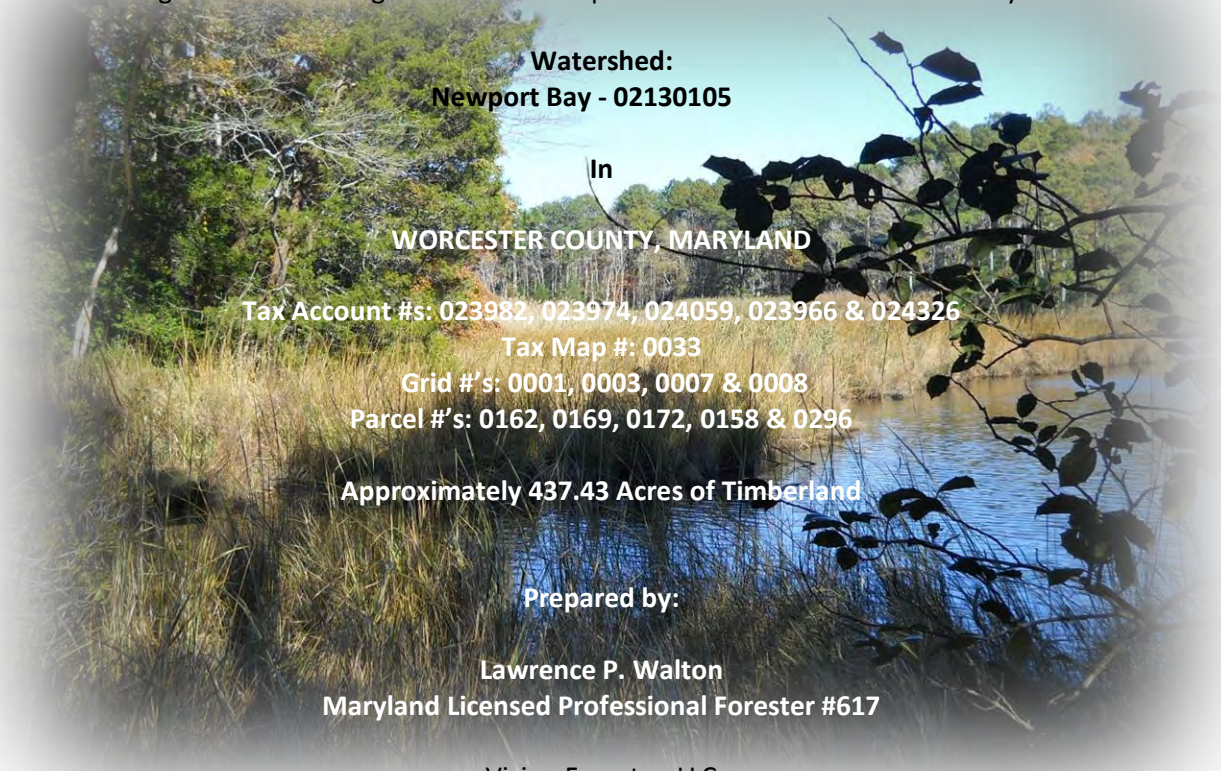
FOREST STEWARDSHIP PLAN

Prepared for:

COUNTY COMMISSIONERS OF WORCESTER COUNTY, MD
1 West Market Street
Snow Hill, Maryland 21863

Location:

Fronting on both Assateague Road and Sinepuxent Road on the West Side of Ayers Creek



Watershed:
Newport Bay - 02130105

In

WORCESTER COUNTY, MARYLAND

Tax Account #s: 023982, 023974, 024059, 023966 & 024326
Tax Map #: 0033
Grid #'s: 0001, 0003, 0007 & 0008
Parcel #'s: 0162, 0169, 0172, 0158 & 0296

Approximately 437.43 Acres of Timberland

Prepared by:

Lawrence P. Walton
Maryland Licensed Professional Forester #617

Vision Forestry, LLC
P.O. Box 2677
310 Tilghman Road
Salisbury, MD 21802

Date: November 8, 2016

Vision Forestry, LLC
Sustainable Forest Management

TABLE OF CONTENTS

Landowners Objectives*/*Property Overview:

In March of 2011 Worcester County purchased this 437 acre property from The Adkins Company. *(See Figure 1: Location Map).* The property is located within the Holly Groves Swamp area, which is 4,000 contiguous acres of forestland; the largest block of unprotected forestland in the county.

The land was acquired in part with funds through the Coastal and Estuarine Land Conservation Program. The deed states that "Title to the property conveyed by this deed shall vest in the County Commissioners of Worcester County, Maryland, subject to the conditions that the property shall be *managed for conservation purpose and consistent with the purposes for which it was entered into the CELCP*, and shall not convert to other uses."

Prior to the transfer of land to Worcester County, The County Commissioners and the Maryland Coastal Bays Foundation (MCBF) entered into a Memorandum of Understanding (MOU) whereby MCBF assumed management responsibilities of the property.

In Section 2 of the MOU the following management goals and objectives are listed as outlined in the Federal CELCP grant award:

- To maintain the property in a state as suitable only for passive recreation and the publicly accessible portion of a multi-phase conservation effort to protect the Holly Grove Swamp; a 4,000 acre contiguous coastal plain headwater forest block.

- To manage the property to protect principal habitats of concern in Maryland's Coastal Bays as each of the key habitats on the CELCP property plays a valuable role toward maintaining the ecological integrity of the area's intricate hydrological system. These habitats include the sensitive shoreline, palustrine and estuarine wetlands and adjacent upland forest areas.

- To maintain ecological integrity of the property in the region. The acquisition of the subject property will protect one of the largest, most ecologically valuable, unprotected forest parcels in the Ayer's Creek area. Management of this property shall be conducted in a manner to maintain these characteristics.

- To restore the palustrine forested wetland that was previously planted as loblolly pine monoculture for silvicultural purposes. The loblolly pine monoculture stands comprise approximately 153 acres and are located in the southwestern and northeastern portion of the property. As stated in the final CELCP grant application upon which final funding of the property was contingent, the MCBP has agreed to restore approximately 65 acres of the pine

monoculture to a native forest after the property is acquired. Revenue generated from the removal and sale of the loblolly pines should be used only for management of the property. This could include allocation the funds to develop a low impact trail system. Such activities should be consistent with conservation oriented projects.

- To ensure that any non-motorized boat (e.g. kayak, canoe) access project on the property consider and be consistent with existing and developing water trails that could include the Maryland Coastal Bays Kayak Trail and the developing Ayers Creek Water Trail. This will require working in coordination with the County and/or Maryland Department of natural resources.

- To complete additional restoration work to block ditches and restore natural hydrology and habitat on the property.

A management committee was created to steer the management of the property. The committee was made up of Worcester County Department of Parks and Recreation, Department of Natural Resources, Maryland Coastal Bays Program and Maryland Department of Environment.

The Management committee prepared a plan in 2013 which provided a good overview of the property as well as some very specific recommendations as to the restoration of the Loblolly Pine plantations on the south side of the property accessed off of Assateague Road. This restoration project began in 2015 with a timber harvest, followed by some limited tree planting. The balance of the restoration project is ongoing and described more specifically in this Stewardship Plan.

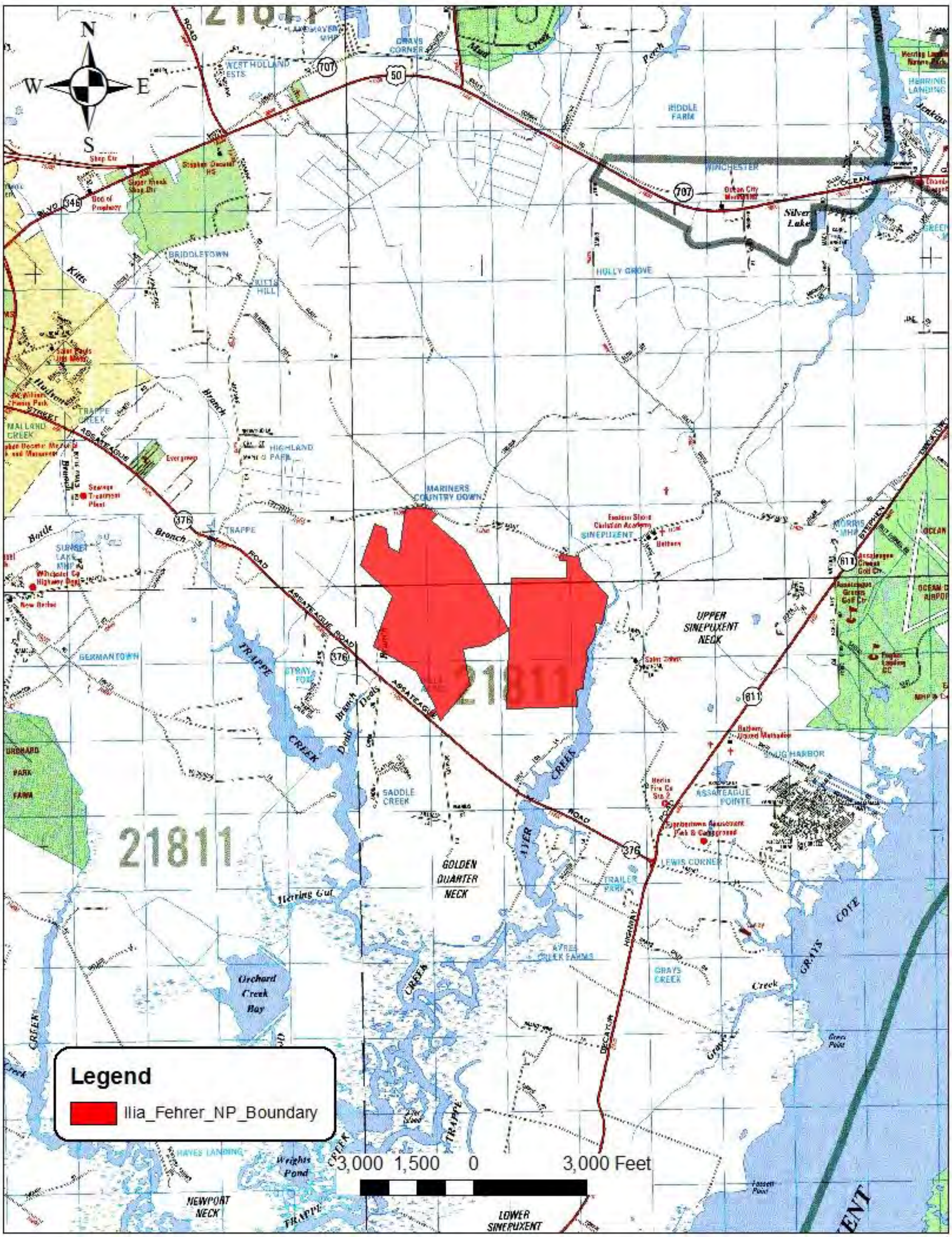


Figure 1: Location Map

MUSYM	Soil Name	Limitations - Haul Road Construction	Suitability for Log Landings	Soil Rutting Hazard	% of Tract
Mu	Mullica-Berryland Complex	Severe – Wetness Limitation	Poorly Suited –Wetness Limitation	Severe – Wetness & Strength Limitation	33.74%
As	Askecksy Loamy Sand	Severe – Wetness Limitation	Poorly Suited – Wetness & Sand Limitation	Severe – Wetness Limitation	28.23%
WdA - WdB	Woodstown Sandy Loam	Moderate – Strength Limitation	Moderately Well Suited	Severe – Strength Limitation	8.97%
Fa	Falsington Sandy Loam	Severe – Wetness Limitation	Poorly Suited – Wetness Limitation	Severe – Wetness & Strength Limitation	6.62%
HmA	Hammonton Loamy Sand	Slight	Well Suited	Moderate – Strength Limitation	5.62%
Hu	Hurlock Sandy Loam	Severe – Wetness Limitation	Poorly Suited – Wetness Limitation	Severe – Wetness Limitation	5.43%
HbB	Hambrook Sandy Loam	Moderate – Strength Limitation	Moderately Well Suited	Severe – Wetness Limitation	4.38%
Ke	Kentuck Silt Loam	Severe – Wetness Limitation	Poorly Suited – Wetness Limitation	Severe – Wetness & Strength Limitation	2.49%
KsA	Klej Sandy Loam	Moderate – Wetness Limitation	Moderately Well Suited – Sand & Wetness Limitation	Moderate – Strength Limitation	1.62%
RoB	Rosedale Loamy Sand	Severe – Wetness	Poorly Suited - Wetness	Severe - Wetness	1.57%
BX	Boxiron & Broadkill Soils	Severe – Flooding & Wetness Limitation	Poorly Suited – Flooding & Wetness Limitation	Severe – Wetness & Strength Limitation	.88%
In	Indiantown Silt Loam	Severe – Flooding Limitation	Poorly Suited – Flooding Limitation	Severe – Wetness& Strength Limitation	.44%

Table 1: Soil Capability for Forestry Operations

Soils: *(See Figure 2: Soils Map)*

Nearly 80% of the soils that make up the Ilia Fehrer Nature Preserve are deep to very deep poorly drained hydric soils. A **hydric soil** is a soil that is, "formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" These soils offer limited access for forestry operations in all but the drier seasons. *(See Table 1)*

Wetlands: *(See Figure 3: Wetlands Map)*

Approximately 88% of the property is considered wetland. The Management Committee prepared a Management Plan in 2013 which included a good description of the wetlands on the property. The following is an excerpt from that plan describing these wetlands:

The subject property is a functional estuarine and palustrine forested wetland complex. Wetlands within this category include inland marshes and swamps as well as bogs, fens, tundra and floodplains. Almost 50% of the property (about 211 acres) contains sensitive palustrine forested wetlands. An additional 40% (177 acres) consists of well documented, nationally decreasing wetland types including estuarine intertidal emergent and palustrine emergent/scrub-shrub wetlands (Table 1). Estimated acreages of major wetland types on the subject property include the following:

Estuarine Intertidal Emergent Persistent Irregularly Flooded (E2EM1P).

This project protects approximately 7 acres of saltmarsh on the eastern extreme of the property. This portion of the property provides excellent habitat for a variety of migrating bird species and the adult ribbed mussel that depend on dynamic estuarial ecosystems for their survival.

Palustrine Emergent Persistent Saturated (PEM1Bd)

The project seeks to restore approximately 65 acres of inland marshes/wetland meadows. This southwestern portion of the property was logged 10-15 years ago and is heavily ditched. This restoration plan includes blocking ditches to restore natural hydrology and replacing loblolly pine trees planted for silviculture with a more appropriate forest community for these soil conditions. Planned restoration activities for this property are described in a later section.

Palustrine Scrub-Shrub Broad-Leaved Deciduous Seasonally Flooded/Saturated (PSS1E)

The project protects approximately 65 acres of shrub wetlands. The heavily flooded nature of this part of the property provides ideal habitat for rare, threatened, and endangered plants and amphibians.

Palustrine Scrub-Shrub Broad-Leaved Deciduous and Needle Leaved Evergreen Saturated (PSS1/4B).
This project will protect approximately 22 acres of shrub wetlands. This heavily flooded portion of the property transitions into estuarine.

Palustrine Scrub-Shrub Needle-Leaved Evergreen and Broad Leaved Deciduous Saturated (PSS4/1B). This project will protect approximately 17 acres of shrub wetlands. This heavily flooded portion of the property transitions into estuarine.

Approximately 88% of the area is comprised of coastal wetlands directly associated with a river or bay environment and most of the site's wetlands are interconnected by natural or artificial stream channels. The remainder of the property is associated upland forests. The values of the wetlands within the project area are well documented as they provide habitat for fish and wildlife including state rare and federal migrating endangered species.

Table 2. Habitat types and their proportion of the property.

Habitat Type	*Number Acres*	*% of Property*
Stable Coastal Wetlands	*213*	*48*
Declining Coastal Wetlands		
Estuarine Intertidal Emergent	*7*	*2*
Palustrine Emergent	*66*	*15*
Palustrine Scrub-Shrub	*105*	*23*
TOTAL WETLANDS	*391*	*88*
TOTAL UPLANDS	*51*	*12*
TOTAL ACRES	*441*	*100*
TOTAL SHORELINE AREA	*0.5 miles*	

Threatened and Endangered (T&E) & High Conservation Value Forest (HCVF):

The entire property is designated by Maryland Heritage as a Sensitive Species Project Review Area. *(See Figure 4: SSPRA Map*) A designation that triggers additional heritage reviews for Forestry Projects in the Critical Area. Before any harvesting activity Heritage should be notified, and given an opportunity to review the activity and make recommendations in regard to any T&E species that may be found in the area.

News releases at the time of the purchase stated that 11 State and Federal endangered, rare or threatened plant and animal species are found within the Holly Grove Swamp. The area is also said to be home of the largest concentration of the Red-Bellied Water Snake. Because this is part of a large contiguous forest, made up of a significant acreage of mature hardwood, the entire property is considered high quality breeding habitat for Forest Interior Birds (FIDS). Also, as stated by the

Management Committee in the plan that the "*7 acres of saltmarsh on the eastern extreme of the property. This portion of the property provides excellent habitat for a variety of migrating bird species and the adult ribbed mussel that depend on dynamic estuarial ecosystems for their survival.*"

A request has been made to Maryland DNR Wildlife & Heritage for a listing of all of the State rare or endangered species and their habitats that may be found on the property. At the time of this writing that has not been made available.

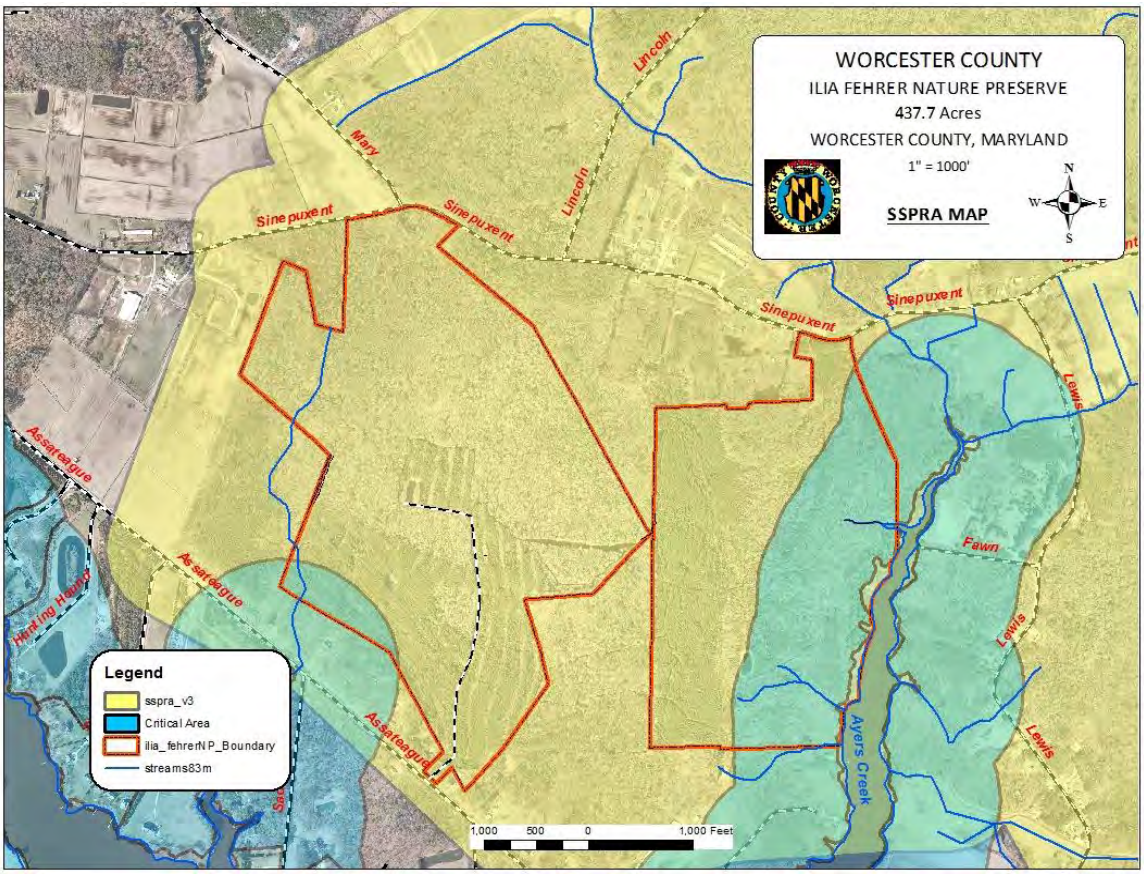


Figure 4: SSPRA Map

Recreational Opportunities:

There were two items in the MOU in regard to public recreation on the property:

- To maintain the property in a state as suitable only for passive recreation and the publicly accessible portion of a multi-phase conservation effort to protect the Holly Grove Swamp; a 4,000 acre contiguous coastal plain headwater forest block.

- To ensure that any non-motorized boat (e.g. kayak, canoe) access project on the property consider and be consistent with existing and developing water

trails that could include the Maryland Coastal Bays Kayak Trail and the developing Ayers Creek Water Trail. This will require working in coordination with the County and/or Maryland Department of natural resources.

Though beyond the scope of this Stewardship Plan, while performing the fieldwork for the plan many of the existing trails were walked and GPS'd. *(See Figure 5: Trail Map)* The Trail Map included here did by no means capture all of the trails or potential trails on the property. Many of these were old skid trails from past logging operations that were kept open by hunters and/or ATV's, or maintained by horseback riders on the property. The southeast corner of the Property along Ayers Creek may provide the best access to the property and trail system via Ayers Creek.

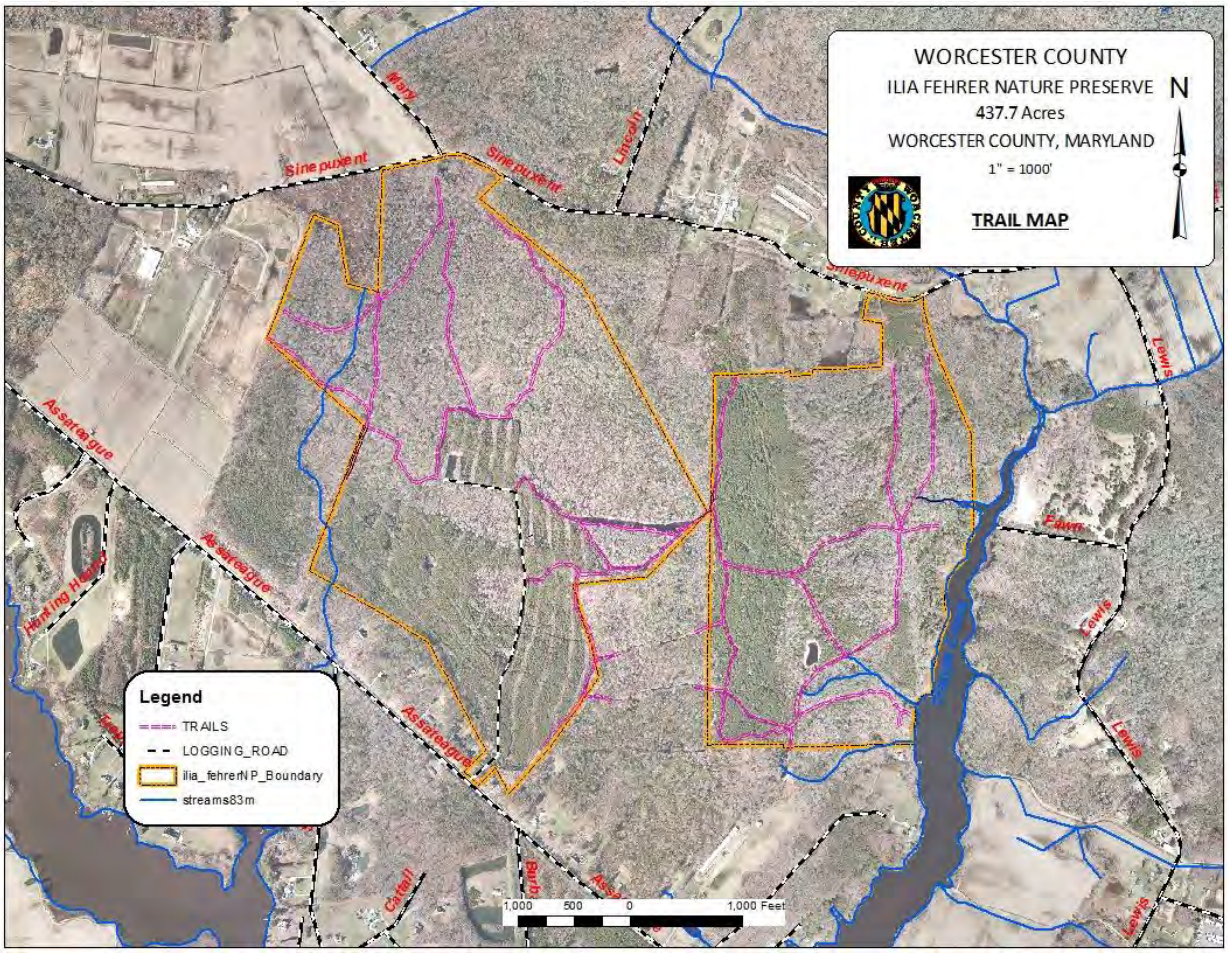


Figure 5: Trail Map

STAND* DESCRIPTIONS - MANAGEMENT RECOMMENDATIONS

** A stand is a group of forest trees of sufficiently uniform species composition, age and condition to be considered a homogeneous unit for management purposes.*

(See Figure 6 – Restoration Area & 7 – Google Map
& Figure 8 – Stand Map)

Stand Number: 1 – Restoration Area (Currently all natural regeneration, Not including areas already planted - Stands 1A, 1AC, 1B & 1C)

Acres: 62.83 Acres

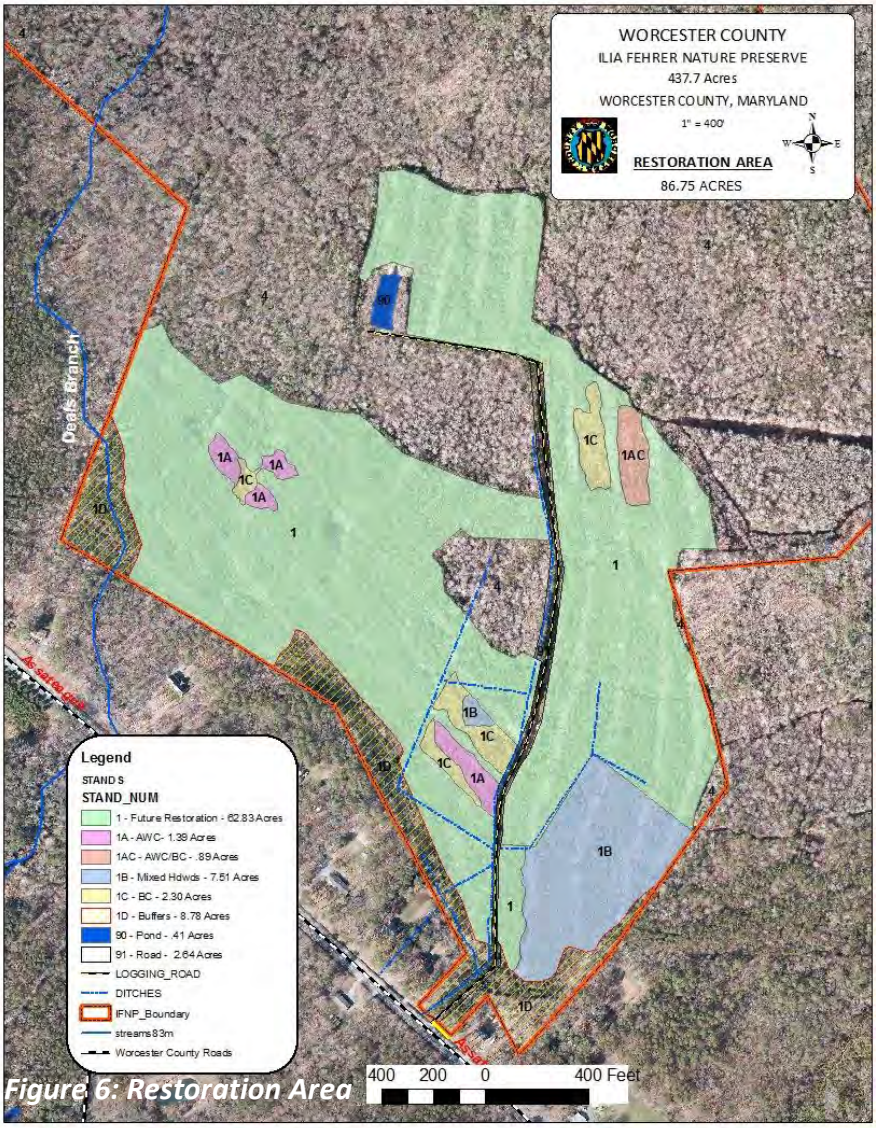


Figure 6: Restoration Area

This area was harvested in the late summer of 2015 in preparation of restoration as per the MOU that accompanied the CELCP grant that required the restoration of these loblolly pine (Pinus taeda) plantations to a more natural, native mixed hardwood pine forest. Though there have already been some small planting within this area, all of the various plantings have been included in this single stand description (and sub-stands) as the entire area is still a work in progress.

In the 1990's these areas had been harvested, site prepared and planted with Loblolly Pine seedlings. The western side of the logging road had been site prepared before planting by shearing and piling the un-merchantable trees and logging slash into long "windrows". These windrows eventually developed into narrow strips of hardwoods between the rows of Loblolly Pines. They were primarily made up of Sweetgum (Liquidambar styracyflua) and Red Maple (Acer Rubrum), but Black Cherry *(Prunus serotina)*, Yellow Poplar *(Liriodendron tulipifera)* and a variety of oaks *(Quercus spp.)* can be found in these windrows. On the eastern side of the logging road, the site was more intensively site prepared before planting Loblolly Pine. This area was also sheared and piled into windrows similar to the west side, but this area was also "bedded" with a bedding plow which created raised beds where the Loblolly Pines were planted in an effort to keep them out of the standing water during the winter and early spring months. This was mostly successful, but still there was seedling mortality in areas where the seasonal water was still too high. Areas were some of the initial restoration plantings took Place.

In August of 2015 the site was harvested by Eastern Shore Forest Products. Instructions were to remove only the loblolly pines, and to leave the windrows intact. The contractors were also instructed to leave oak trees if found within the loblolly pine areas. A few mature oaks were intermingled with the pines and left during the harvest, all on the West Side of the road.

Figure 7: Google Map

In the fall of 2016 a natural regeneration count was conducted on both sides of the logging road, and the tree species makeup was quite different from one side of the road to the other.

The West Side of the road has a considerable amount more natural seedlings than found on the East Side. For this plan both areas were walked and a number of 1000th acre plots were taken and all seedlings that fell within that 1000th acre were tallied. ***On the west side***, Loblolly pines averaged over 1800 stems/acre. There were also Sweetgum (364/Acre), Red Maple (270/Acre), and a smaller number of American Holly (81/Acre), Oaks (27/Acre), Blackgum (13/acre) and Yellow Poplar (13/Acre). These trees were not evenly distributed throughout the area. There were a much higher number of pines along the south side of this harvest area.

On the east side, Loblolly Pines only averaged 83 stems/acre while Sweetgums averaged 624/acre, and Red maple averaged 541/acre.

It's possible that the older stand on the west side of the road had more cone bearing pines than the younger stand on the East Side of the road. Also the bedded areas provided good growing conditions for sedges and grasses which were very dense making establishment of trees seedlings very difficult.

Dominant Overstory Species: Loblolly Pine *(Pinus taeda)*, Sweetgum *(Liquidambar styraciflua)*, Red Maple *(Acer rubrum*) (See comments above)

Dominant Understory Species: N/A

Age: 1 year.

Stocking/*Basal Area: See comments above.

Site Growth Potential:. Soils in this stand are mostly Hydric Askesksy, Falsington, Hurlock, Mullica/Berryland, and Hammonton Loamy Sands and Sandy Loams. The Soil Survey of Worcester County estimates Woodland Productivity in terms of site index* for different species on the various soil types. Loblolly Pine and Sweetgum are the most productive tree species on most of these soils with site indexes between 80 and 90 (on 50 year basis), though they are all also well suited for a variety of Oaks with site indexes of 70 to 80.

(**Site index indicates the total height a tree will reach in 50 years and a measure commonly used by foresters as an indication of site quality, Site index can also be expressed on a 25 year basis … more commonly used for Loblolly Pine plantations)*

Soil Types/Suitability for Forestry Activities: The soils in this stand are suited for Forestry activities in only the drier seasons. (See Table 1)

Documentation of Existing Practices: Timber harvest records and permits on file.

Activity History: Timber Harvest in 2015.

Income Potential: Income will not be a goal for this area moving forward.

Riparian Areas/Water Features: There are a number of old agricultural ditches on the south side of this stand, as well as some small seasonal ponds where planted Loblolly Pines couldn't survive.

Recommendations: As stated in the MOU *(see Landowner Objectives),* part of the restoration of this site was to restore the natural hydrology to the area. At the time of the preparation of this plan, MCBP was still in the process of determining in what manner they would attempt this hydrology modification. Clearly some ditch plugs/water control structures in the old ditches are planned, and MDE and restoration specialists from MD DNR have already inspected the site. Other opportunities may be to level some of the "bedded" areas which would create some more natural ponding during the wetter seasons.

Forestry prescriptions (tree planting, species, etc.) may vary depending upon the success of the hydrology restoration. Recommendations in this plan will be to wait until all the hydrology projects are completed, and see how the site is affected. At this time perform another natural regeneration count to determine the amount and species mix of the natural regeneration that survives the higher water levels and where it doesn't.

There will most likely will still be densely stocked stands in the higher areas made up of Loblolly Pine, Sweetgum and Red Maple as well as small numbers of other species. To completely eliminate those and attempt to create something different would be costly and difficult to achieve, particularly since replacing a pine plantation with another one would be in conflict with the goals of the project. It would be best to work with that natural regeneration through pre-commercial thinning and/or some backpack herbicide applications to work the mix of species to a desired mix and density over time.

There are already some areas that are extremely wet, where trees or even heavy grasses have yet to establish themselves. Tree planting in the immediate future should be confined to these areas with trees that can tolerate high water during the winter and spring. The Bald Cypress already planted in similar areas has done quite well within this restoration area *(See Stands 1C and 1AC)*.

While the plan list the acres in this stand as 62.83 Acres, excluding the areas that have already been planted, 15% + of this area is made up of the windrows, the long strips of mixed hardwood (Sweetgum, Red Maple), which should be left out of the restoration efforts as it provides some diversity of species and vertical structure, while providing some shade and protection for the new regeneration in the cutover areas, planted or otherwise.

Stand Number: 1A – Atlantic White Cedar

Acres 1.39 Acres

Recommendations: These areas were planted in the spring of 2016. There has been some mortality in some areas, which is not unexpected, but at this point the planting has been mostly successful. Atlantic White Cedar is a favorite deer browse, but there is little evidence of browse. The seedlings do risk competition from both the natural pine and hardwood regeneration, and heavy grasses in places. The areas should be visited annually and competition should be controlled either chemical or mechanical methods. If deer browse becomes a problem, some protection may be necessary. This could be in the form of tree tubes or cages, fencing, or spraying of safe repellents. At this small of a scale, any of these methods would be feasible.

Stand 1AC – Atlantic White Cedar/Bald Cypress

Acres .89 Acres

Recommendations: This area was on the east side of the logging road where the area had been bedded. This particular area, even though it had been bedded, the previous pine plantation failed in this area. The thinking here was that Atlantic White Cedar *(Chamaecyparis thyoides)* that prefer very wet soils, but not inundation, would do well on these beds. In places though, the area were still too wet and there is some seedling mortality. Interspersed in this area some Bald Cypress *(Taxodium distichum)* was planted also. These seedlings are doing well.

Fencing was experimented with on this site, but both the fencing material and posts, were not substantial enough to withstand the elements. The posts have separated at the joints in some places, and the fencing material is laying on the ground in many places. Fencing, even with more substantial posts and fencing material takes some ongoing monitoring to keep in good repair. Consideration should be given to replacing the existing posts with 5/8" rebar. 10' pieces can be driven into the ground two feet with little effort in these wet soils, and existing fencing material can be zip tied to posts. Because the area is rectangular with corners, some 4 x 4 posts, set in concrete at the corners would help strengthen the fence.

Similar to 1A, some ongoing competition control is recommended until the trees are larger and become "free to grow" (free from competing vegetation). Where the Atlantic White Cedar have failed, some replanting of cypress, or other trees or shrubs (button bush) that can tolerate the water can be considered.

Stand 1B – Mixed Hardwoods

Acres 7.5 Acres

Recommendations: A mixture of 5 trees and shrubs were planted in this area in the spring of 2015: 100 Buttonbush *(Cephanthus occidentalis)*, 400 Pin Oak *(Quercus palustris)*, 600 Swamp White Oak *(Quercus bicolor)*, 300 Sycamore *(Plantanus occidentalis)*, 600 Willow Oak (*Quercus phellos*). As some of the other plantings were in this area, these hardwood areas were planted by students. While a valuable learning experience for the students, the planting itself was probably not as successful as it could have been. Planting hardwoods is a tough proposition even with professional tree planters. Judging the survival rate is difficult as the area now covered with tall grasses and the planting itself was far from a uniform spacing. A search for seedlings did find trees that survived, some far from the next found seedling, some with 3 or 4 all within a 10 foot radius.

Elsewhere in these planted areas there are also some natural Loblolly Pines, Sweetgums and Red Maples. In the spring of 2017 after leaf out, there should be some effort finding the planted hardwoods, marking their locations for some follow-

up work to protect those seedlings that survived. Locating and marking these seedlings could possibly be a follow-up project for students: a tree identification exercise. Once found, similar to 1A, some completion control and possibly deer protection measures will become necessary.

Stand 1C – Bald Cypress

Acres 2.30 Acres

Recommendations: 700 Bald Cypress *(Taxodium distichum)* were planted in these areas in the spring of 2015. These areas were chosen because of the level of standing water, and for the most part, the seedlings were planted directly in the water. As water stands in these areas well into the growing season, competition from grasses and other trees is limited, and these plantings appear to have done quite well. There are other opportunities for similar plantings within the restoration area.

While competition will not be as aggressive around these Bald Cypress, some monitoring and control moving forward may become necessary until the Bald Cypress are considered "free to grow"

Stand 1D – Buffers

Acres: 8.78 Acres

Recommendations: These are areas that are primarily the residual of the original pine plantations that were not harvested and left as buffers. On the west side of the area the buffers are associated with the headwaters of a blue line stream (Deals Branch) which lies within the Critical Area. The other buffers along the southern boundary were left as a visual buffer between the harvest area and the homeowners along Assateague Road. These areas also serve as habitat retention.

The areas will be left undisturbed from any restoration activities, other than some tree removal to provide for a small parking area near the entrance on Assateague Road.

Stand 2 – Lobolly Pine

Acres: 73.90

Dominant Overstory Species: Loblolly Pine
Dominant Understory Species: American Holly, Red Maple and Sweetgum in places, but much of the stand is nearly a pure loblolly pine monoculture with little understory.

Age: 16 years

Stocking/Basal Area:
**Basal area is measure of stocking used by foresters defined as the total cross-sectional area of all stems in a stand measured at breast height, and expressed as per unit of land area (typically square feet per acre)*

Most of this stand is a densely stocked Loblolly Pine stand. No records of tree planting were found, but it was planted it soon became overwhelmed by natural loblolly pine seedlings. Before the harvest in or around 2000, this was primarily mature large native Lobolly Pines. The site was rutted up somewhat by the logging operation at that time exposing a significant amount of mineral soil, conducive to good natural pine regeneration.

The Basal Area of the stand is 183, quite high for such a young stand, but 1/3 of this basal area are pre-merchantable stems from 3 to 5" in diameter and numbering 663 trees/acre. The merchantable stems range from 5 to 11 inches in diameter and numbering 500 trees per acre. Many trees have already been crowded out and died.

Site Growth Potential: The soils in this stand are mostly Askesksy Loamy Sands which are fair loblolly pines sites. Heights taken on Loblolly pines indicate a site index of 60 (on a 25 year basis) which is about average for the lower eastern shore, but also a good site for Sweetgum.

Soil Types/Suitability for Forestry Activities: Other than a small area of Woodstown Loam Sands found in this stand, the soils are suited for forestry activities, only during the drier seasons.

Documentation of Existing Practices: No documentation found, but discussions with forester who worked with former owner, and imagery confirmed the time of harvest.

Activity History: See above

Income Potential: Income is not the goal of this forest stewardship plan, though restoration of this area is, so there will be some small amount of income generated

from the harvests necessary to achieve the restoration to a more natural, native mixed hardwood/pine forest.

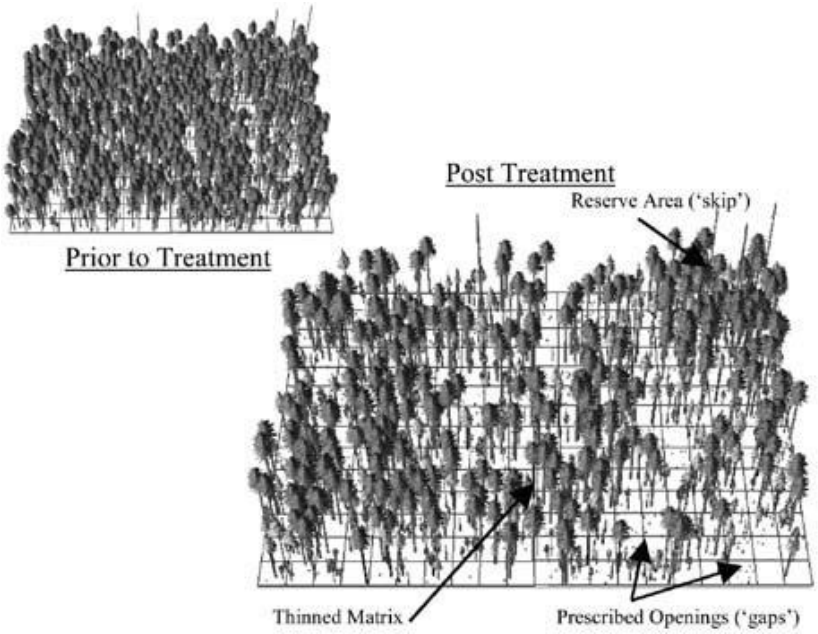
Riparian Areas/Water Features: This stand does not front on Ayers creek, but the area is almost entirely non-tidal wetlands with a man-made pond within the stand.

Presence of Noxious or Invasive Species: None noted in this stand during the inspection for this plan.

Recommendations: The MOU requires that this pine area also is in need of restoration. Included in this stand are some areas that regenerated to pine after the 2000 harvest, but not in the main block that lies along the western boundary of the eastern block of this ownership. There are some smaller areas where pines were removed, and main skid trails were located that regenerated to Loblolly Pine, but not nearly as dense. The focus of these recommendations will be on about 80% of the areas shown as stand 2 on the Stand Map.

Similar to the restoration efforts already started on the western block of this property, this site could be clearcut with and followed up with similar restoration efforts, though there are no ditches to block or other hydrologic modifications needed. The plan leaves this as one option. This would most likely require some intensive site preparation (Chemical and/or burning) to eliminate what surely would be some dense loblolly pine natural regeneration. Finding crews to burn and finding windows to do so is difficult, if possible this could be a good restoration project. There would be considerable logging slash combined with the fuel, and the area is somewhat higher and drier than the other restoration area. Following a good burn, monitor the natural regeneration that occurs for desired results. Monitor the plant communities, beyond just tree species, that result from the burning as fire may encourage some rare early successional plant communities.

The other option is to work the stand to a desired mixed forest over time through a succession of select harvests. The trees are now probably a little on the small side to find an interested buyer, but in a few years conduct a first "variable density thinning". Unlike a conventional commercial thinning that just removes access corridors and thins uniformly in between, this thinning would create larger gaps. Currently very little sunlight is reaching the forest floor, this harvest would open up the stand to sunlight and a diversity of regeneration in the understory. A prescribed burn after this thinning would further enhance the diversity of the plant community. In 10 years a second thinning could focus on removing pines in favor of the natural hardwood regeneration created from the first thinning and burning. Monitor results and over time chemically or manually control undesirable regeneration in the understory. This course of action will be revenue neutral as harvest incomes should cover the less intensive nature of this restoration method.



Stand Number: 3 – Sweetgum/Maple Wetland

Acres: 65.75

Dominant Overstory Species: Red Maple, Sweetgum

Dominant Understory Species: American Holly, Red Maple, Sweetgum, High Bush Blueberry, *(Vacinium corymbosum),* Sweet Pepperbush *(Clethra alnifolia)*

Age: Uneven

Stocking/Basal Area: Nearly 100% of the merchantable trees in this stand are either Red Maple. Total Basal area is 133 square feet/acre and 140+ merchantable trees per acre with over 60% of this being Red Maple. There is also a small Basal Area of pre-merchantable stems consisting of Red Maple and American Holly.

Soil Types/Suitability for Forestry Activities: The site is very wet and the many of the old skid trails remain under water for much of the year. Moss on the trees indicate that water levels throughout this stand remain high for much of the year.

Activity History: Looking at a series of imagery it appears as if this stand was select harvested in the 1980's. Moss covered stumps can be seen throughout the stand

Recommendations: No harvest recommendations for this stand. Monitor for insects and disease.

Stand Number: 4 – Hardwood/Pine

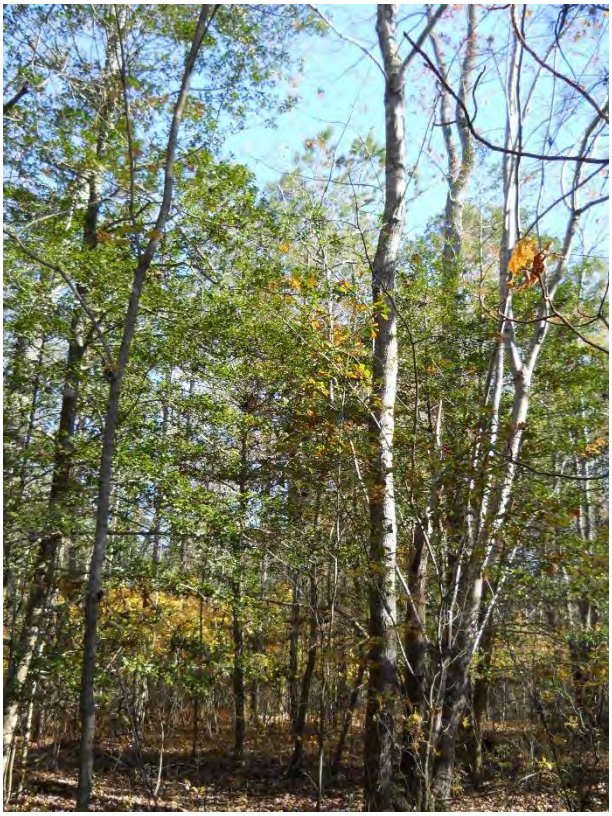
Acres: 198.10 Acres

Dominant Overstory Species: Sweetgum, Red Maple, Swamp Chestnut Oak *(Quercus michauxii),* Southern Red Oak *(Quercus falcata),* White Oak *(Quercus alba),* Willow Oak *(Quercus phellos),* Blackgum *(Nyssa sylvatica),* with scattered Loblolly Pine, Beech *(Fagus grandifolia*), Water Oak *(Quercus nigra)*, Scarlet Oak *(Quercus coccinea)* and Northern Red Oak *(Quercus rubra).*

Dominant Understory Species: American Holly, Red Maple, Pepperbush, High Bush Blueberry, Mountain Laurel *(Kalmia latifolia)*

Age: Uneven aged

Stocking/Basal Area: This stand covers large areas on both blocks of the IFNP. Since there will be no harvest recommendations this was all lumped into one stand though the stocking and species mix can be quite can vary widely. It differed from stand 3 in that these areas were not as wet, and in fact contain some upland forests. On the east block much of this stand was cut through when the Stand 2 was harvested, most likely selecting pines where they were found and easily accessible, yet there are several areas where no harvesting occurred and large Red Oaks (mostly Willow Oak), and White Oaks (mostly Swamp Chestnut Oaks) remain. Trees probably 100 years old or so. On the west block this stand was cut through most likely in the 1980's. Because it is less wet, Loblolly Pines regenerated in some areas naturally. Increment corings of these pines indicated they were approximately 30 years old confirming that the stand was probably harvested last around 30 years ago.



Across the entire stand Basal Area of merchantable trees averaged 106 square feet/acre and 120 trees/acre. There is an additional Basal Area of pre-merchantable trees of 15 square feet/acre and 160 trees/acre averaging less than 5" dbh (diameter and breast height). Red Oaks (19%), White Oaks (19%) and Red Maple (23%) make up more than 60% of the basal area. Loblolly Pine basal area makes up 17% of the total. Blackgum, Sweetgum, Holly and Beech make up most of the rest of the merchantable Basal Area. Overall this stand provides a diversity of habitat and vertical structure from mature open woods (top) to more densely stocked mixed hardwoods and pines (left).

Site Growth Potential: There is a wide variety of soils and growing conditions across this stand. For the most part, the species that have established themselves naturally across this large stand, have done so in soils and conditions that suit the species.

Soil Types/Suitability for Forestry Activities: While there aren't a great deal of uplands and suitable soils across the IFNP, most of the small acreage of uplands are located within this stand. These offer fair conditions for Forestry Activities in many season. Still the majority of this stand is made of wetlands and wet natured soils, limiting activity.

Recommendations: No forestry related activities are recommended for this stand. It will serve as Habitat Retention. Monitor the stand for insects and disease.

Stand Number: 5–Loblolly Pine

Acres: 3.83 Acres

Dominant Overstory Species: Loblolly Pine

Dominant Understory Species: Red Maple, Sweetgum

Stocking/Basal Area:

Age: 47±

Old 1964 Aerial Imagery shows this area as an open field. Increment corings indicate an age of approximately 47 years old.

Stocking/Basal Area: This is a well-stocked maturing small stand of old field Loblolly pine. Basal area of merchantable loblolly pines is 160 square feet/acre and average diameter of 14". There is some Red Maple and Sweetgum in the understory otherwise a fairly open stand of Loblolly Pines.

Site Growth Potential: Soil in this stand are mostly Hambrook Sandy Loam and is an upland site. While the pines on this site have done fairly well, this upland site would be equally suited for a variety of upland oak species.

Soil Types/Suitability for Forestry Activities: While accessibility to this stand is difficult, the stand itself is well suited for forestry activities during most seasons.

Income Potential: While timber income is not the focus of this plan, if restoration of this small pine stand to an oak stand a harvest here would generate a fair income per acre.

Recommendations: If a harvest occurs in Stand 2, and if restoration of this small stand is a goal of the landowner, then this stand can be harvested when the harvesting is done in stand 2. This would easily generate enough income to site prepare and plant this small stand with oaks, with income left over to fund restoration of stand 2.

Stand Number 6: Loblolly Pine -

Acres: 4.17 Acres

Dominant Overstory Species: Loblolly Pine

Dominant Understory Species: Eastern Red Cedar *(Juniperus virginiana*) in places.

Age: 50+

Stocking/Basal Area: No plots were taken in this wet, failing Loblolly Pine stand along Ayers Creek. There is a considerable number of dead mature Loblolly Pines throughout the stand. Mortality most likely due to high water, salt effected. Over time this stand will continue to deteriorate and add acres to the adjoining salt marsh. Already the understory is full of phragmite.

Recommendations: No recommendations other than to monitor natural progression to salt marsh.

Stand Number 7: Loblolly Pine

Acres: 1.67 Acres

Dominant Overstory Species: Loblolly Pine *(Pinus taeda)*

Age: 27

Stocking/Basal Area: No plots were taken in this old field Loblolly Pine plantation, though it is a well-stocked Loblolly Pine stand.

Soil Types/Suitability for Forestry Activities: See table 1. This is also an upland site made up of mostly Hambrook Sandy Loam soils, and would be suitable for forestry activities in most seasons.

Recommendations: There is a small access road that enters the tract through this stand, but not drivable very far. There is already an existing culvert pipe at the county road. Discussions have been that this may be the location of a small parking area. This narrow strip of pine could provide a good visual buffer from the parking area which could be placed behind this stand in the portion of stand 2 (younger pine) which is equally suitable for roads and parking areas. To make it worth a contractor's time to cut a small parking area, this stand and adjoining portion of stand 2 could be thinned and income would help pay for the construction of a small parking area.

Stand Number 8: Marsh

Acres: 3.0 Acres

Stand Number 9: Regeneration around Pond

Acres: .43 Acres

The ponds were probably constructed sometime after the 2000 harvests. Imagery shows neither pond on 1998 imagery, but both are on 2004 imagery. The clearing for this pond extended beyond where the water levels have been, and a dense strip of regeneration has filled in this strip.

Stand Number 90: Ponds

Acres: .80 Acres

Stand Number 91: Roads

Acres: 2.64 Acres

STAND DESCRIPTION	ACTIVITY DESCRIPTION	TIME FRAME
Stand 1, 1A, 1AC, 1B,1C - Restoration Area	Complete Hydrological Restoration	2017
	Consider Planting some other extremely wet areas (Bald Cypress, etc.)	Spring 2017
	Monitor and protect/release 2016 plantings as needed in 1A, 1AC, 1B, 1C.	Spring of 2017 and ongoing
	Regeneration Inventory (1), GPS areas impacted by Hydrological Restoration work.	One year after hydrologic restoration projects in place
	Release, Plant, or leave to grow or combination of all.	Based upon regeneration inventory – the following spring and summer.
	Pre-commercial thin Natural Regeneration areas… if any.	2022
	Monitoring stand progress – with Timber Stand Improvement work as needed.	Annually
Stand 2 - LOBLOLLY PINE	Variable Retention Thinning or clearcut	2019, sooner if feasible.
	Prescribe Burn after natural regeneration established, and found to be unacceptable.	2 years after harvest
	If Clearcut – Monitor and plant if needed	Growing season after burn.
	If thinned – Second Variable Retention Thinning	10 years after first thinning.
	Monitoring stand progress with Timber Stand Improvement work as needed	Annually
Stand 3 - MIXED HARDWOOD	Monitor for insects and disease	Annually
Stand 4 - HARDWOOD/PINE	Monitor for insects and disease	Annually
Stand 5 LOBLOLLY PINE	Consider Clearcut when stand 2 is harvested	2019 or sooner if feasible
	Plant with Stand 2	
	Monitor stand progress with Timber Stand Improvement work as needed.	Annually
Stand 6 LOBLOLLY PINE	Monitor for insects and disease	Annually

Stand 7 LOBLOLLY PINE	Consider thinning coinciding with parking area construction	2017
TRESPASS - DUMPING & OTHER MAINTENANCE	Monitor the property for invasive species	Note invasives during other scheduled monitoring visits - treat with herbicides if invasives found.
	Monitor health of the forest	Ongoing.
	Boundary line painting	Boundaries should be firmly established and maintained on a 5-7 year schedule. Newly created boundary through thinned pine plantation should be marked, while posts can be found along the line, without faded flagging lines would otherwise be difficult to locate.
	Roads & Gates	As necessary
	Monitor & discourage trespass	As necessary

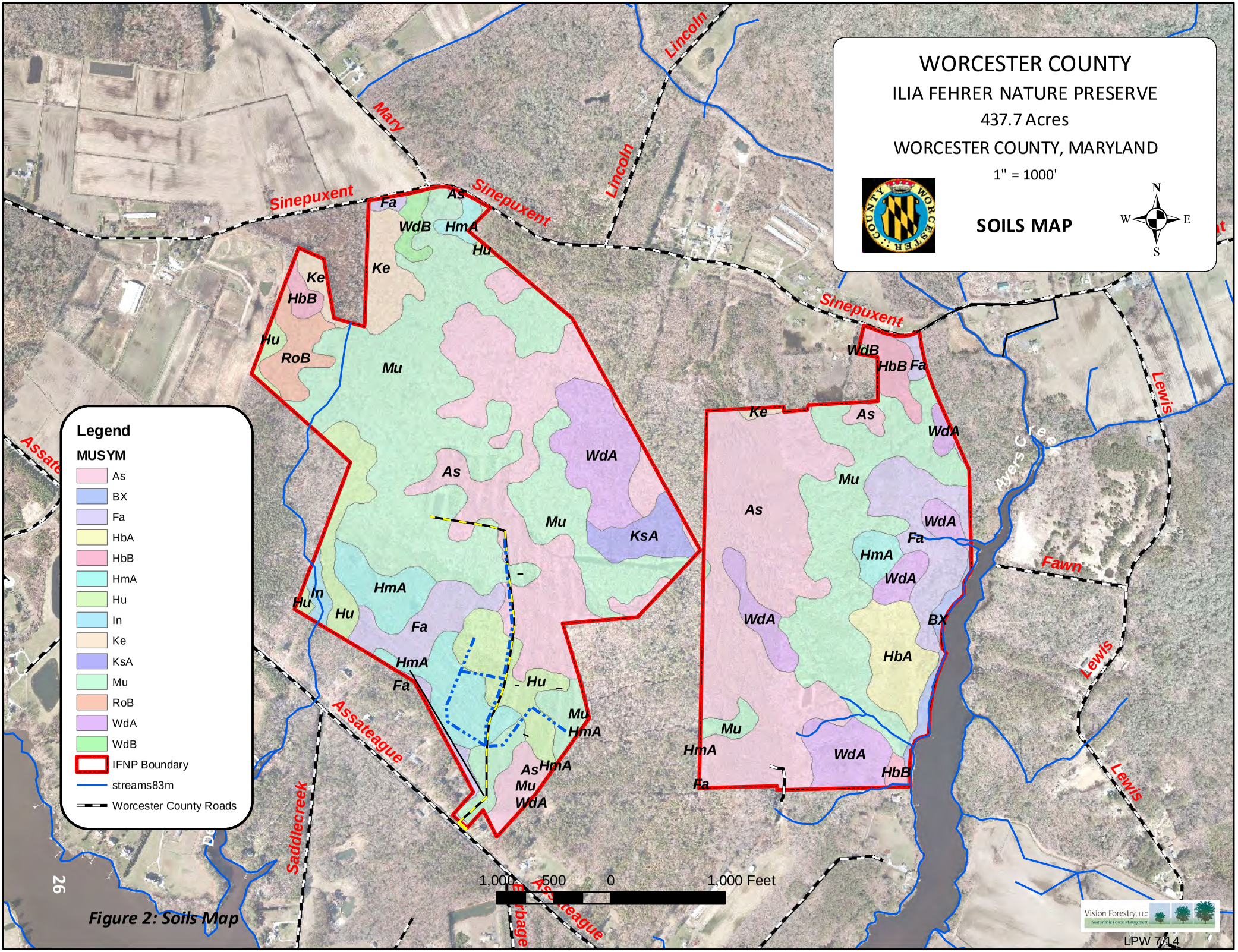


Figure 2: Soils Map

Figure 3: Wetlands Map

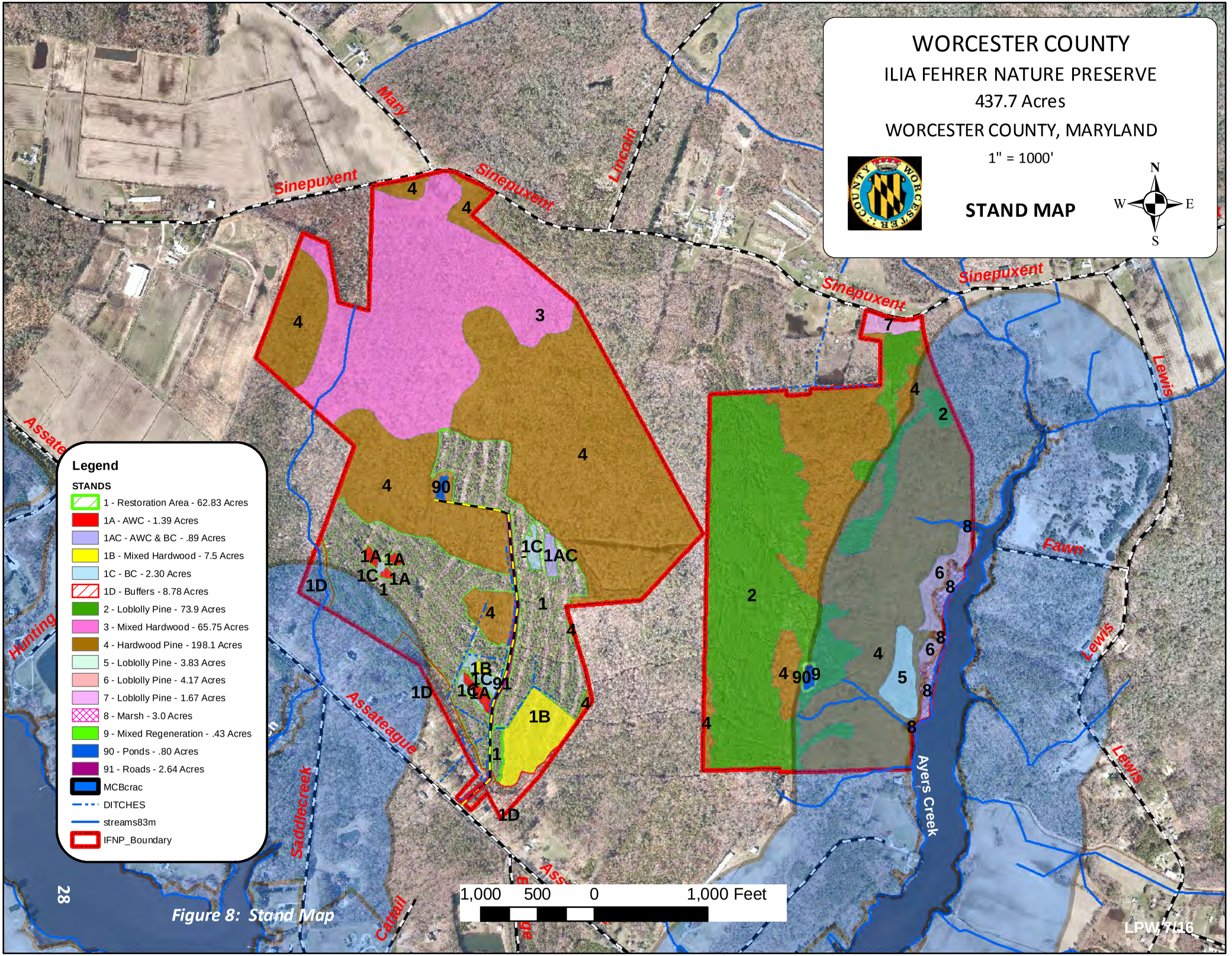


Figure 8: Stand Map