.6	2.0
Ironwood	0.08	0.6	0.06	0.9	0.7
Yellow Birch	0.06	0.4	0.06	0.9	1.3
Black Cherry	0.10	0.7	0.04	0.6	1.3
American Hazelnut	0.06	0.4	0.04	0.6	1.0
Mockernut Hickory	0.02	0.1	0.04	0.6	0.7
Bitternut Hickory	0.02	0.1	0.04	0.6	0.7
Flowering Dogwood	0.02	0.1	0.02	0.3	0.4
Chestnut Oak	0.02	0.1	0.01	0.2	0.3
Red Maple	0.02	0.1	0.01	0.2	0.3

MIXED HARDWOODS - MAPLE

HERBACEOUS LAYER

<u>Species</u>	<u>Ave. Dominance</u>	<u>Relative Dominance(%)</u>	<u>Frequency</u>	<u>Relative Frequency(%)</u>	<u>I.V.</u>
False Solomon's Seal	1.53	10.7	89.8	8.0	18.7
Sugar Maple	1.57	9.6	79.6	7.1	16.7
Virginia Creeper	1.16	8.1	73.5	6.6	14.7
Aster	0.98	6.9	69.4	6.2	13.1
Solomon's Seal	0.86	6.0	75.5	6.8	12.8
Marginal Wood Fern	0.71	5.0	49.0	4.4	9.4
Jack-in-the-Pulpit	0.43	3.0	53.1	4.8	7.8
Bladdernut	0.49	3.4	32.7	2.9	6.3
Goldenrod	0.31	2.2	44.9	4.0	6.2
Spicebush	0.41	2.9	34.7	3.1	6.0
Wild Sarsaparilla	0.41	2.9	34.7	3.1	6.0
Maple-Leaf Viburnum	0.45	3.2	30.6	2.7	5.9
Sedge	0.27	1.9	34.7	3.1	5.0
Wild Ginger	0.41	2.9	26.5	2.4	5.3
White Ash	0.35	2.5	28.6	2.6	5.1
Bloodroot	0.16	1.1	40.8	3.7	4.8
Violet	0.18	1.3	32.7	2.9	4.2
Garlic Mustard	0.35	2.5	18.4	1.6	4.1
Spinulose Wood Fern	0.20	1.4	28.6	2.6	4.0
Poison Ivy	0.61	4.2	36.7	3.3	7.6
Wild Geranium	0.14	1.0	12.2	1.1	2.1
Birdweed	0.08	0.6	16.3	1.5	2.1
Perfoliate bellwort	0.12	0.8	12.2	1.1	1.9
Blue Cohosh	0.22	1.5	3.2	0.3	1.8
Hepatica	0.02	0.1	18.4	1.6	1.7
Common Polypody	0.04	0.3	12.2	1.1	1.4
Gill-over-the-ground	0.12	0.8	4.8	0.4	1.2
Black Cherry	0.10	0.7	6.1	0.5	1.2
Hemlock Parsley	0.12	0.8	4.1	0.4	1.2
Basswood	0.02	0.1	10.2	0.9	1.0
Christmas Fern	0.67	4.7	4.6	0.4	5.1
Meadow Rue	0.06	0.4	6.1	0.5	0.9
Sensitive Fern	0.04	0.3	6.1	0.6	0.9
Rose	0.06	0.4	4.1	0.4	0.8
Sassafras	0.04	0.3	6.1	0.5	0.8
Herb Robert	0.06	0.4	4.1	0.4	0.8
American Hazelnut	0.06	0.4	4.1	0.4	0.8
Enchanter's Nightshade	0.04	0.3	4.1	0.4	0.7
Gooseberries	0.04	0.3	4.8	0.4	0.7
Jewel Weed	0.04	0.3	4.1	0.4	0.7
Hedge Bindweed	0.04	0.3	4.1	0.4	0.7
Wild Lilly-of-the-Valley	0.04	0.3	4.1	0.4	0.7
Shortstalk Arrowwood	0.06	0.4	2.1	0.2	0.6
Slippery Elm	0.02	0.1	4.8	0.4	0.5
Pasture Gooseberry	0.04	0.3	2.0	0.4	0.8
Witch Hazel	0.02	0.1	4.1	0.4	0.5
Alderleaf Buckthorn	0.04	0.3	2.0	0.2	0.3

MIXED HARDWOODS - MAPLE

HERBACEOUS LAYER
(continued)

<u>Species</u>	<u>Ave. Dominance</u>	<u>Relative Dominance(%)</u>	<u>Frequency</u>	<u>Relative Frequency(%)</u>	<u>I.V.</u>
Brambles	0.04	0.3	2.0	0.2	0.5
Grass	0.04	0.3	2.0	0.2	0.5
Squawroot	0.02	0.1	4.1	0.4	0.5
Bedstraw	0.02	0.1	4.1	0.4	0.5
Groundnut	0.02	0.1	2.0	0.2	0.3
Purple Flowering Raspberry	0.02	0.1	2.0	0.2	0.3
Hayscented Fern	0.02	0.1	2.0	0.2	0.3
Lady Fern	0.02	0.1	2.0	0.2	0.3
Common Speedwell	0.02	0.1	2.0	0.2	0.3
Tulip Poplar	0.02	0.1	2.0	0.2	0.3
White Oak	0.02	0.1	4.1	0.4	0.5

MIXED HARDWOODS - MAPLE

HERBACEOUS LAYER

Species with less than 1% cover

<u>Species</u>	<u>Rating</u>	<u>Frequency(%)</u>	<u>Relative Frequency</u>
Rattlesnake Fern	+	10.2	12.9
Ebony Spleenwort	+	8.2	10.3
Chestnut Oak	+	6.1	7.7
Flowering Dogwood	+	6.1	7.7
Red Oak	+	6.1	7.7
Baneberry	+	6.1	7.7
Greenbriar	+	4.1	5.2
Grapevines	+	4.1	5.2
White Baneberry	+	4.1	5.2
Horse Nettle	+	4.1	5.2
Wild Leek	R	2.0	2.5
Hornbeam	+	2.0	2.5
Maidenhair Spleenwort	+	2.0	2.5
Maidenhair Fern	+	2.0	2.5
Helleborine	+	4.1	5.2
Rock Cress	+	2.0	2.5
Celandine	+	2.0	2.5
Triangle Grape Fern	R	<u>2.0</u>	2.5
		79.3	

HEMLOCK TYPE

OVERSTORY

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density(%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Hemlock	3.64	56.2	3.71	41.8	98.0
Sugar Maple	0.79	12.2	1.68	19.2	31.4
Black Birch	0.75	11.6	1.14	12.9	24.5
Tulip Poplar	0.18	2.8	0.36	4.1	6.9
Ailanthus	0.21	3.2	0.29	3.3	6.5
Chestnut Oak	0.11	1.7	0.32	3.6	5.3
Red Maple	0.14	2.2	0.21	2.4	4.6
Shagbark Hickory	0.11	1.7	0.18	2.2	3.9
Red Oak	0.11	1.7	0.18	2.0	3.7
White Ash	0.07	1.1	0.18	2.0	3.1
White Oak	0.07	1.1	0.14	1.6	2.7
White Pine	0.07	1.1	0.11	1.2	2.3
Sassafras	0.07	1.1	0.11	1.2	2.3
Basswood	0.04	0.6	0.11	1.2	1.8
Ironwood	0.04	0.6	0.07	0.8	1.4
Pignut Hickory	0.04	0.6	0.04	0.5	1.1
Chestnut	<u>0.04</u>	0.6	<u>0.04</u>	0.5	1.1
Totals	6.48		8.87		

of sample plots in type - 28

Average basal area of type - 140 sq. ft./acre

Average d.b.h. of: largest tree - 18.2 inches
medium sized tree - 10.7 inches
small tree - 5.4 inches

HEMLOCK TYPE

UNDERSTORY: SHRUB LAYER

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density(%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Sugar Maple	3.71	45.5	1.39	27.7	73.2
Hemlock	1.04	12.8	1.00	20.0	32.8
Maple Leaf Viburnum	1.11	13.6	0.50	10.0	23.6
Spicebush	0.64	7.9	0.43	8.6	16.5
White Ash	0.32	3.9	0.32	6.4	10.3
Witch Hazel	0.39	4.9	0.25	5.0	9.9
Hophornbeam	0.18	2.2	0.25	5.0	7.2
Black Birch	0.18	2.2	0.25	5.0	7.2
Ailanthus	0.14	1.7	0.07	1.4	3.1
Beech	0.07	0.9	0.11	2.2	3.1
Red Maple	0.07	0.9	0.11	2.2	3.1
Chestnut Oak	0.07	0.9	0.07	1.4	2.3
Sassafras	0.04	0.5	0.07	1.4	2.3
Tulip Poplar	0.07	0.9	0.07	1.4	2.3
Black Cherry	0.04	0.5	0.04	0.8	1.3
Striped Maple	0.04	0.5	0.04	0.8	1.3
Basswood	<u>0.04</u>	0.5	<u>0.04</u>	0.8	1.3
Totals	8.15		5.01		

HEMLOCK TYPE
HERBACEOUS LAYER

<u>Species</u>	<u>Ave. Dominance</u>	<u>Relative Dominance (%)</u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>I.V.</u>
Spinulose Wood Fern	0.57	7.1	53.6	7.0	14.1
Sugar Maple	0.54	6.8	48.9	6.4	13.2
Maple Leaf Viburnum	0.57	7.1	42.9	5.6	12.7
Aster	0.32	4.0	57.1	7.4	11.4
Virginia Creeper	0.43	5.9	39.3	5.1	11.0
Solomon's Seal	0.39	4.9	42.9	5.6	10.5
Spicebush	0.43	5.4	35.7	4.7	10.1
Wild Lilly-of-the-Valley	0.54	6.8	25.0	3.3	10.1
Christmas Fern	0.39	4.9	32.1	4.2	9.1
Wild Sarsaparilla	0.43	5.4	21.4	2.8	8.2
False Solomon's Seal	0.32	4.0	32.1	4.2	8.2
Poison Ivy	0.32	4.0	32.1	4.2	8.2
Jack-in-the-Pulpit	0.32	4.0	32.1	4.2	8.2
White Ash	0.25	3.1	32.1	4.2	7.3
Wild Ginger	0.32	4.0	21.4	2.8	6.8
Common Polypody	0.18	2.3	14.3	1.9	4.2
Partridge Berry	0.18	2.3	14.3	1.9	4.2
Marginal Wood Fern	0.14	1.8	17.9	2.3	4.1
Goldenrod	0.04	0.5	25.0	3.3	3.8
Hayscented Fern	0.21	2.6	7.1	0.9	3.5
Sedge	0.07	0.9	17.9	2.3	3.2
Baneberry	0.04	0.5	17.9	2.3	2.8
Gill-Over-the-Ground	0.18	2.3	3.6	0.5	2.8
Bloodroot	0.07	0.9	14.3	1.9	2.8
Rattlesnake Fern	0.07	0.9	14.3	1.9	2.8
Lady Fern	0.07	0.9	7.1	0.9	2.8
Round-lobed Hepatica	0.04	0.5	10.7	1.4	1.9
Bedstraw	0.07	0.9	7.1	0.9	1.8
Touch-Me-Not	0.07	0.9	7.1	0.9	1.8
Indian Cucumber Root	0.07	0.9	7.1	0.9	1.8
White Baneberry	0.07	0.9	3.6	0.5	1.4
Perfoliate Bellwort	0.04	0.5	3.6	0.5	1.0
Witch Hazel	0.04	0.5	3.6	0.5	1.0
Maidenhair Fern	0.04	0.5	3.6	0.5	1.0
Tree-of-Heaven	0.04	0.5	3.6	0.5	1.0
Red Maple	0.04	0.5	3.6	0.5	1.0

HEMLOCK TYPE

Herbaceous Layer

Species with Less Than 1% Cover

<u>Species</u>	<u>Rating</u>	<u>Frequency (%)</u>	<u>Relative Frequency (%)</u>
Elderberry	+	3.6	10.4
Violet	+	7.1	10.4
Helleborine	+	7.1	10.4
Beech	+	3.6	5.3
Tulip Poplar	+	3.6	5.3
Sassafrass	+	3.6	5.3
Garlic Mustard	+	3.6	5.3
Shortstalk Arrowwood	+	3.6	5.3
Greenbriar	+	3.6	5.3
Black Birch	+	3.6	5.3
Brambles (blackberry)	+	3.6	5.3
Basswood	+	3.6	5.3
Squawroot	+	3.6	5.3
Japanese barberry	+	3.6	5.3
Walking Fern	+	<u>3.6</u>	5.3
Total		68.1	

HEMLOCK - NORTHERN HARDWOODS TYPE

OVERSTORY

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density (%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Hemlock	2.76	51.3	2.97	36.8	88.1
Sugar Maple	0.93	17.3	1.69	21.0	38.3
Red Oak	0.34	6.3	0.59	7.3	13.3
Chestnut Oak	0.28	5.2	0.48	6.0	11.2
Black Birch	0.24	4.5	0.52	6.5	11.0
Basswood	0.17	3.2	0.28	3.5	6.7
White Oak	0.10	1.9	0.31	3.8	5.7
Beech	0.14	2.6	0.25	3.1	5.7
Red Maple	0.07	1.3	0.21	2.6	3.9
White Ash	0.07	1.3	0.14	1.7	3.0
Elm	0.07	1.3	0.14	1.7	3.0
Scarlet Oak	0.03	0.6	0.10	1.2	1.8
Ailanthus	0.03	0.6	0.07	0.9	1.5
White Pine	0.03	0.6	0.07	0.9	1.5
Hophornbeam	0.03	0.6	0.07	0.9	1.5
Tulip Poplar	0.03	0.6	0.07	0.9	1.5
Shagbark Hickory	0.03	0.6	0.07	0.9	1.5
Black Locust	<u>0.03</u>	0.6	<u>0.03</u>	0.4	1.0
Totals	5.38		8.06		

of sample plots - 29

Average basal area - 119 sq. ft./acre

Average d.b.h.: largest tree - 17.6 inches
medium tree - 10.3 inches
small tree - 6.4 inches

HEMLOCK - NORTHERN HARDWOODS TYPE

UNDERSTORY: SHRUBLAYER

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density(%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Sugar Maple	4.76	42.24	1.66	30.07	72.31
Hemlock	1.21	10.74	0.86	15.58	26.32
Maple Leaf Viburnum	1.69	15.00	0.48	8.70	23.70
Witch Hazel	1.21	10.74	0.59	10.69	21.43
Spicebush	0.55	4.88	0.41	7.43	12.31
Beech	0.31	2.75	0.24	4.34	7.09
Ailanthus	0.45	3.99	0.10	1.81	5.80
Basswood	0.28	2.48	0.17	3.08	5.56
White Ash	0.24	2.13	0.14	2.54	4.67
Black Birch	0.17	1.51	0.17	3.08	4.59
Flowering Dogwood	0.03	0.27	0.10	1.81	2.08
Hophornbeam	0.03	0.27	0.10	1.81	2.08
Chestnut	0.03	0.27	0.07	1.27	1.54
Bladdernut	0.03	0.27	0.07	1.27	1.54
Ironwood	0.03	0.27	0.07	1.27	1.54
Shagbark Hickory	0.03	0.27	0.07	1.27	1.54
Tulip Poplar	0.03	0.27	0.07	1.27	1.54
Red Maple	0.07	0.62	0.03	0.54	1.16
Chestnut Oak	0.03	0.27	0.03	0.54	0.81
White Oak	0.03	0.27	0.03	0.54	0.81
Striped Maple	0.03	0.27	0.03	0.54	0.81
Mockernut Hickory	<u>0.03</u>	0.27	<u>0.03</u>	0.54	0.81
Totals	11.27		5.52		

HEMLOCK - NORTHERN HARDWOODS TYPE

HERBACEOUS LAYER

<u>Species</u>	<u>Ave. Dominance</u>	<u>Relative Dominance (%)</u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>I.V.</u>
Sugar Maple	0.76	8.1	69.0	7.8	15.9
Christmas Fern	0.69	7.4	62.1	7.0	14.4
Solomon's Seal	0.48	5.1	65.5	7.4	12.5
False Solomon's Seal	0.66	7.1	41.4	4.7	11.8
Aster	0.55	5.9	51.7	5.9	11.8
Maple Leaf Viburnum	0.69	7.4	37.9	4.3	11.7
Virginia Creeper	0.48	5.1	51.7	5.9	11.0
Marginal Wood Fern	0.52	5.6	37.9	4.3	9.9
Spinulose Wood Fern	0.38	4.1	37.9	4.3	8.4
Wild Sarsaparilla	0.41	4.4	31.0	3.5	7.9
Spicebush	0.31	3.3	37.9	4.3	9.9
Wild Ginger	0.52	5.6	17.2	2.0	7.6
Common Polypody	0.34	3.6	31.0	3.5	7.1
Jack-in-the-Pulpit	0.21	2.2	31.0	3.5	5.5
Poison Ivy	0.21	2.2	24.1	2.7	4.9
Wild Lilly-of-the-Valley	0.28	3.0	13.8	1.6	4.6
White Ash	0.17	1.8	20.7	2.3	4.1
Garlic Mustard	0.24	2.6	10.3	1.2	3.8
Partridge Berry	0.17	1.8	13.8	1.6	3.4
Goldenrod	0.10	1.1	20.7	2.3	3.4
Sedge	0.10	1.7	13.8	1.6	3.3
Bloodroot	0.07	0.7	20.7	2.3	3.0
White Baneberry	0.10	1.1	10.3	1.2	2.3
Hemlock	0.07	0.7	13.8	1.6	2.3
Perfoliate Bellwort	0.10	1.1	6.9	0.8	1.9
Beech	0.07	0.7	10.3	1.2	1.9
Red Oak	0.07	0.7	6.9	0.8	1.5
Basswood	0.03	0.3	10.3	1.2	1.5
Horse Nettle	0.03	0.3	10.3	1.2	1.5
Blue Cohosh	0.03	0.3	6.9	0.8	1.1
New York Fern	0.07	0.7	3.4	0.4	1.1
Bladdernut	0.03	0.3	6.9	0.8	1.1
Bedstraw	0.03	0.3	6.9	0.8	1.1
Tree-of-Heaven	0.07	0.7	3.4	0.4	1.1
Touch-Me-Not	0.03	0.3	6.9	0.8	1.1
Enchanter's Nightshade	0.03	0.3	3.4	0.4	0.7
Lady Fern	0.03	0.3	3.4	0.4	0.7
Shortstalk Arrowwood	0.03	0.3	3.4	0.4	0.7
Black Cherry	0.03	0.3	3.4	0.4	0.7
Black Birch	0.03	0.3	3.4	0.4	0.7
Witch Hobble	0.03	0.3	3.4	0.4	0.7
Pignut Hickory	0.03	0.3	3.4	0.4	0.7

HEMLOCK - NORTHERN HARDWOODS TYPE

HERBACEOUS LAYER

Species with less than 1% cover

<u>Species</u>	<u>Rating</u>	<u>Frequency(%)</u>	<u>Relative Frequency(%)</u>
Striped Maple	+	10.3	15.9
Rattlesnake Fern	+	10.3	15.9
Helleborine	+	6.9	10.6
Round-lobed Hepatica	+	3.4	5.2
Witch Hazel	+	3.4	5.2
Skunk Cabbage	+	3.4	5.2
Wild Geranium	+	3.4	5.2
Fragaria	+	3.4	5.2
Wild White Licorice	+	3.4	5.2
Meadow Rue	R	3.4	5.2
Red Maple	+	3.4	5.2
Sassafras	+	3.4	5.2
Flowering Dogwood	R	3.4	5.2
White Pine	R	<u>3.4</u>	5.2
		64.9	

EARLY SUCCESSIONAL HARDWOODS TYPE

OVERSTORY

<u>Species</u>	<u>Ave. #/Plot</u>	<u>Relative Density (%)</u>	<u>Ave. Cover</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Elm	1.69	25.6	1.69	21.5	47.1
Black Locust	1.15	17.4	1.31	16.7	34.1
Sugar Maple	0.85	12.9	1.23	15.7	28.6
Ailanthus	0.92	13.9	1.00	12.7	26.6
Tulip Tree	0.54	8.2	0.54	6.9	15.1
White Ash	0.38	5.7	0.31	3.9	9.6
Black Cherry	0.23	3.5	0.46	5.9	9.4
Hemlock	0.15	2.3	0.54	6.9	9.2
Red Oak	0.31	4.7	0.31	3.9	8.6
Black Birch	0.31	4.7	0.31	3.9	8.6
Red Maple	<u>0.08</u>	1.2	<u>0.15</u>	1.9	3.1
Totals	6.61		7.85		

of sample plots in vegetation type - 13

Average basal area (ft²/acre) - 104

EARLY SUCCESSIONAL HARDWOODS TYPE

UNDERSTORY - SHRUB LAYER

<u>Species</u>	<u>Total #</u>	<u>Ave. #/Plot</u>	<u>Relative Density(%)</u>	<u>Total Cover</u>	<u>Ave. Cover</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Sugar Maple	157	12.08	62.8	45	3.46	42.8	105.6
Spicebush	33	2.54	13.2	14	1.08	13.4	26.6
Ailanthus	23	1.77	9.2	8	0.62	7.7	16.9
Elm	9	0.69	3.6	8	0.62	7.7	11.3
White Ash	8	0.62	3.2	5	0.38	4.7	7.9
Shagbark Hickory	4	0.31	1.6	3	0.23	2.8	4.4
Red Maple	2	0.15	0.8	4	0.31	3.8	4.6
Black Birch	2	0.15	0.8	4	0.31	3.8	4.6
Ironwood	3	0.23	1.2	2	0.15	1.9	3.1
Witch Hazel	2	0.15	0.8	2	0.15	1.9	2.7
Red Oak	1	0.08	0.4	2	0.15	1.9	2.3
Grape Vine	1	0.08	0.4	2	0.15	1.9	2.3
Black Cherry	1	0.08	0.4	1	0.08	1.0	1.4
Choke cherry	1	0.08	0.4	1	0.08	1.0	1.4
Tulip tree	1	0.08	0.4	1	0.08	1.0	1.4
Beech	1	0.08	0.4	1	0.08	1.0	1.4
Totals	250	19.25		105	8.08		

Total # of plots - 13

Average Cover Class of 13 plots - 4.3

EARLY SUCCESSIONAL HARDWOODS TYPE

HERBACEOUS LAYER

<u>Species</u>	<u>Ave. Dominance</u>	<u>Relative Dominance (%)</u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>I.V.</u>
Garlic Mustard	1.92	14.4	69.2	9.1	23.5
Virginia creeper	1.46	11.0	46.0	6.1	17.1
Jack-in-the-Pulpit	0.85	6.4	69.2	9.1	15.5
Poison Ivy	0.92	6.9	53.8	7.1	14.0
False Solomon's Seal	0.78	5.9	46.2	6.1	12.0
Sugar Maple	0.92	6.9	38.5	5.1	12.0
Enchanter's Nightshade	0.76	5.7	46.2	6.1	11.7
Spicebush	0.85	6.4	30.8	4.0	10.4
Brambles (Blackberry)	0.62	4.7	23.1	3.0	7.7
Aster	0.31	2.3	38.5	5.1	7.4
Touch-Me-Not	0.54	4.1	23.1	3.0	7.1
Goldenrod	0.38	2.9	30.8	4.0	6.9
Tree-of-Heaven	0.31	2.3	30.8	4.0	6.3
White Ash	0.31	2.3	23.1	3.0	5.3
Lady Fern	0.31	2.3	15.4	2.0	4.3
Sedge	0.16	1.2	23.1	3.0	4.2
Horse Nettle	0.15	1.1	7.7	1.0	2.1
Pasture Gooseberry	0.16	1.2	7.7	1.0	2.2
Wild Ginger	0.16	1.2	7.7	1.0	2.2
Marginal Wood Fern	0.16	1.2	7.7	1.0	2.2
Soloman's Seal	0.16	1.2	7.7	1.0	2.2
Christmas Fern	0.16	1.2	7.7	1.0	2.2
Black Cherry	0.08	0.6	7.7	1.0	1.6
Slippery Elm	0.08	0.6	7.7	1.0	1.6
Wild Leek	0.08	0.6	7.7	1.0	1.6
False Nettle	0.08	0.6	7.7	1.0	1.6
Skunk Cabbage	0.08	0.6	7.7	1.0	1.6
Grape vines	0.08	0.6	7.7	1.0	1.6
Bedstraw	0.08	0.6	7.7	1.0	1.6
Honeysuckle	0.08	0.6	7.7	1.0	1.6
Wild Lilly-of-the-Valley	0.08	0.6	7.7	1.0	1.6
Gooseberries	0.08	0.6	7.7	1.0	1.6
Totals	13.31		761.3		

Average cover class of all plots - 3.9

EARLY SUCCESSIONAL HARDWOODS TYPE

Herbaceous Layer

Species with Less Than 1% Cover

<u>Species</u>	<u>Rating</u>	<u>Frequency (%)</u>	<u>Relative Frequency (%)</u>
Hemlock Parsley	+	15.4	22.2
Violet	+	30.8	44.4
Japanese Barberry	+	7.7	11.1
White Baneberry	R	7.7	11.1
Maple Leaf Viburnum	+	<u>7.7</u>	11.1
Total		69.3	

CHESTNUT OAK - RED CEDAR TYPE

OVERSTORY

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Chestnut Oak	1.33	75.2	2.17	36.2	111.4
Red Cedar	1.33	75.2	1.50	25.0	100.2
White Ash	1.17	25.1	1.17	19.5	44.5
Red Oak	0.33	7.1	0.50	8.3	15.4
Hornbeam	0.33	7.1	0.33	5.5	12.6
Mockernut Hickory	<u>0.17</u>	3.6	<u>0.33</u>	5.5	9.1
	4.66		6.00		

of sample plots in vegetation type - 6
total area of vegetation type - 7 acres
average basal area (sq. ft./acre) - 70

CHESTNUT OAK - RED CEDAR TYPE

SHRUB AND SMALL TREE LAYER

<u>Species</u>	<u>Ave. Density</u>	<u>Relative Density(%)</u>	<u>Ave. Dominance</u>	<u>Relative Dominance</u>	<u>I.V.</u>
Shortstalk Arrowwood	4.17	30.9	1.33	13.8	44.7
Sugar Maple	2.33	17.2	1.83	19.0	36.2
White Ash	1.67	12.4	1.67	17.3	29.7
Chestnut Oak	1.50	11.1	0.83	8.6	19.7
Hornbeam	1.17	8.7	1.00	10.4	19.1
Red Oak	1.00	7.4	1.00	10.4	17.8
Mockernut Hickory	0.67	5.0	0.83	8.6	13.6
Black Oak	0.33	2.4	0.33	3.4	5.8
Bladdernut	0.17	1.3	0.17	1.8	3.1
Hemlock	0.33	2.4	0.33	3.4	5.8
Red Maple	<u>0.17</u>	1.3	<u>0.33</u>	3.4	4.7
Totals	13.51		9.65		

average cover class - 4.3

CHESTNUT OAK - RED CEDAR TYPE

HERBACEOUS LAYER

<u>Species</u>	<u>Ave. Dominance</u>	<u>Relative Dominance(%)</u>	<u>Frequency</u>	<u>Relative Frequency(%)</u>	<u>I.V.</u>
Common Polypody	2.50	20.3	100	11.8	32.1
Virginia Creeper	2.33	18.9	100	11.8	30.7
False Solomon's Seal	1.33	10.8	100	11.8	29.2
Marginal Wood Fern	1.67	13.5	100	11.8	25.3
Solomon's Seal	0.83	6.7	83.3	9.8	16.5
Chestnut Oak	0.50	4.1	66.7	7.8	11.9
Sugar Maple	0.67	5.4	50.0	5.9	11.3
Shortstalk Arrowwood	0.33	2.7	50.0	5.9	8.6
Wild Rose	0.33	2.7	33.3	3.9	6.6
Wild Sarsaparilla	0.33	2.7	33.3	3.9	6.6
Goldenrod	0.17	1.4	33.3	3.9	5.3
Brambles (blackberry)	0.33	2.7	16.7	2.0	4.7
Tall Deerberry	0.33	2.7	16.7	2.0	4.7
Red Oak	0.17	1.4	16.7	2.0	3.4
Perfoliate Bellwort	0.17	1.4	16.7	2.0	3.4
Partridge Berry	0.17	1.4	16.7	2.0	3.4
Black Cherry	0.17	1.4	16.7	2.0	3.4
Totals	12.33		850.1		

average cover class - 4.5

CHESTNUT OAK - RED CEDAR TYPE

Herbaceous Layer

Species with Less Than 1% Cover

<u>Species</u>	<u>Rating</u>	<u>Frequency (%)</u>	<u>Relative Frequency (%)</u>
Aster	+	33.3	38.4
Red Cedar	+	16.7	19.2
Bitternut	+	16.7	19.2
Ebony Spleenwort	+	16.7	19.2
Round-lobed Hepatica	+	16.7	19.2
Pale Corydalis	+	<u>16.7</u>	19.2
Total		86.8	

ACREAGE OF VEGETATION TYPES

<u>Types</u>	<u>Acres</u>
Hemlock	32
Hemlock - Northern Hardwoods	26
Mixed Hardwoods - Maple	85
Mixed Hardwoods - Oak	4
Early successional hardwoods	15
Chestnut Oak - Red Cedar	7
Plantations	<u>6</u>
	175

AVERAGE BASAL AREA OF VEGETATION TYPES

<u>Type</u>	<u>sq. ft./acre</u>
Hemlock	140
Hemlock - Northern Hardwoods	119
Mixed Hardwoods - Maple	97
Mixed Hardwoods - Oak	113
Early Successional Hardwoods	104
Plantations	170

LEGALLY PROTECTED PLANTS
ON THE
HOME OF FRANKLIN D. ROOSEVELT NATIONAL HISTORIC SITE

<u>Protected Plant</u>	<u>Scientific Name</u>	<u>Frequency(%)*</u>
Flowering Dogwood	<u>Cornus florida</u>	10
Bloodroot	<u>Sanguinaria canadensis</u>	26
Helleborine (orchid family)	<u>Epipactus helleborine</u>	6
<u>FERNS:</u>		
Maidenhair Fern	<u>Adiantum pedatum</u>	1
Ebony Spleenwort	<u>Asplenium platyneuron</u>	5
Maidenhair Spleenwort	<u>Asplenium trichomanes</u>	1
Lady Fern	<u>Athyrium filix-femina</u>	6
Triangle Grape Fern	<u>Botrychium lanceolatum</u>	1
→ Rattlesnake Fern	<u>Botrychium virginianum</u>	10
Walking Fern	<u>Camptosorus rhizophyllus</u>	1
Marginal Wood Fern	<u>Dryopteris marginalis</u>	36
Spinulose Wood Fern	<u>Dryopteris spinulosa</u>	30
Stiff Club Moss	<u>Lycopodium annotinum</u>	1
Common Polypody	<u>Polypodium vulgare</u>	18
Christmas Fern	<u>Polystichum acrosticoides</u>	32
New York Fern	<u>Thelyptesis noreboracensis</u>	1

* frequency is the percent of the total number of sample plots on which the species was found

SPECIES LIST

List of all species found on sample plots on the Home of
Franklin D. Roosevelt National Historic Site

<u>Common Name</u>	<u>Scientific Name</u>
Alderleaf Buckthorn	<u>Rhamnus alnifolia</u>
American Beech	<u>Fagus grandifolia</u>
American Elm	<u>Ulmus americana</u>
American Yew	<u>Taxus canadensis</u>
Aster	<u>Aster spp.</u>
Baneberry	<u>Actaea spp.</u>
Basswood	<u>Tilia americana</u>
Bedstraw	<u>Galium spp.</u>
Bindweed	<u>Convolvulus spp.</u>
Bitternut Hickory	<u>Carya cordiformis</u>
Black Birch	<u>Betula lenta</u>
Black Cherry	<u>Prunus serotina</u>
Black Locust	<u>Robinia pseudoacacia</u>
Black Oak	<u>Quercus velutina</u>
Bladdernut	<u>Staphylea trifolia</u>
Bloodroot	<u>Sanguinaria canadensis</u>
Blue Beech, Ironwood	<u>Carpinus caroliniana</u>
Blue Cohosh	<u>Caulophyllum thalictroides</u>
Brambles, Raspberries	<u>Rubus spp.</u>
Celandine	<u>Cheledonium majus</u>
Chestnut	<u>Castanea dentata</u>
Chestnut Oak	<u>Quercus prinus</u>
Chokecherry	<u>Prunus virginiana</u>
Christmas Fern	<u>Polystichum acrostichoides</u>
Common Polypody	<u>Polypodium vulgare</u>
Common Speedwell	<u>Veronica officinalis</u>
Early Low Blueberry	<u>Vaccinium racillans</u>
Eastern Hemlock	<u>Tsuga canadensis</u>
Ebony Spleenwort	<u>Asplenium platyneuron</u>
Elderberry	<u>Sambucus canadensis</u>
Elm	<u>Ulmus spp.</u>
Enchanter's Nightshade	<u>Circaea quadrisulcata</u>
False Nettle	<u>Boehmeria cylindrica</u>
False Solomon's Seal	<u>Smilacina racemosa</u>
Flowering Dogwood	<u>Cornus florida</u>
Garlic Mustard	<u>Alliaria officinalis</u>
Gill-Over-The-Ground	<u>Glechoma hederacea</u>
Goldenrod	<u>Solidago spp.</u>
Gooseberries	<u>Ribes spp.</u>
Grapevines	<u>Vitus spp.</u>
Grass	<u>Brachyelytrum erectum</u>
Greenbriar	<u>Smilax spp.</u>
Grey Dogwood	<u>Cornus racemosa</u>
Groundnut	<u>Apios americana</u>
Hackberry	<u>Celtis occidentalis</u>
Hayscented Fern	<u>Dennstaedtia punctilobula</u>
Hazelnut	<u>Cornus americana</u>
Hedge Bindweed	<u>Convolvus sepium</u>

- Coordinate with the NH Coastal Program to produce the joint newsletter, Tidelines, published 3 times per year
- Coordinate NHEP conferences and public events, including the 2003 State of the Estuaries Conference
 - Work with media sources to publicize NHEP projects, activities, and accomplishments
 - Develop and implement a yearly NHEP Outreach Plan, coordinating with the NHEP Outreach Team and Management Committee as necessary
- Develop content for the NHEP website and coordinate updates
 - Support and enhance volunteer monitoring efforts and other volunteer opportunities
- Maintain and enhance mailing lists and databases for effective and targeted communications

Qualifications and Skills

- Master's degree in relevant field (resource management, environmental science, planning, public administration, community development, etc.) and three years of related experience; OR relevant Bachelor's degree and five years of related experience
- Understanding of estuarine systems, watersheds, and water quality issues
- Ability to work independently and as part of a team
- Experience using Microsoft Access to create and manage databases
- Ability to interpret technical data and communicate technical data to others
- Experience writing technical reports on natural resource issues
- Ability to organize and coordinate work groups and project teams

Other Information

- Salary range is \$35,334 to \$48,126 depending on experience and qualifications
- Job classification is Principal Planner; Labor Grade is 24
- 37.5 hour work week
- Generous state benefits package

Closing Date

November 1, 2002

Common Name

Helleborine
Hemlock Parsley
Herb Robert
Honeysuckle
Hornbeam
Horse-Balm, Richweed
Indian Cucumber Root
Jack-In-The-Pulpit
Japanese Barberry
Lady Fern
Maidenhair Fern
Maidenhair Spleenwort
Maple-Leaf Viburnum
Marginal Woodfern
Meadow Rue
Mockernut Hickory
New York Fern
Pale Corydalis
Pasture Gooseberry
Pignut Hickory
Poison Ivy
Rattlesnake Fern
Red Cedar
Red Maple
Red Oak
Red Pine
Rose
Patridge Berry
Perfoliate Bellwort
Purple Flowering Raspberry
Round-Lobed Hepatica
Lyre-Leaved Rock Cress, Rock Cress
Sassafras
Scarlett Oak
Sedge
Sensitive Fern
Shagbark Hickory
Shining Clubmoss
Shortstalk Arrowwood
Skunk Cabbage
Slippery Elm
Solomon's Seal
Spicebush
Spinulose Woodfern
Squawroot
Striped Maple
Sugar Maple
Sycamore
Tall Deerberry
Touch-Me-Not, Jewelweed

Scientific Name

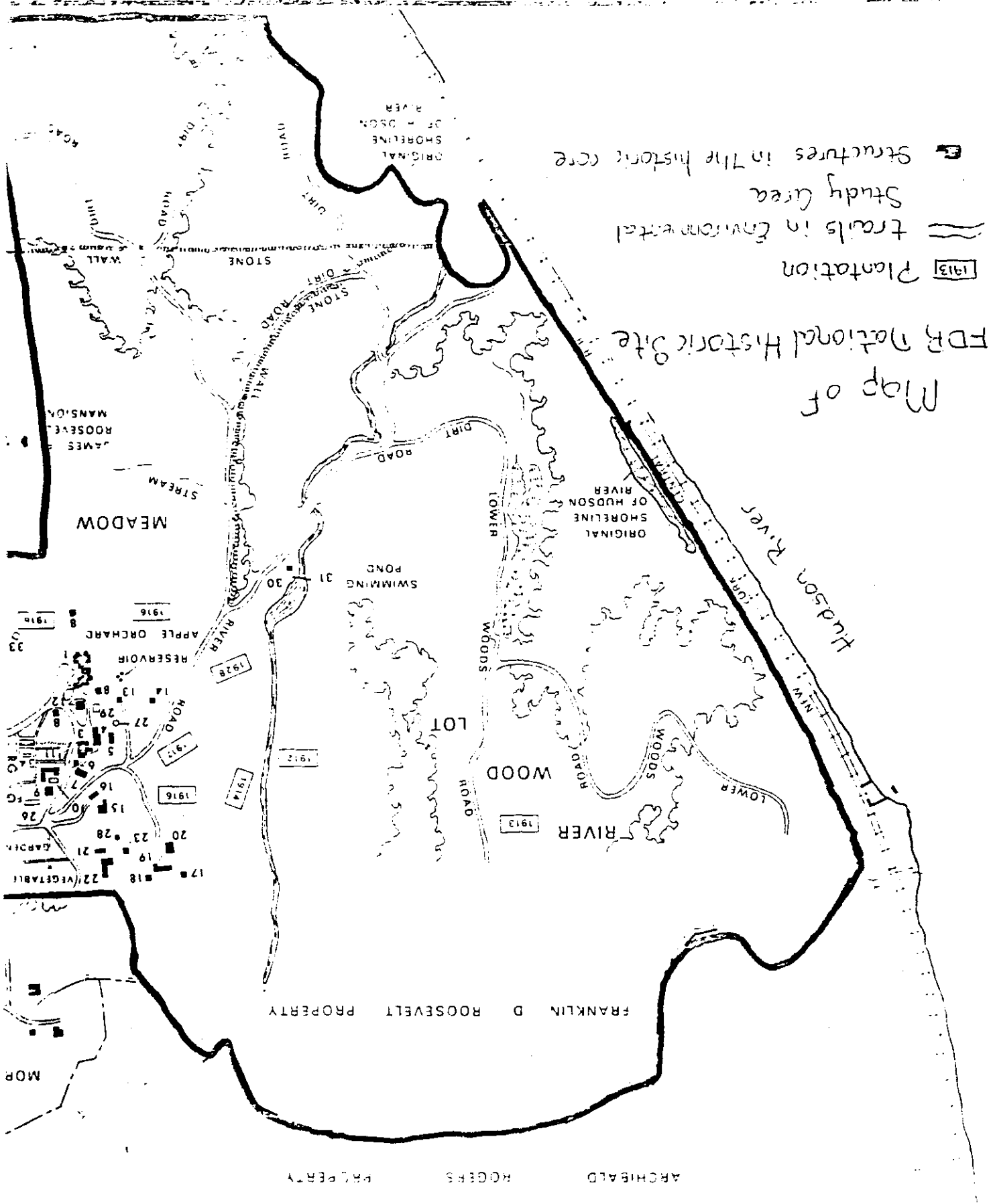
Epipactis helleborine
Conioselinium chinense
Geranium robertianum
Lonicera sp.
Ostrya virginiana
Colinsonia canadensis
Medeola virginiana
Arisaema triphyllum
Berberis thunbergii
Atherium filix-femina
Adiantum pedatum
Asplenium trichomanes
Viburnum acerifolium
Dryopteris marginalis
Thalictrum spp.
Carya tomentosa
Thelypteris noreboraconsis
Corydalis sempervirens
Ribes cynosbata
Carya glabra
Rhus radicans
Botrychium virginianum
Juniperus virginiana
Acer rubrum
Quercus rubra
Pinus rigida
Rosa spp.
Mitchella repens
Uvularia perfoliatum
Rubus odoratus
Hepatica americana
Arabis lyrata
Sassafras albidum
Quercus coccinea
Carex spp.
Anoclea sensibilis
Carya ovata
Lycopodium lucidulum
Viburnum rafinesquianum
Symplocarpus foetidus
Ulmus rubra
Polygonatum pubescens
Lindera benzoin
Dryopteris spinulosa
Conopholis americana
Acer pennsylvanicum
Acer Saccharum
Platanus occidentalis
Vaccinium stamineus
Impatiens capensis

Common Name

Tree-Of-Heaven
Triangle Grape Fern
Tulip Poplar
Violet
Violet
Virginia Creeper
Walking Fern
White Ash
White Baneberry
White Oak
White Pine
White Wild Licorice
Wild Geranium
Wild Geranium
Wild Ginger
Wild Leek
Wild Lilly-Of-The-Valley
Wild Sarsaparilla
Wild Strawberry
Witch-Hazel
Witch Hobble
Yellow Birch

Scientific Name

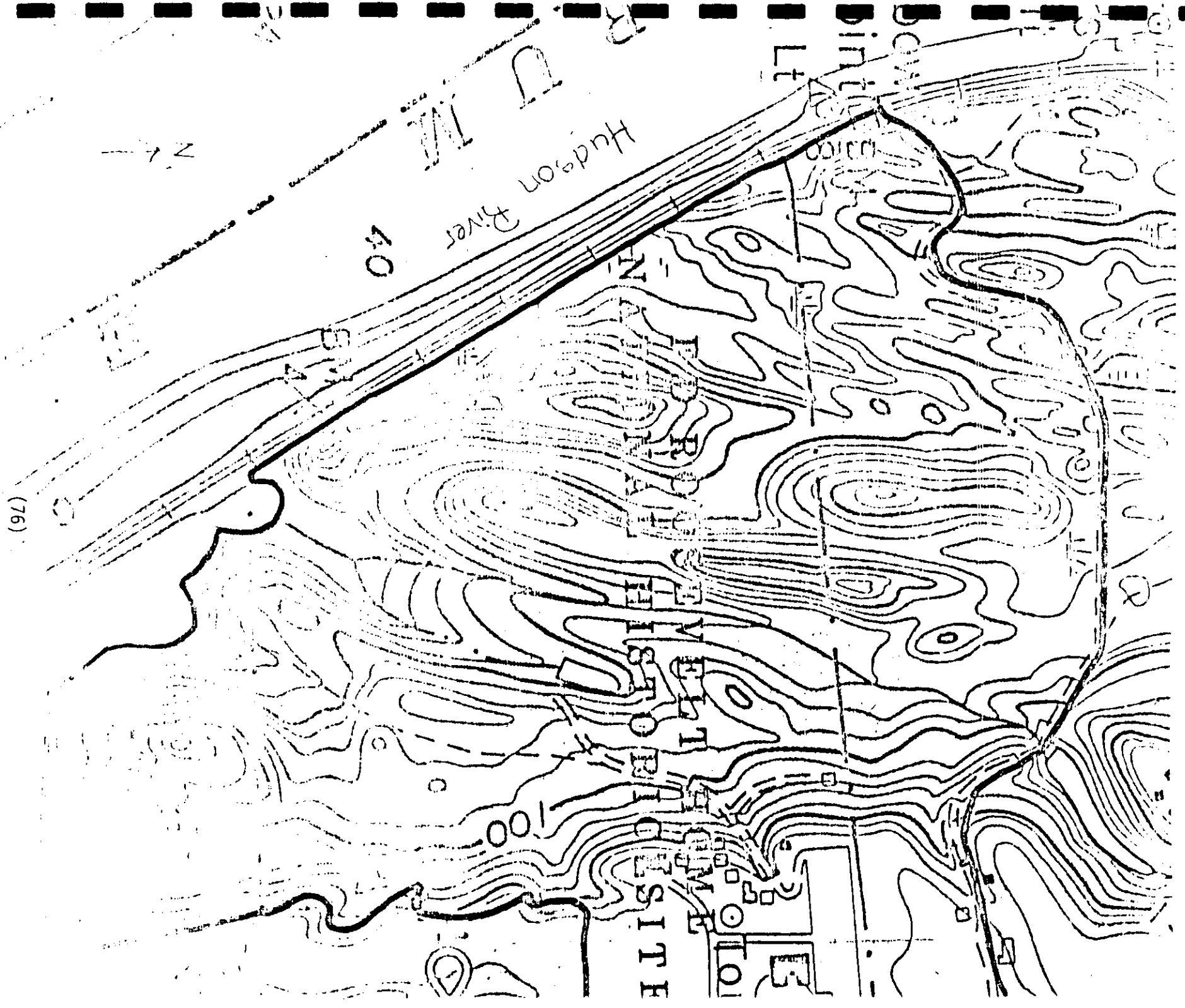
Ailanthus altissima
Botrychium lanceolatum
Liriodendron tulipifera
Viola rostrata
Viola spp.
Parthenocissus quinquefolia
Camptosorus rhizophyllus
Fraxinus americana
Actaea pachypoda
Quercus alba
Pinus strobus
Galium circaezans
Geranium maculatum
Geranium sp.
Asarum canadense
Allium tricoccum
Mianthemum canadense
Aralia nudicaulis
Fragaria sp.
Hammamelis virginiana
Viburnum alnifolium
Betula alleghaniensis

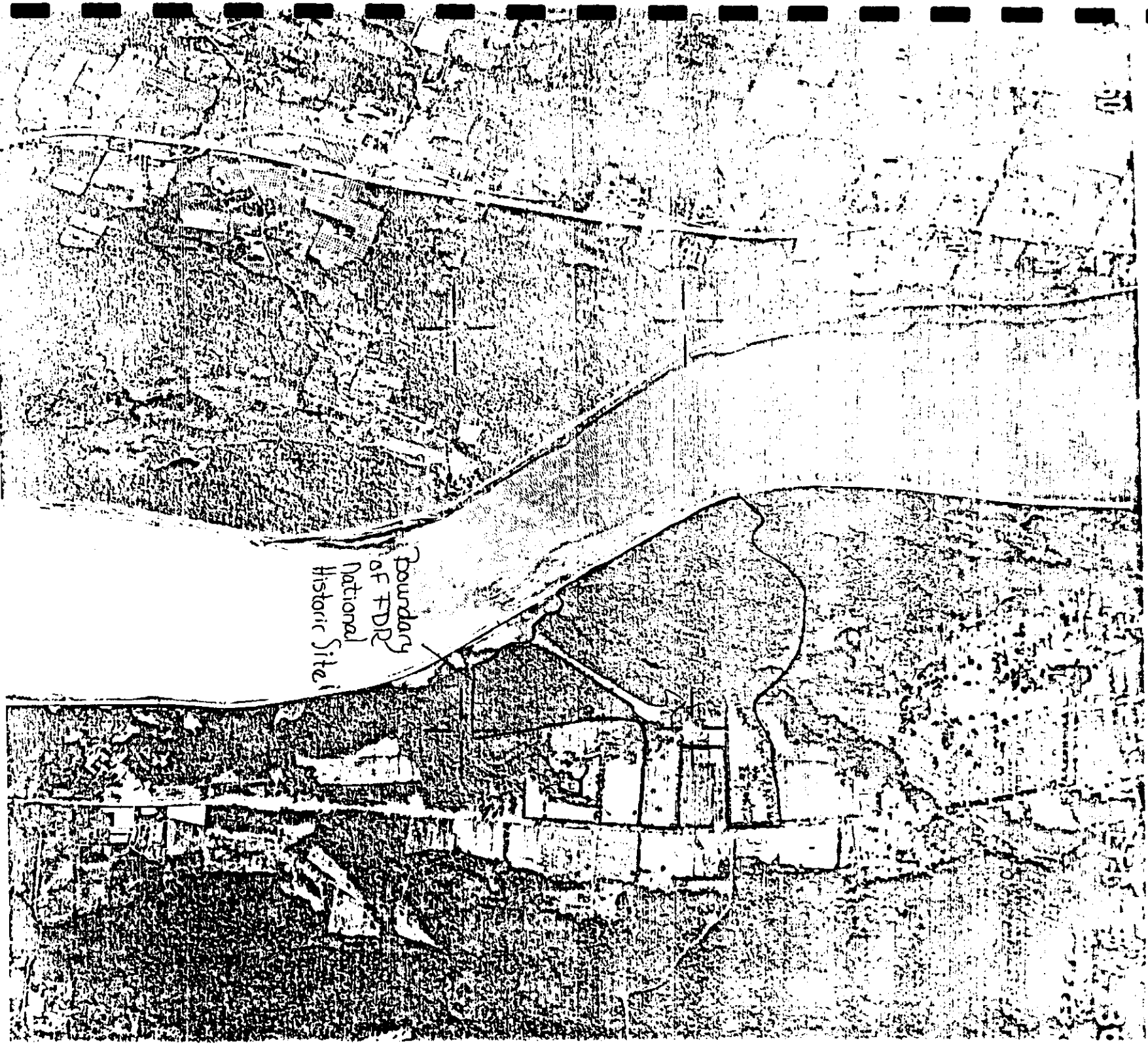


Map of
FDR National Historic Site
Plantation
Trails in Environmental
Study Area
Structures in the historic core

ARCHIBALD ROGERS PROPERTY

FRANKLIN D ROOSEVELT PROPERTY





1960 aerial photograph

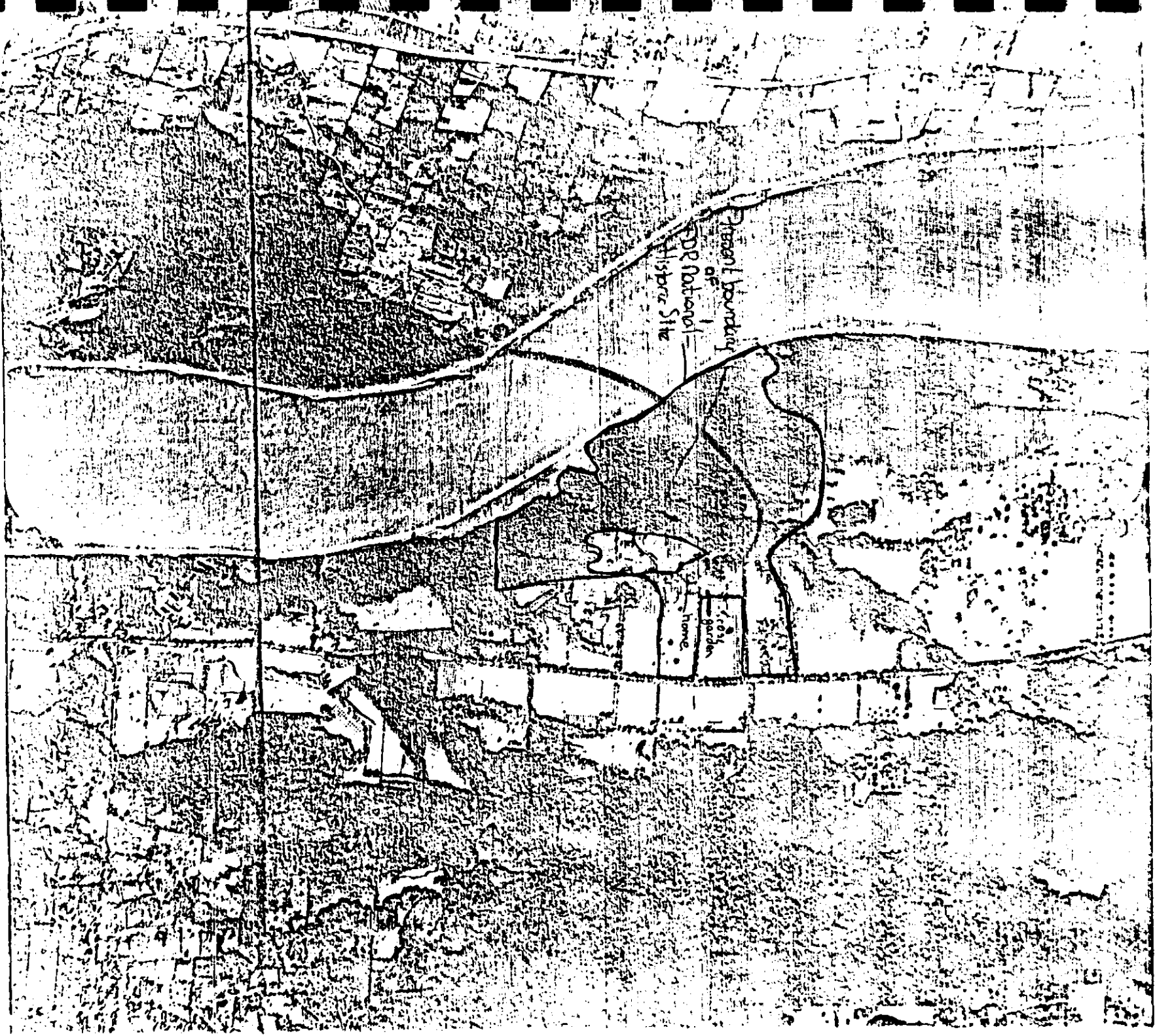
Boundary
of FDR
National
Historic Site

In red: outline of the remains of
field that provided vista
and the 1960 Park Service
vista restoration attempt



1947 aerial photograph
— after FDR's death

In red: outline of field that provided
scenic vista.
(78) → note invasion by trees and shrubs



Undated aerial photographs

-prior to FDR's death

(79)

— in red: outline of Field that provided scenic vista