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Timber Inventory  
&  
Forest Management Plan  
of

Fort Eustis, VA  
(US ARMY)

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## **Executive Summary**

The first comprehensive Forest Inventory & Vegetation Assessment for Fort Eustis was conducted in 1997. The purpose of this document is to provide the US Army (Fort Eustis, Virginia) with a comprehensive re-inventory of the installation's forest resources, a re-assessment of the vegetation on its facility, as well as management recommendations for compatible uses of its forest resources. Implicit in the unique mission of Fort Eustis is the challenge of operating diverse air and ground training activities that are compatible within its natural and cultural surroundings. This document offers recommendations that will best provide for the effective operations of Fort Eustis while minimizing environmental and financial impacts to the forests and vegetated grounds upon which the facility is located.

Since the 1997 report, considerable alterations to the land cover on Fort Eustis have occurred. New construction/development, and Hurricane Isabel, as well as forest insect and disease outbreaks, primarily on the Golf Course and on Mulberry Island, have altered the forest within various compartments. These changes have an adverse effect on, and possibly disregard previous management implications and goals. It was therefore necessary that an update of the earlier plan take place in order to address future mission needs of the Army.

The first step in developing a compatible vegetative management document was to conduct an inventory of existing vegetation and assess its condition and status. The second step was to research existing and future missions that may occur at Fort Eustis. Planning documents were developed which showed several areas on Fort Eustis that would likely be subject to land use changes. The third step was to conduct a comparative analysis of land cover changes that have occurred since the 1997 Forest Vegetation Assessment, in order to focus data collection efforts. Four months of data collection by teams of foresters and botanists was conducted during the spring and summer of 2007 (which is a period when vegetation can most effectively be identified). Management recommendations were then developed, which are compatible with existing and proposed future missions of Fort Eustis as well as being consistent with the protection and enhancement of environmental and cultural resource protection requirements.

A blend of two types of inventory methodology was used to capture information on the vegetation layers of the forests on the area. Thirty Eight forested compartments were initially defined in the 1997 Report (according to criteria that included vegetation type, operational functions, and natural and/or man-made boundaries). Since the 1997 report, some land that was previously open has re-seeded into forest, and some forested compartments acreage was reduced due to changing land uses. A comparative analysis was conducted utilizing aerial photographs and a Geographic Information System (GIS) to identify changes to the original 38 compartments. Changes were identified on True Terrain 2' aerial imagery from June, 2004, and then further verified by use of web-based imagery showing winter cover for 2004 and 2005. Compartments were then adjusted by use of a GIS to depict identified land use changes and previously unaccounted land cover characteristics made visible by the use of high-resolution imagery. Primary changes were made as a result of new development/construction, land clearing, new forest cover, and previous imagery discrepancies. Former Compartment 32 was transferred to the Commonwealth of Virginia, and in order to maintain the ability to compare compartments, the 1997 numbering system was maintained. Compartments 37 and 38 (two islands) were not sampled during the 2007 Forest and Vegetation Inventory (approved by the conservation branch) due to limited access and restrictions that apply to ranges three and four. The remaining 35 (Compartments 1-31, 33-36) compartments were then examined to collect data that described the vegetation, its structure, as well as to provide specific recommendations for forest management.



In addition to the specific recommendations for each compartment, a set of recurring recommendations emerged, and they were then offered as general recommendations. They focus on the need for sound forest management practices to be considered and incorporated into existing operations.

## **General Recommendations**

1. Typically, timber harvests are conducted on areas subject to land use changes for the sole purpose of site development without having consideration for improving the composition or health of the surrounding forest. Consideration should be given to begin planning a timber harvest once it appears development plans for a particular site are reasonably certain. A comprehensive harvest plan can meet the requirements for site development, while concurrently improving the durability and health of adjacent forests.

2. Grounds maintenance plans should include the maintenance and systematic control of vegetation as well as the removal of hazardous trees surrounding all buildings, primary roads and utility lines. Selective removal of fast growing/short lifespan species such as pines should be conducted, which will encourage more durable species such as most species of oaks, and will improve the durability of the forest cover.

3. Landscape plans for all site development should strongly encourage the use of native vegetation whenever possible. Native vegetation typically is more capable of withstanding insect and disease conditions, and requires less maintenance than most non-native species.

4. Greater use of prescribed burns on Fort Eustis in certain forest types such as pine and pine/hardwood stands can improve access for training activities while promoting improved habitat for wildlife.

5. Aggressive pre-commercial and commercial thinning operations will increase forest health by removing weaker trees that are more likely to attract insect and disease. Using thinning to manage stocking levels (number of trees/acre) will stimulate the growth and vigor of residual forests and allow for a longer rotation before a final harvest becomes necessary.

6. Training of the grounds maintenance crew on general Plant Health Care would likely result in the reduction of damage to existing vegetation and improve in the health of new plantings. Consideration should be given to restricting grass mowing below forested areas to prevent mechanical stem injuries. Stem injuries will shorten the lives of afflicted trees and can result in the development of a hazardous tree, should the tree be located in a sensitive area. Greater use of mulch and selective use of herbicides can reduce the need for mowing.

7. During planning design meetings, proposed new buildings as well as the identification of all environmental constraints associated with construction should be discussed. Additionally, a list of environmental opportunities should be included in order to proactively address possible opportunities. A primary opportunity would be to identify forested vegetation that must be removed for the footprint of the building and associated infrastructure as well as further expanding the scope of discussion on practices that can be concurrently performed that will improve forest health in areas in close proximity to the proposed construction project.

8. The recommendations as outlined for each compartment should be implemented within the time period specified whenever possible. However, training schedules, the need for cultural resource evaluations and other factors may delay implementation. Therefore, for planning purposes, projects should be planned and coordinated on a five-year planning period.

Forest vegetation is not static but is constantly evolving. As vegetation grows and matures, its ability to provide functional benefits also change. Shrubs planted below power lines may be appropriate in some

settings- as long as the shrubs' mature height does not interfere with overhead wires. Trees that have become established on important cultural resources such as the extensive World War I earthworks- commonly found at Fort Eustis, may not be detrimental for 50 years.

However, as these trees mature and their root systems penetrate and become anchored into the earthworks, the cultural integrity of these sites is jeopardized. As the trees begin to physiologically decline, root and stem decay increases and the likelihood of trees being wind thrown increases. As this occurs, the residual roots can remove considerable volumes of soil. The resulting loss of the integrity of these earthworks greatly reduces their historical value.

Understanding vegetational dynamics, individual species silvicultural characteristics, including longevity, rooting and structural wood characteristics and the functional needs for the use of the land can provide a reasonably predictable schedule of management practices. If a decision is made to harvest timber to accommodate pending construction activities, to protect cultural resources, for insect and disease control, or to stimulate growth of the residual forest, the harvest design planning and approval process should get underway and a systematic process should be followed to insure that all management objectives are balanced. Otherwise, natural vegetational changes will continue to occur in an unpredictable manner with little ability to address management objectives. Management will be reactive rather than proactive.

Several invasive species are present on the Fort Eustis and reference is made to Section 4.2, Invasive Species Accounts for a description and control techniques. Japanese stilt grass, Japanese honeysuckle, tree-of-heaven, common reed, , and autumn olive were the most prevalent invasive species observed while conducting the forest inventory. Invasive species are opportunistic and capitalize on both man made and natural disturbances. Within Mulberry Island, hurricane damage resulted in considerable windthrow of trees that created variable size openings. Considerable colonization of invasive species occurred in these openings. While the eradication of invasive species is likely not possible, consideration should be given to developing an effective control program suitable for Fort Eustis. Various alternative tools have been developed to target invasive species. Prior to the development of a large scale invasive species control program, an evaluation of alternative control approaches applicable to Fort Eustis and a prioritization of specie base control techniques will provide resource managers the ability to use the most effective tools in order to reduce both the cost and total herbicide volumes necessary for control.

Isolated invasive species populations, especially when encountered near unique natural communities or areas where disturbance is planned should be targeted for control.

Lastly, due to the high visibility of certain areas, such as the administration areas and facility entrance, customized landscaping would enhance the aesthetics and provide additional opportunities for these sites. Implementation of these recommendations will provide Fort Eustis with a healthier, lower-cost grounds maintenance operation which will better meet the needs of the facility and its diverse activities.

## **1.0 - Introduction**

### ***1.1 - Objective of Project***

This assessment is a follow-up to an original survey conducted in 1997. The objective of this project is to:

1. Conduct a forest inventory to determine the specie composition and volume of all forestlands on Fort Eustis
2. Develop short- and long-term forest management recommendations
3. Assess changes to forest health that have occurred since the Forest Vegetation Assessment project that was completed in 1997.
4. Prepare a comprehensive Forest Management Plan of various forested compartments on the Fort Eustis, U.S. Army Installation and provide compartmental recommendations.

### ***1.2 - Purpose and Need***

The management of this acreage requires careful consideration and understanding of the vegetational component of the landscape and how it can best be managed to fit the mission of Fort Eustis. The forest is dynamic, and as it evolves the functional attributes also change. The changing conditions may or may not support existing or future training requirements.

Through an understanding of its existing and future characteristics, sound forest management can simultaneously support training, provide recreational opportunities for military personnel and their families, and provide aesthetic and economic values. Concurrently, it is imperative that when planning construction and/or training activities, consideration be given to natural resources due to the potential to either support or detract from Fort Eustis training missions. Unnecessary construction, damage to soils, and existing vegetation will result in future liabilities if forest health is compromised and tree removal becomes necessary- particularly if impacted vegetation is located in critical or sensitive areas. A carefully planned landscaping and reforestation program around redevelopment sites supporting native trees and plants can provide functional benefits and greatly improve the aesthetic character while supporting training missions.

The purpose of this document is therefore to provide the Army with pertinent information on existing vegetation at Fort Eustis, as well as to provide recommendations for the future development of the facility.

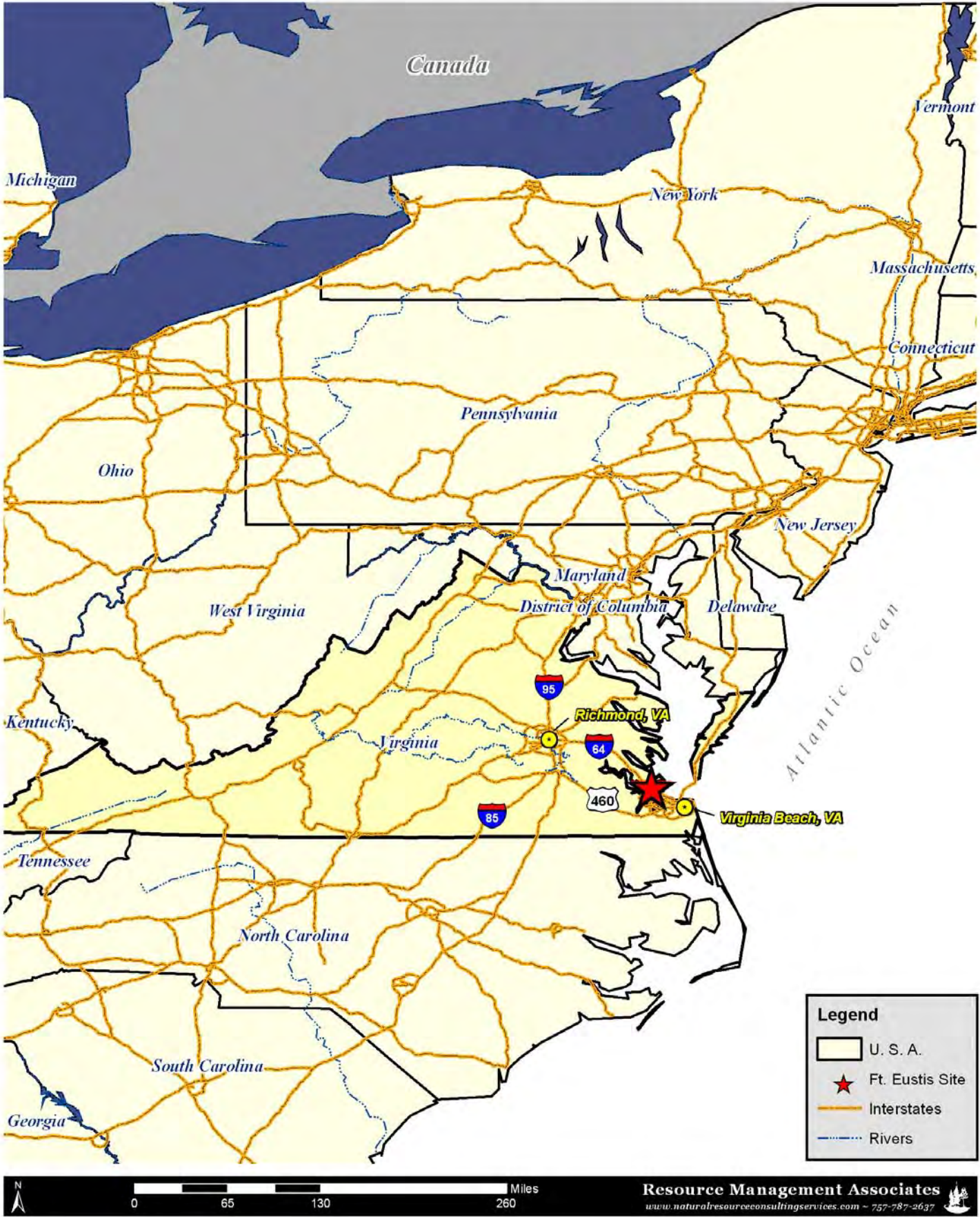
### ***1.3 - Site Orientation***

Fort Eustis is located in southeastern Virginia, approximately 30 miles west of the mouth of the James River and its confluence with the Chesapeake Bay, 60 miles southeast of the City of Richmond, 160 miles south of Washington D.C., and 20 miles northwest of Norfolk. Reference is made to Figure 1.3A: Fort Eustis, VA ~ General East Coast Vicinity map. It is nestled in the southwest portion of the Hampton Roads metropolitan area, being contiguous with the City of Newport News. It is bordered on the northwest by James City County, on the northeast by the City of Newport News, on the west and south by the James River, and east by the Warwick River. The 7,809 acre installation consists of a 2,466 acre cantonment area and a 5,343 acre island, known as Mulberry Island. Reference is made to Figure 1.3B: Fort Eustis, VA ~ General Site Location (Virginia Peninsula) which depicts the cantonment or Main Post and Mulberry Island areas on the installation.. The cantonment area or Main Post, which contains the more developed areas of the installation, is found on the main land of southern Newport News County. It also includes a small

training area within James City County located on the west side of the inlet to Skiffes Creek and being the southeastern most part of James City County. The 51 acre training area is located on the southeastern most part of James City County, on the northwest side of Skiffes Creek. A canal connecting the James and Warwick Rivers divides the Main Post and Mulberry Island. Mulberry Island consists of low vegetated land and is therefore mainly used for training purposes.

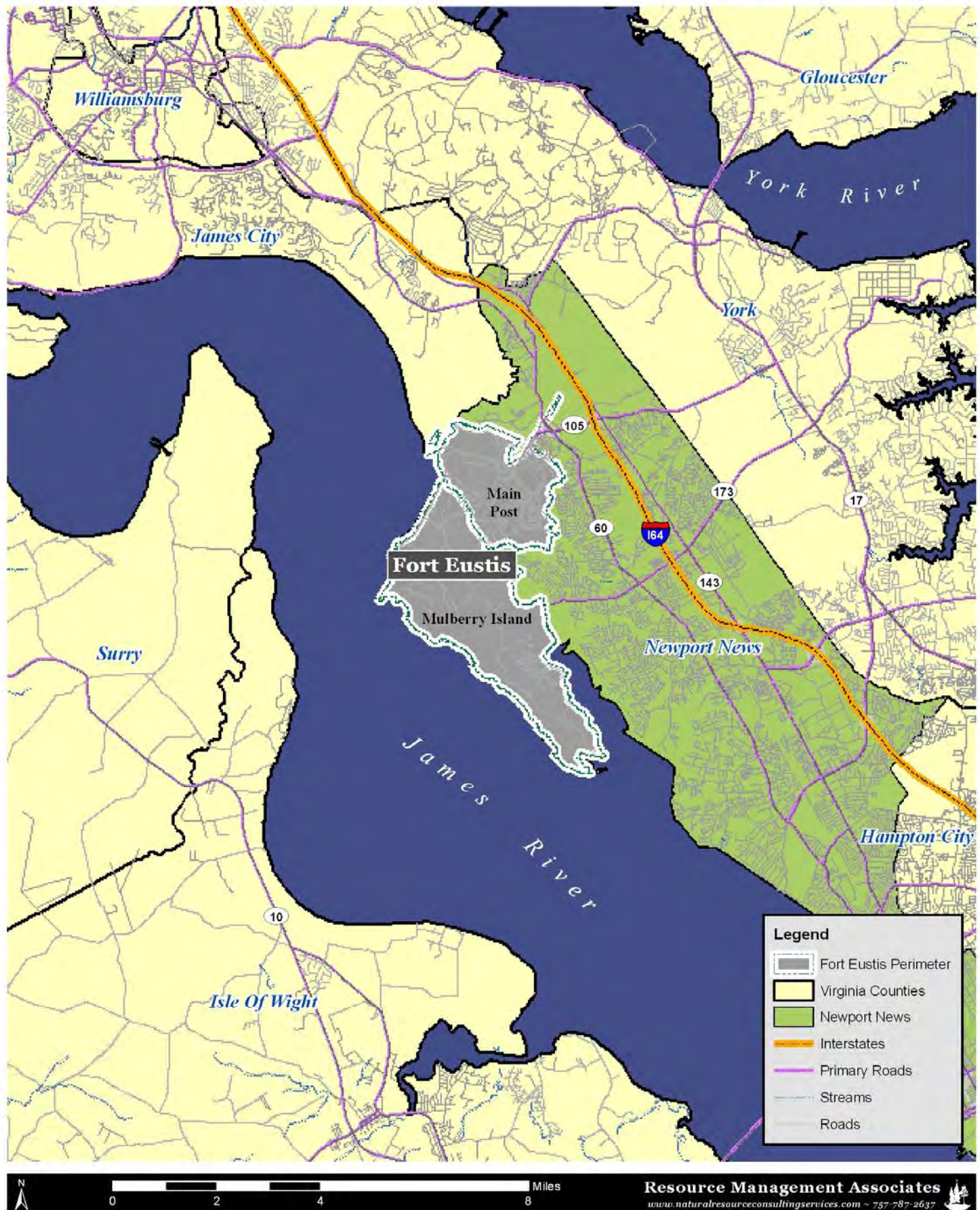
Figure: 1.3A

Ft. Eustis, VA - General East Coast Vicinity





# Ft. Eustis, VA - General Site Location (Virginia Peninsula)



## ***1.4 - Fort Eustis History***

The land presently occupied by Fort Eustis was settled in the early 1600s, the majority of which, mainly Mulberry Island, consisted of tobacco plantations. Throughout the 1800s the land underwent industrial and commercial development resulting in rapid population growth. In the late 1800s, during the civil war, the land served as one of the Confederacy's defensive posts, anchoring the southern end of the Warwick Line (Wkp 2007). The army purchased the land on March 7th, 1918, later naming the installation Camp Abraham Eustis. The camp served as a training center for Coast Artillery Corps units and as an Army Balloonist's School. In 1923 the installation was renamed Fort Eustis. During the 1930s, the installation was used as a correction camp for bootleggers and later used as a work camp under the Works Progress Administration and the National Youth Administration. During World War II, the camp served as training grounds for Coast Artillery Units and later as a naval hospital and POW Camp. In 1946 it became a transportation school of rail, marine, and amphibious operations.

## **2.0 - Fort Eustis Overview**

### ***2.1 - Fort Eustis Mission***

The US Army Transportation Center, Fort Eustis (USATCFE) is a major subordinate command of TRADOC (Training and Doctrine Command). As a TRADOC installation, Fort Eustis provides training in modes of transportation, focusing on rail, marine, and amphibious operations. The Northeast Region Office (NERO) of the Installation Management Agency (IMA) authorizes all garrison operations. Training activities are carried out by various tenants, including: 7th Transportation Group, 8th Transportation Brigade, US Army Transportation School (USATSCH), US Army Aviation Logistics School, NCO Academy, Army Reserve Component Support Division (ARCSD) of the Directorate of Plans, Training, Mobilization, and Security (DPTMSEC)

### ***2.2 - Fort Eustis Training & Ranges***

Fort Eustis provides various training activities, including training for: fixed port operations and logistics-over-the-shore (LOTS); highway and motor transport operations; proficiency in common tasks and skills associated with the transportation of units, rolling stock, and cargo; use of equipment and techniques for loading and unloading railcars, ships, and trucks under a variety of conditions; driving trucks and other rolling stock over roads and rough terrain; equipment maintenance; and ship-to-shore discharge of cargo. There are 26 training areas, found both on the Main Post (cantonment area) and Mulberry Island and six ranges, all found on Mulberry Island. Reference is made to Table 2.2A Fort Eustis Training Areas and Table: 2.2B Fort Eustis Firing Ranges for further detail. Reference is made to Figure 2.2A, Fort Eustis, VA ~ Main Post Training Areas, Figure 2.2B, Fort Eustis, VA ~ Mulberry Island (North): Training Areas for the locations of all Training Areas and Ranges and Figure 2.2C, Fort Eustis, VA ~ Mulberry Island (South): Training Areas and Ranges.



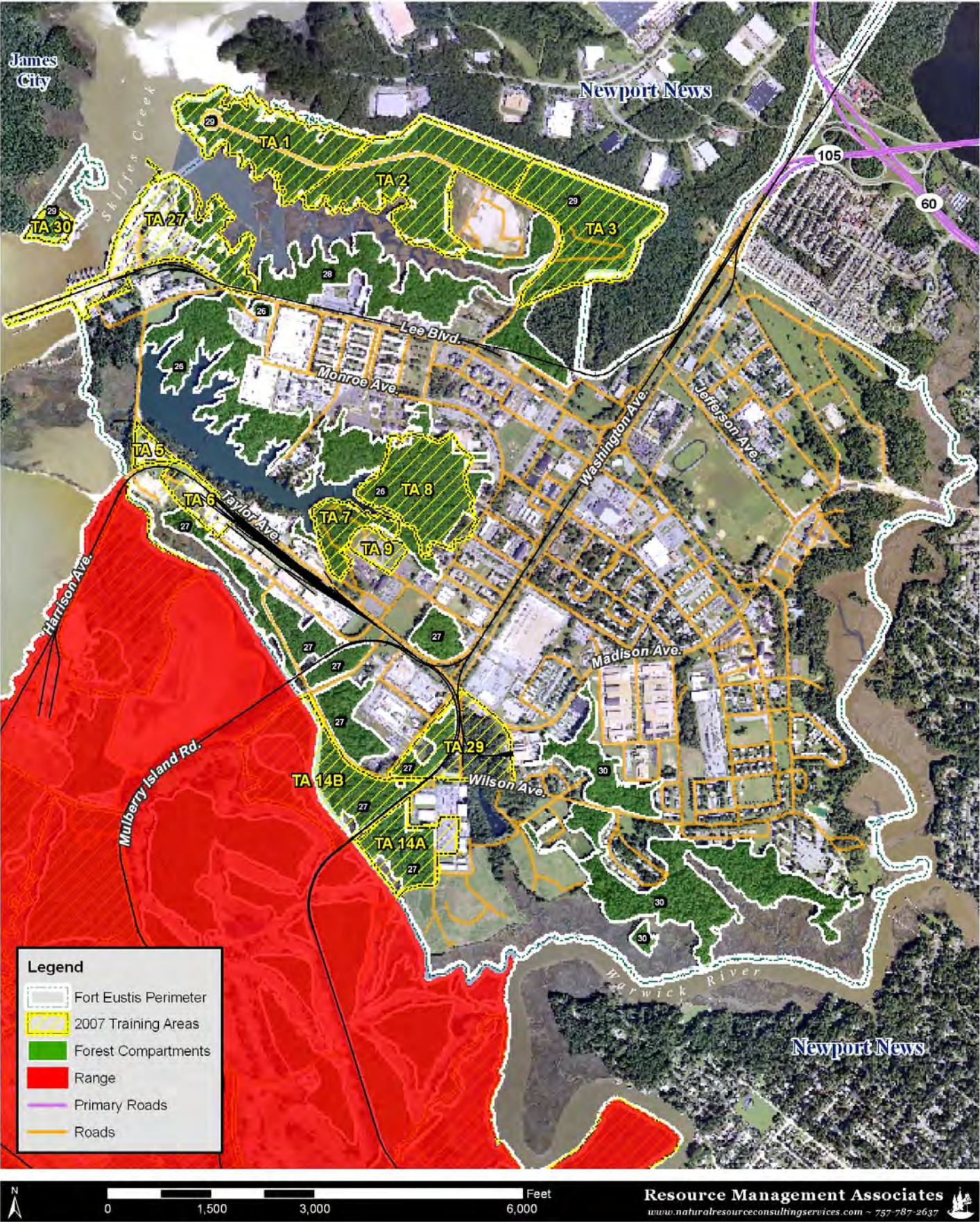
Fort Eustis Training Areas				Table: 2.2A
#	Name	Location	Description	Acres
1	Yorktown	MP	Tactical Bivouac; LandNav	49.73
2	Tiensen	MP	Tactical Bivouac; LandNav	67.05
3	Manila	MP	Tactical Bivouac; LandNav	52.03
5	Cowpens	MP	Vehicle Staging Area; TOC Area	4.26
6	Hank's Yard	MP	Railcar Loading	12.84
7	Chancellorsville	MP	Boy Scout Camp	14.82
8	Muese Argonne	MP	Confidence Course; CTT Course; TF Warrior Individual Lanes	42.67
9	Tippecanoe	MP	Aircraft Mock-up; Rappel Tower; EST 2000	7.28
14A	Hue	MP	Vehicle Staging Area	25.98
14B	Manassas	MP/MI(N)	Aviation Survival Training Course	60.88
15	Normandy	MI(N)	Cargo Yard; Storage & Access; 88H MHE Training	78.37
17A	St. Michel	MI(N)	Tactical Bivouac	83.02
17B	Fredericksburg	MI(N)	Airfiled Operations; Reserve Component	340.14
17C	Missionary Ridge	MI(N)	Tactical Bivouac; LandNav; TF Warrior Support	83.08
18	Anzio Beach	MI(N)	Logistic-Over-The-Shore Area	13.30
19	Grenada	MI(N)	Tactical Bivouac; LandNav; TF Warrior Individual Lanes; Future Site UAC	92.78
20	Qui Nhon	MI(N)	Logistics-Over-The-Shore Area	13.86
21	Antietam	MI(N)	Tactical Bivouac; LandNav; MOUT	150.04
22	Inchon	MI(N)	Tactical Bivouac; Fire & Maneuver Range; Future Site Range Operations	101.35
23	Magruder Line	MI(N)	Tactical Bivouac; Future Squad Defense Range	607.88
24	Seoul	MI(N&S)	Tactical Bivouac; Fire & Maneuver Range	581.00
26	Cold Harbor	MI(N)	Tactical Bivouac; NBC Chanber; LRC; Future Site Rappel Tower	148.20
27	Third Port	MP	Landship & Haaglund Crane	53.78
28	Junction City	MI(N)	Helicopter VOR Sling-lod Area; Driver Training Trail LandNav; Convoy Reaction Course	705.58
29	Wonju	MP	Railcar Loading Training Area	33.54
30	Unnamed	MP(JCC)	Bivouac	5.08

Fort Eustis Firing Ranges		Table: 2.2B
#/ID	Description	Acres
R1	Fort Eustis/NNPD Cooperative Pistol/Shotgun Range; Future Shoothouse Location	5.25
R2	25M Zero Range; M16 Alternate Qualification Course; M249 10M FAM	3.41
R3	Automated Record Fire Range	25.81
R4	SRT Sniper Range; 9mm; M60 MG	16.34
R5	CPQC; AATD Ballistics Lab;	10.03
R6	M203 Range; Helicopter Landing Tower Operations	12.79



Figure: 2.2A

# Ft. Eustis, VA - Main Post: Training Areas



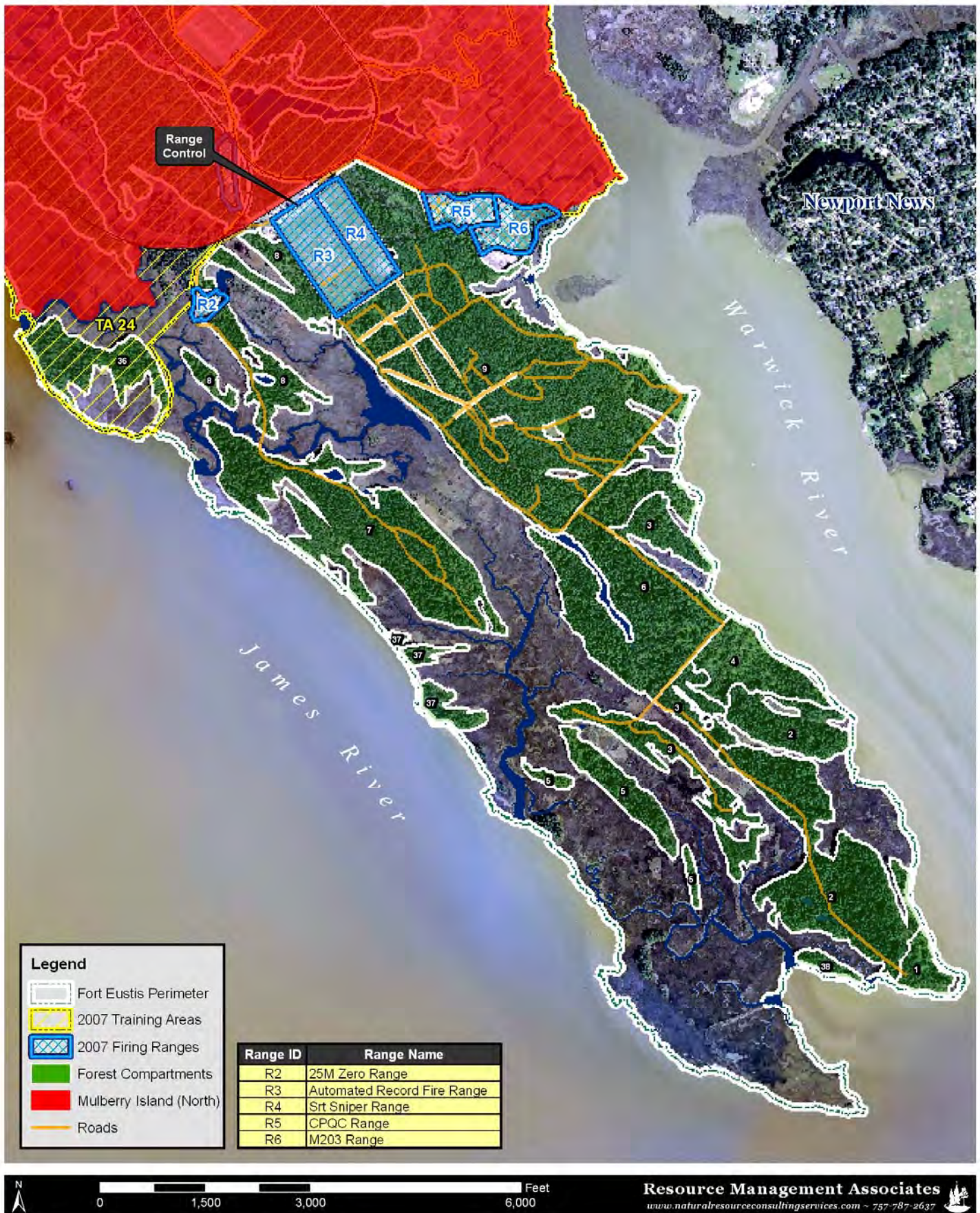


# Ft. Eustis, VA ~ Mulberry Island (North): Training Areas & Ranges





# Ft. Eustis, VA ~ Mulberry Island (South): Training Areas & Ranges



### ***2.3 - Fort Eustis Tenants***

Fort Eustis supports several tenant organizations. Training activities are conducted by the 7th Sustainment Brigade, 8th Transportation Brigade, US Army Transportation School (USATSCH), US Army Aviation Logistics School, and other respective tenant activities.

#### **Additional Fort Eustis Tenants**

- Army and Air Force Exchange Service
- Aviation Applied Technology Directorate
- US Army Aviation Systems Command
- Detachment 13, 5th Weather Squadron
- US Air Force
- Directorate of Information Management
- US Army Information Systems Command - Fort Eustis
- US Army Criminal Investigation Division Command
- James River Reserve Fleet, Maritime Administration,
- Southeast Commissary Region, Fort Eustis Commissary and
- TRADOC Contracting Activity
- US Army Aviation Logistics School
- US Army Medical Department Activity (MacDonald Army Health Center)
- US Army TMDE Support Operations
- US Army Training Support Center
- US Marine Corps Liaison Office USATCFE
- Deployment Processing Modernization Office
- NCO Academy
- Joint Deployment Training Center
- Military Surface Deployment and Distribution Command
- Residential Communities Initiative
- US Army Reserve Units

### ***2.4 – Infrastructure***

Fort Eustis contains approximately 1,900 acres of improved grounds, consisting of open operational and cantonment areas including the airfield, golf course, range complex; and two freshwater lakes. An additional 1,400+ acres are classified as unimproved grounds.

#### **Buildings:**

Fort Eustis supports 5.8 million square feet or 132.4 acres of buildings (as calculated by GIS), the majority of which are located on the Main Post, these structures include administrative offices, community facilities, housing, barracks, industrial, landfill, Third Port (1,000' pier), maintenance, medical, research, supply/storage, recreation, and training areas. Mulberry Island contains buildings associated with Felker Airfield, Pines Golf Course and training areas.

#### **Roads:**

The road network on Fort Eustis includes approximately 76.7 miles of surfaced roads with average widths of approximately 26 feet. This road system is estimated to cover approximately 189 acres. The

majority of these roads are located on the Main Post area of Fort Eustis. Unpaved roads serve the majority of Mulberry Island.

#### **Utilities:**

Privatized utility systems throughout the installation include: drinking water, electric, steam heating, industrial waste, natural gas, waster water sewer, storage tanks, storm water sewer, and telephone. The resulting network of utilities mainly serves the Main Post with extensions serving the airfield and golf course on Mulberry Island.

## ***2.5 - Natural Resources***

#### **Topography:**

Fort Eustis is found within the Atlantic Coastal Plain Physiographic Province. It consists of low, flat terrain with maximum elevations only reaching 30 feet above mean sea level. The built-up areas of the installation on the Main Post are relatively level at an elevation of approximately 30 feet above sea level. The outlying areas form a peninsula known as Mulberry Island between the James River and the Warwick River. A man-made ditch that connects Milstead and Butlers Creeks, which flow into the James and Warwick Rivers, separates these two areas. The terrain of Mulberry Island is level, partly wooded, and is composed of extensive tidal creek and marshy areas. Elevations range from sea level to 10 feet above. The general ground condition lends itself to drainage into either the James or Warwick Rivers, which are both tributaries leading to the Chesapeake Bay.

The majority of the 7,809-acre installation has physical limitations to access and development, ranging from marshes and ponds typically found on Mulberry Island, to the steeply sloped ravines more characteristic of the Main Post area.

The Main Post contains extensive areas of steep slopes north of Milstead and Butlers Creeks, essentially around the perimeter of the upland/shoreline interface. Steep slopes also border the western banks of the Warwick River and its tributaries. These ravines reach into the NCO housing area at the north of the cantonment area and the officers' housing area to the south. Smaller ranges of steep slopes limit expansion of the warehouse area on Taylor Avenue. Most of these areas have slopes in excess of 10%, resulting in potential erosion issues due to stormwater runoff.

#### **Geology/Soils:**

Fort Eustis is located in the Coastal Plain Geomorphic. Fort Eustis rests upon the Princess Anne terrace formation, which is of Pleistocene age. Between this formation and the granite basement rock surface, which lies at a depth of approximately 2,000 feet, are mostly unconsolidated Cretaceous and Tertiary sediments which are separated by an unconformity. Clays and sands are exposed at the surface.

Stiff surface clays with underlying soft organic silts and clays occur within a one-mile belt running northwest-southeast through the middle of the installation. The eastern part of the post is composed of stiff surface clays that overlie dense silty sands and shell fragments, with occasional zones of organics in buried stream valleys off the Warwick River.

Great differences in soil properties can occur within short distances, especially on Mulberry Island. Understanding soil properties, their capabilities, limitations, and incorporating this understanding in the



planning process for construction, training and natural resource management is essential to ensure sustainability of the ecosystem.

Damage to soil structure as a result of construction, training and or forest management can cause unintended, on- and off-site consequences such as die-back and/or mortality of established trees, disruption and/or redirection of subsurface water flows to undesirable locations and increased runoff that can lead to soil erosion and degradation of water quality. A detailed Soil Survey Report for Fort Eustis was conducted by Robert L. Hodges and Kathleen W. Molten in 1984 and should be referenced prior to any planned changes in activities involving land uses.

Fort Eustis Soil Types		Table: 2.5A
Altavista fine sandy loam (fsl)	Craven-Uchee complex (cx), 2-10% slopes	Seabrook loamy fine sand (lfs)
Augusta fine sandy loam (fsl)	Dragston fine sandy loam (sl)	Slagle fine sandy loam (fsl), 0-6% slopes
Axis very fine sandy loam (fsl)	Emporia fine sandy loam (fsl), 2-50% slopes	State fine sandy loam (fsl)
Beaches	Johnston complex (cx)	Tetotum silt loam (sl)
Bethera silt loam (sl)	Levy silty clay (sc)	Tomotley fine sandy loam (fsl)
Bohicket muck (m)	Munden loamy fine sand (fs)	Udorthents, loamy (l)
Bojac sandy loam (sl)	Newflat silt loam (sl)	Udorthents-Dumps complex (cx)
Chickahominy silt loam (sl)	Peawick silt loam (sl)	Yemassee fine sandy loam (cx)

### General Soils Descriptions:

**Altavista fine sandy loam (fsl):** Altavista soils are non-hydric soils found throughout the Mulberry Island and James/Warwick rivers marshland systems that encompass small islands and pockets of well drained soils found adjacent to tidal wetlands. The majority of these soils are forested.

**Augusta fine sandy loam (fsl):** Augusta soils are non-hydric soils found throughout the Mulberry Island and James/Warwick rivers marshland systems that encompass pockets of poorly drained soils adjacent to tidal wetlands. The majority of these soils are forested.

**Axis very fine sandy loam (fsl):** Axis soils are hydric soils found as a small pocket of poorly drained soil along the James River, between Mulberry and Marshy Points.

**Beaches:** Beaches are found along the James River on the west side of Mulberry Island.

**Bethera silt loam (sl):** Bethera soils are hydric soils found on the southeastern quarter of the main post. The majority of these soils are forested.

**Bohicket muck (m):** Bohicket soils are hydric, poorly drained soils found throughout the Mulberry Island and James/Warwick Rivers marshland systems that encompass the majority of the tidal wetlands within this area. These soils are not forested.

**Bojac sandy loam (sl):** Bojac soils are non-hydric, well drained soils present in two areas within central Mulberry Island, the majority of which are forested.

**Chickahominy silt loam (sl):** Chickahominy soils are hydric, poorly drained soils scattered throughout Mulberry Island. The majority of these soils are forested.

**Craven-Uchee complex (cx), 2-10% slopes:** Craven-Uchee complex soils are non-hydric, well drained soils found along ravines throughout the base, mainly those on the main post leading to the water. The majority of these soils are forested.

**Dragston fine sandy loam (sl):** Dragston soils are non-hydric, poorly drained soils found sporadically throughout the Mulberry Island and James/Warwick Rivers marshland system. This soil is somewhat forested.

**Emporia fine sandy loam (fsl), 2 -50% slopes:** Emporia soils are non-hydric, well drained soils found along ravines throughout the main post. The majority of these soils are forested.

**Johnston complex (cx):** Johnston soils are hydric, poorly drained soils found at the head of various guts on the main post.

**Levy silty clay (sc):** Levy soils are hydric, poorly drained soils found sporadically in tidal wetlands throughout the base.

**Munden loamy fine sand (fs):** Munden soils are non-hydric, moderately drained soils that make up a small, forested island within the Mulberry Island marshland system.

**Newflat silt loam (sl):** Newflat soils are non-hydric, somewhat poorly drained soils found sporadically throughout the base. The majority of these soils are forested.

**Peawick silt loam (sl):** Peawick soils are non-hydric, moderately well drained soils found on the main post. The majority of these soils are forested.

**Seabrook loamy fine sand (lfs):** Seabrook soils are non-hydric, moderately well drained soils found in a small island within the Mulberry Island marshland system and within the dredge spoil site on the northwestern portion of Mulberry Island.

**Slagle fine sandy loam (fsl), 0-6% slopes:** Slagle soils are non-hydric, moderately well drained soils found sloping down towards wetlands on the main post.

**State fine sandy loam (fsl):** State soils are non-hydric, well drained soils found throughout Mulberry Island, making up a large portion of the well drained soils on the islands. The majority of these soils are forested.

**Tetotum silt loam (sl):** Tetotum soils are non-hydric, moderately well drained soils found throughout Mulberry Island, making up a large portion of the well drained soils on the islands. The majority of these soils are forested.

**Tomotley fine sandy loam (fsl):** Tomotley soils are hydric, poorly drained soils found on the northeastern portion of Mulberry Island along tidal wetlands.

**Udorthents, loamy (l):** Udorthents soils are disturbed, moderately well drained soils found throughout the base.

**Udorthents-Dumps complex (cx):** Udorthents-Dumps complex soils are disturbed, moderately well drained soils found in the dredge spoil site and on the southeastern portion of the main post.

**Yemassee fine sandy loam (cx):** Yemassee soils are non-hydric, somewhat poorly drained soils found sporadically within the base.



**Drainage/Wetlands:**

Surface drainage of the northern, developed portion of the fort readily occurs via a drainage system characterized by relatively short, steep slopes that has created natural drainage channels leading to small streams and creeks influenced by tidal action. Within this area, surface runoff is generally rapid. Seasonal high surface water table elevations on the main post generally range from 5'-10' below the ground surface. Two man-made lakes exist on the Main Post, these are Eustis Lake (45 acres) and Brown's Lake (2.5 acres). Eustis Lake was originally and still is a recreational lake. Brown's Lake was originally constructed as a storm water retention pond and is now a recreational pond.

The entire area of Mulberry Island lies below the standard flood line of 13 feet above mean sea level. It contains approximately 1,800 acres of wetlands, as delineated by the U.S. Fish & Wildlife Service (NWI), 1,312 acres which have since been re-delineated by the Army Corps of Engineers. The remaining land is composed of loose sands and organic deposits with an elevation between 5' and 10' above mean sea level. Scattered throughout the island are more than 30 low profile, smaller islands supporting maritime forest surrounded by tidal creeks and marshes. Runoff on Mulberry Island is predominately horizontal surface and subsurface flow at much slower rates than found on the Main Post. Vertical infiltration is greatly limited due to the shallow depths to the surface water table, which is generally found less than 2' from the ground's surface. Horizontal runoff rates are also greatly influenced by tidal conditions, especially during periods of high tides resulting from storm and high lunar tides.

All surface drainage waterways from Fort Eustis eventually enter the James and Warwick Rivers, which flow into the Chesapeake Bay and Atlantic Ocean. The named waterways are Bailey Creek, Skiffes Creek, Milstead Island Creek, Morleys Gut, Butlers Gut, Blows Creek, Morrisons Creek, Fort Creek, and Jail Creek. Several unnamed tributaries extend through the wetlands of Mulberry Island. The marshes are mostly saline or brackish along the James and Warwick Rivers. Because of the large volume of freshwater entering the James from upstream stormwater flows, however, the river can show considerable variability in salinity levels. Reference is made to Figure 2.5A: Fort Eustis, VA ~ Wetlands, for the locations of wetlands as defined by the National Wetland Inventory and a wetland delineation project recently completed by the U.S. Army Corp. of Engineers.

Ft. Eustis, VA - Wetlands (NWI & USACE)



### **Community Assemblage & Composition:**

Fort Eustis is primarily a loblolly pine-hardwood ecosystem that has been managed to favor young loblolly pines. Approximately 2,784 acres of Fort Eustis are forested and 2,500 acres are wetlands, both tidal and non-tidal. The installation encircles one of the largest principally intact wetlands systems in the lower James River. Tidal areas include Milstead Island Creek, Blows Creek, and Morleys Gut, as well as the brackish tidal marsh which covers 50 acres of the southern end of the installation. Non-tidal wetlands are found in Eustis and Brown's Lakes, Skiffes Creek, Bailey's Creek, and an unnamed freshwater tributary of the Warwick River. A significant portion of the lower peninsula remains in wooded, undeveloped tracts. There are 2,784 acres of commercial forest land on Fort Eustis.

Woodlands are comprised of approximately 2/3 coniferous species dominated by loblolly pine. The remaining 1/3 is a variety of hardwoods, including white oak, northern red oak, southern red oak, yellow poplar, and sweetgum. A typical understory growth of sassafras, aralia and honeysuckle can be found in association with the conifers. Some areas include loblolly pine stands with associated greenbrier and wax myrtle, and deciduous woods consisting of beech, white oak, black oak, and red oak associated with maidenhair, sedge and millet.

Estuarine marshes on Fort Eustis have largely been maintained in a natural state in contrast to those found in adjacent areas such as Newport News, which have been altered through dredging and filling activities. The estuarine marshes of Fort Eustis are characterized by broad areas of black needlerush with abundant salt marsh cordgrass at lower elevations, especially along the creek channels. One of the important values of black needlerush marsh is its ability to resist erosion. This value is especially important along the James River where erosive action of storm waves and currents are more in evidence. Scattered throughout areas of higher elevations are salt meadow grasses that include species such as big cordgrass, saltmeadow hay and cattails. In the upstream creek sections, where salinities are very low, marsh species such as marsh hibiscus, cattails and saltbushes occur.

Freshwater lakes and marshes are hospitable to duckweed watermeal, cattails, willows and goldenrod. Soil disturbance of marsh communities either by filling, dredging and/or attempts to control vegetation as conducted around Felker field can create conditions favorable for the establishment, spread and domination of phragmites, at the detriment of the natural more diverse marsh community.

The Virginia Division of Natural Heritage (DNH) completed a rare plant inventory of Fort Eustis in 1994. Seven species on the DNH Watchlist (those that have between 20 and 100 occurrences known (S3 rank)) have been identified on Fort Eustis: beaked spikerush, southern twayblade, crow-poison, few-flowered milkweed, coastal water-hyssop, shadow-witch, and three-ribbed arrowgrass.

Approximately 60-100 acres of the installation are planted with wildlife foods each year. Fort Eustis maintains 20-25 wildlife food plantings ranging from 1/4-acre to 10 acres in size.

The only noxious weeds found on the installation are kudzu and phragmites. Phragmites is an opportunistic species that rapidly colonizes disturbed wetland areas, especially dredge spoil sites. Once established, its rapid rate of growth allows it to dominate and suppress native wetland species. Eradication of these species is probably not possible. Management should involve identifying locations and avoiding spread by containing existing populations and preventing spread via earthmoving activities. Ditch maintenance and/or construction near sites where existing populations are located can result in spread to unaffected areas. Extensive areas of these noxious weeds and/or isolated populations can be treated with herbicides. Repeat applications and annual monitoring is necessary for effective control. Management

strategies should have the objective of reducing the acreage afflicted and eliminating new infestation rather than eradication. Eradication would require a disproportionate level of effort with uncertain success that would likely adversely impact surrounding ecosystems.

**Wildlife:**

The forests of Fort Eustis provide habitat for a wide variety of wildlife, both game and nongame species. Predominant game species include deer, turkey, gray squirrel, quail, woodcock, and an assortment of waterfowl.

The expansive mixed hardwood stands also provide good habitat for neotropical migratory birds. A number of warblers, thrushes, vireos, and other songbirds utilize these forests for nesting as well as migration habitat. Large areas of unfragmented forest are decreasing at an alarming rate, especially in the piedmont, and areas like Fort Eustis are important at the landscape level as well as at the local base level.

Some areas are maintained in early successional stages, such as the airfield and other training and open space areas. Early successional wildlife species will benefit by the maintenance of such areas. It is recommended, however, that a maintenance plan which allows for taller growth of grass stages be implemented, along with a plan to encourage the growth of native plant species. A one to three-year maintenance plan would benefit wildlife like quail, turkey, grasshopper sparrow and other sparrows, meadowlarks, and upland sandpipers. Many species utilize early successional patches for foraging and cover if adequate buffers are in place.

Two federally and state listed animal species occur on Fort Eustis, they are the bald eagle and peregrine falcon. Please refer to the Virginia Comprehensive Wildlife Conservation Strategy for further details on the status and conservation needs of these species.

Fish common to the James and Warwick Rivers include various varieties of prey fish such as inland silverside and striped killifish, American shad and hickory shad, and Atlantic herring. Representative bottom feeders include a variety of catfish and bullheads, spot and flounder. Predator fish include striped bass, Atlantic croaker, and bluefish. Shellfish populations have declined through the 1900's as a result of general water quality problems in the Bay and its tributaries.

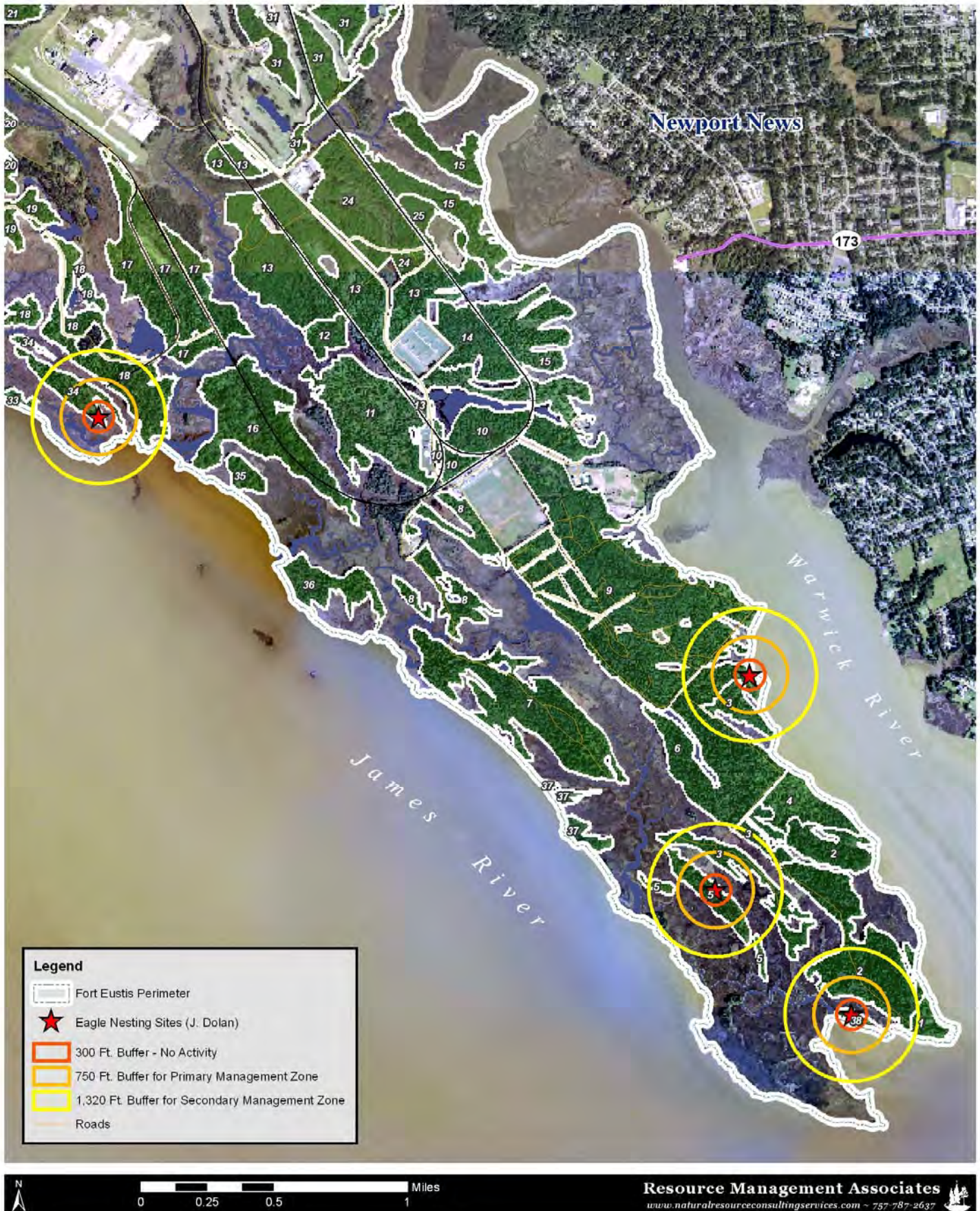
**Threatened and Endangered Species:**

In 1987, a bald eagle nest was first discovered on Fort Eustis. Since then, approximately 30 young have been produced on the installation (Dolan, 2007). The bald eagle is listed and protected as federally and state threatened. Its status recently was down listed from endangered, as the Chesapeake Bay bald eagle population recovers and builds in numbers. Reference is made to Figure: 2.5B, Fort Eustis, VA ~ Eagle Management Areas for the location of 5 eagle nest located on Fort Eustis and their corresponding management zones as recommended by the Virginia Department of Game and Inland Fisheries.

The USFWS has developed a Fort Eustis bald eagle plan. Please refer to this plan for details on the status of the utilization of the forests for nesting, foraging and roosting. A bald eagle management area has been established for the post.



# Ft. Eustis, VA - Eagle Management Areas



### **3.0 - Existing Vegetative Management Program**

The responsibility for the existing vegetative management program at Fort Eustis is divided among several organizational units. The primary organization is the Directorate of Public Works (DPW). The responsibility for all forest management activities is the responsibility of DPW, Environmental Division, Conservation Branch.

### **4.0 - Invasive Species**

#### ***4.1 - Background Research***

Research was conducted to identify potential invasive species that may occur on Fort Eustis. Research of past inventories, assessment and plans conducted on Fort Eustis were performed. In addition a literature review was conducted to identify potential invasive species that may occur on Fort Eustis. Source information was obtained from VA-DCR's Invasive Alien Plant Species of Virginia, the US Army Corp of Engineers - Noxious and Nuisance Plan Management Information System (PMIS), the Virginia Native Plant Society and the Virginia Invasive Species Council. Based on the source information that was compiled, the following table (Table 4.1A) lists targeted invasive species for the Fort Eustis area.



Target Invasive Alien Plant Species\*

Table: 4.1A

Common Name		Scientific Name
<b>Highly Invasive Species</b>		
1	Alligator weed	( <i>Alternanthera philoxeroides</i> )
2	Autumn olive	( <i>Elaeagnus umbellata</i> )
3	Chinese privet	( <i>Ligustrum sinense</i> )
4	Common reed	( <i>Phragmites australis</i> )
5	Japanese honeysuckle	( <i>Lonicera japonica</i> )
6	Japanese stilt grass	( <i>Microstegium vimineum</i> )
7	Johnson-grass	( <i>Sorghum halepense</i> )
8	Kudzu	( <i>Pueraria montana</i> )
9	Multiflora rose	( <i>Rosa multiflora</i> )
10	Purple loosestrife	( <i>Lythrum salicaria</i> )
11	Tree-of-heaven	( <i>Ailanthus altissima</i> )
<b>Moderately Invasive Species</b>		
12	China-berry	( <i>Melia azedarach</i> )
13	English ivy	( <i>Hedera helix</i> )
14	Mimosa “Silk Tree”	( <i>Albizia julibrissin</i> )
15	Shrubby bushclover	( <i>Lespedeza bicolor</i> )
<b>Occasionally Invasive Species</b>		
16	Beefstake plant	( <i>Perilla frutescens</i> )
17	Crown-vetch	( <i>Coronilla varia</i> )
18	Periwinkle	( <i>Vinca minor / major</i> )
19	Princess tree	( <i>Paulownia tomentosa</i> )
20	Russian olive	( <i>Elaeagnus angustifolia</i> )
21	Tall fescue	( <i>Festuca elatior (F. pratensis)</i> )
22	Thorny elaeagnus	( <i>Elaeagnus pungens</i> )
23	Weeping lovegrass	( <i>Eragrostis curvula</i> )

\*Source: VA DCR

## 4.2 - Invasive Species Accounts

### 1 - Alligator weed (*Alternanthera philoxeroides*)

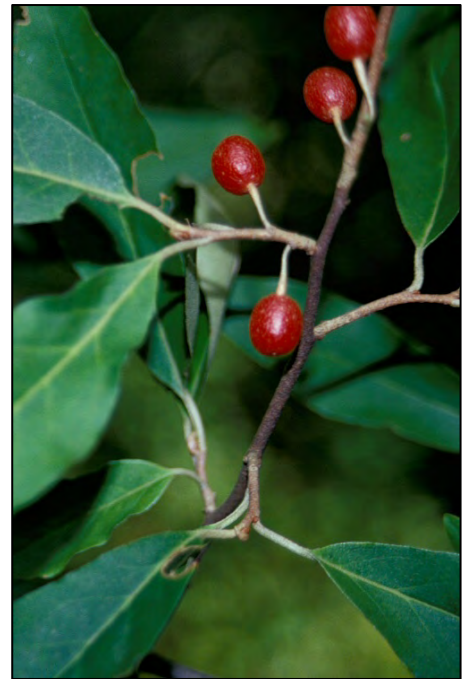
- **Plant:** Herbaceous perennial with roots on shore or shallow water. An emergent, which can also be partially or wholly terrestrial, its trailing stems form dense mats which grow out over the water's surface in thick interwoven mats. Stems are hollow, fleshy and succulent, light to dark green or pink to purplish in color, and reach 3 feet in length. Stems root at the nodes and are usually floating or trailing along the ground except for the tips that turn upward (decumbent). The mats may be up to three feet thick and may spread out over hundreds of feet on the surface of the water.
- **Leaves:** Its leaves are opposite, elliptical, one-quarter to three-quarters of an inch in length with a very short or absent leaf stem. Leaves have a distinctive midrib, are without hairs (glaucous), and are without petioles.
- **Flowers & Seeds:** Flowers are relatively small (13 mm in diameter) and white in color. Flowers occur on flower stalks (peduncle) that are approximately 1/2 to 3 inches in length. Flowering usually occurs from April through October. No seedlings have been reported in the United States.
- **Habitat:** Alligatorweed invades aquatic or very wet habitats. It tolerates a wide variety of environmental conditions from fresh to slightly brackish water and is found in canals, ditches, blackwater rivers, stream edges, and sloughs. It usually requires some disturbance to become established.
- **Reproduction/Spread:** Vegetatively by fragmentation. Stem nodes separated from the plant rapidly root and develop new complete plants.





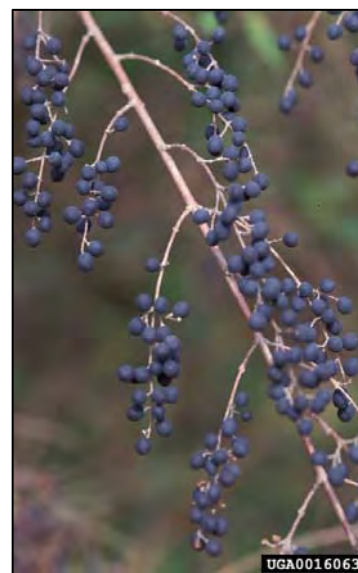
## 2 - Autumn olive (*Elaeagnus umbellata*)

- Plant: Deciduous shrub that can grow to 20 feet in height; stems, buds and leaves have a dense covering of silvery to rusty scales.
- Leaves: Egg or lance-shaped, smooth margined and alternate along the stem; underside of leaves covered with silver-white scales.
- Flowers, Seeds, & Fruits: Plants begin to flower after three years. Small, light yellow, aromatic flowers appear in June and July. Fruits are small, round, pink to reddish and dotted with scales.
- Reproduction/Spread: Primarily by seed, although some vegetative propagation also occurs.
- Habitat: Grasslands, fields, open woodlands, and disturbed areas. Drought tolerant and thrives in a variety of soil and moisture conditions.



### 3 - Chinese privet (*Ligustrum sinense*)

- Plant: Deciduous, semi-evergreen, or evergreen shrubs and small trees that can grow up to 7 m. Bark is whitish-tan to grey in color and smooth in texture. Slender twigs are straight, rounded or four-angled below the nodes, and grey-green in color. Winter buds are ovoid with two outer scales. Terminal buds are present.
- Leaves: Elliptic to elliptic-oblong, 3-7 cm long, acuminate, acute to obtuse, dull green above, pubescent on the midrib below, oppositely arranged on slender twigs, and often leathery and thick.
- Flowers, Seed, & Fruit: Small flowers, somewhat unpleasantly fragrant, and distinctly stalked on panicles 10-16 cm long. Fruits are dark blue or bluish-black drupes, ellipsoid to subglobose, and mostly 4-5 mm long.
- Reproduction/Spread: Digestion/excretion and will grow readily from seed or from root and stump sprouts.
- Habitat: Agricultural areas, coastland, disturbed areas, natural forest, scrub/shrublands, urban areas, water courses, & wetlands, mainly along roadsides, in old fields and in other disturbed habitats, and in a variety of undisturbed natural areas, such as floodplain forests.





#### 4 - Common reed (*Phragmites australis*)

- Plant: Common reed is a tall perennial wetland grass ranging in height from three to thirteen feet, with a large panicle of spikelets on long, smooth stems. The foliage is gray-green during the growing season, with purple-brown plumes appearing by late June. The plant turns tan in the fall and most leaves drop off, leaving only the plume-topped shoot.
- Leaves: Flat, elongated, smooth, up to 2 1/2 inches broad, tapering to a point at the ends.
- Flowers, Seeds, & Fruits: 3-7 flowers per spikelet, with many spikelets arranged in a large, dense, much-branched panicle up to 1 1/4 feet long; spikelets 3/4 inch long, bearing numerous silky hairs.
- Habitat: Sunny wetland habitats, along drier borders and elevated areas of brackish and freshwater marshes and along riverbanks and lakeshores. The species is particularly prevalent in disturbed or polluted soils found along roadsides, ditches and dredged areas.
- Reproduction/Spread: Common reed spreads to a new area by sprouting from a rhizome fragment or from seed. Flowering begins in late June, and seeds are formed by August.



## 5 - Japanese honeysuckle (*Lonicera japonica*)

- Plant: Japanese honeysuckle is a perennial vine that climbs by twisting its stems around vertical structures, including limbs and trunks of shrubs and small trees.
- Leaves: Oblong to oval, sometimes lobed, have short stalks, and occur in pairs along the stem. Often remains evergreen – its leaves remain attached through the winter.
- Flowers, Seeds, & Fruits: Flowers are tubular, with five fused petals, white to pink, turning yellow with age, very fragrant, and occur in pairs along the stem at leaf junctures. Stems and leaves are sometimes covered with fine, soft hairs. Japanese honeysuckle blooms from late April through July and sometimes into October. Small black fruits are produced in autumn, each containing 2-3 oval to oblong, dark brown seeds about 1/4 inch across.
- Reproduction/Spread: Vegetative & sexual (seed-digestion/excretion). It produces long vegetative runners that develop roots where stem and leaf junctions (nodes) come in contact with moist soil. Underground stems (rhizomes) help to establish and spread the plant locally.
- Habitat: Fields, forests, wetlands, barrens, and all types of disturbed lands.





## 6 - Japanese stilt grass (*Microstegium vimineum*)

- Plant: Annual, has a sprawling habit and grows slowly through the summer months, ultimately reaching heights of 2 to 3 1/2 ft. (6-10 dm.).
- Leaves: Pale green, lance-shaped, asymmetrical, 1-3 in. (3-8 cm.) long, and have a distinctive shiny midrib.
- Flowers, Seeds, & Fruits: Slender stalks of tiny flowers are produced in late summer (August - September). Fruits or achenes mature soon after flowering and the plant dies back completely by late fall.
- Reproduction/Spread: Reproduces exclusively by seed. Colonial species, spreads by rooting at stem nodes that touch the ground.
- Habitat: Moist ground of open woods, floodplain forests, wetlands, uplands, fields, thickets, paths, clearings, roadsides, ditches, utility corridors, and gardens. It readily invades areas subject to regular mowing, tilling, foot traffic, and other soil disturbing activities. Appears to prefer moist, acidic to neutral soils that are high in nitrogen.



## 7 - Johnson-grass (*Sorghum halepense*)

- Plant: Johnson grass is a tall, coarse, grass with stout rhizomes. It grows in dense clumps or nearly solid stands and can reach 8 feet (2.4 meters) in height.
- Leaves: Smooth, 6-20 inches (15.2-50.8 cm) long, and have a white midvein. Stems are pink to rusty red near the base. Panicles are large, loosely branched, purplish, and hairy. Spikelets occur in pairs or threes and each has a conspicuous awn.
- Flowers & Seeds: Seedhead a large, open panicle, often with a purplish tint. Seeds are oval, 3 to 5 mm in length, and dark red to black at maturity.
- Reproduction/Spread: Seed and rhizomes.
- Habitat: Crop fields, pastures, abandoned fields, rights-of-way, forest edges, and along streambanks, it thrives in open, disturbed, rich, bottom ground, particularly in cultivated fields.





## 8 - Kudzu (*Pueraria montana*)

- Plant: Deciduous, climbing, semi-woody, perennial vine in the pea family.
- Leaves: Alternate and compound, with three broad leaflets up to 4 inches across. Leaflets may be entire or deeply 2-3 lobed with hairy margins.
- Flowers, Seeds, & Fruits: Individual flowers, about 1/2 inch long, are purple, highly fragrant and born in long hanging clusters. Flowering occurs in late summer and is soon followed by production of brown, hairy, flattened, seed pods, each of which contains three to ten hard seeds.
- Reproduction/Spread: Some seed dispersal, with few viable seeds per pod cluster. Limited to vegetative expansion by runners and rhizomes and by vines that root at the nodes to form new plants.
- Habitat: Grows well under a wide range of conditions and in most soil types. Preferred habitats are forest edges, abandoned fields, roadsides, and disturbed areas, where sunlight is abundant.



## 9 - Multiflora rose (*Rosa multiflora*)

- Plant: Thorny, perennial shrub with arching stems (canes).
- Leaves: Divided in five to eleven sharply toothed leaflets; base of each leaf stalk bears a pair of small fringed structures (stipules).
- Flowers, Seeds, & Fruits: Clusters of showy, fragrant, white to pinkish, 1 inch wide flowers appear during May; small bright red fruits, or rose hips, develop during the summer and remain on the plant through the winter.
- Reproduction/Spread: Reproduces by seed and by forming new plants from the tips of arching canes that can root where they contact the ground.
- Habitat: Dense woods, prairies, along stream banks and roadsides and in open fields and pastures. It has wide tolerance for various soil, moisture, and light conditions.





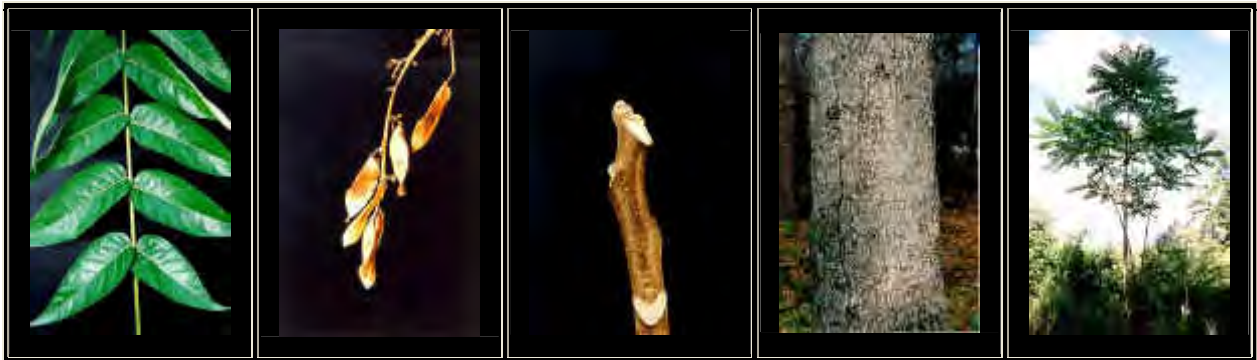
## 10 - Purple loosestrife (*Lythrum salicaria*)

- Plant: Erect perennial herb in the loosestrife family (Lythraceae); have a square, woody stem usually covered by downy hair; grow from 4 to 10 feet high, depending upon conditions.
- Leaves: Lance-shaped, stalk-less and rounded to heart-shaped at the base; arranged in pairs or whorls around the stem.
- Flowers, Fruits, & Seeds: Produces a showy display of magenta-colored flower spikes throughout much of the summer. Individual flowers have five to seven petals. A single mature plant can have 30 to 50 stems arising from one rootstock, and can produce an estimated two to three million seeds per year. The flowering season extends from June to September; flowers require pollination by insects.
- Reproduction/Spread: Vast quantity of seeds, dispersed by wind and water. It also readily reproduces vegetatively through underground stems at a rate of about one foot per year.
- Habitat: Wetlands, including wet freshwater meadows, tidal and non-tidal marshes, river and stream banks, pond edges, reservoirs and ditches.



## 11 - Tree-of-heaven (*Ailanthus altissima*)

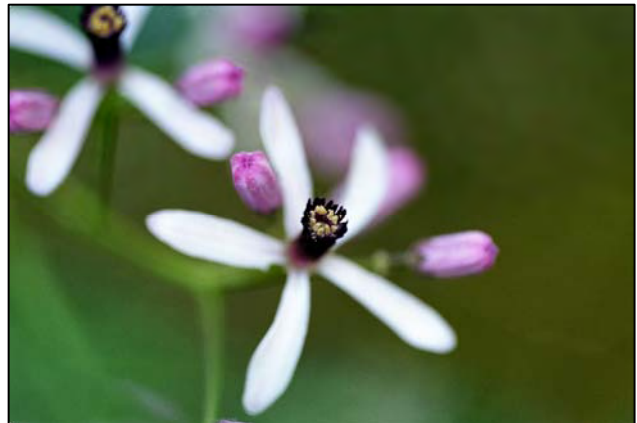
- **Plant:** Rapidly growing, deciduous tree that can reach 80 feet or more in height. Smooth stems with pale gray bark, and twigs, which are light chestnut brown, especially in the dormant season. Wood is soft, weak, coarse-grained, and creamy white to light brown in color. All parts of the tree, especially the flowers, have a strong, offensive odor, likened to peanuts or cashews.
- **Leaves:** Large, compound, 1-4 feet in length, and composed of 11-25 smaller leaflets and alternate along the stems. Each leaflet has one to several glandular teeth near the base.
- **Flowers, Seeds, & Fruits:** Clusters of small, yellow-green flowers appear near the tips of branches in late spring. Seeds are produced on female trees in late summer to early fall, in flat, twisted, tan to pink-colored papery structures called samaras, which may remain on the trees for long periods of time.
- **Reproduction/Spread:** Sexually (seeds) and asexually (vegetative sprouts)
- **Habitat:** Disturbed urban areas, fields, and along roadsides, fencerows, woodland edges and forest openings.





## 12 - Chinaberry (*Melia azedarach*)

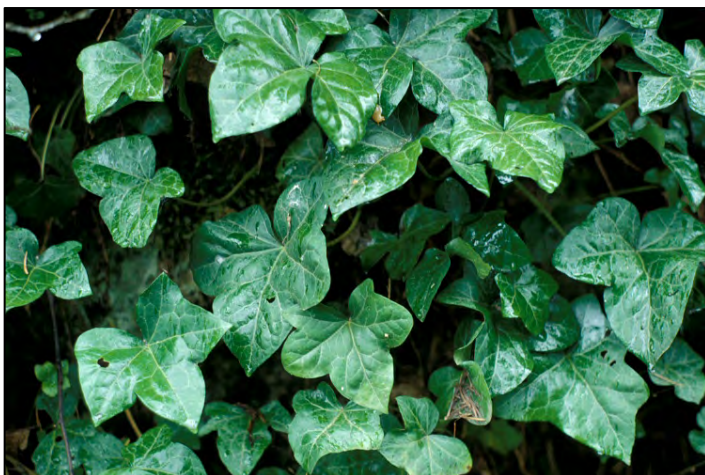
- Description: Small, deciduous, fast growing tree, 20 to 40 feet tall with a spreading, rounded to upright crown. It has brown to slightly reddish brown bark, splitting into slightly criss-crossing furrows. Twigs are very stout, olive-brown to brown with numerous lighter lenticels and are notoriously weak-wooded.
- Leaves are alternate, single to doubly compound, 10 to 22 inches long, leaflets coarsely toothed or lobed, 1 to 2 inches long, shiny green above and smooth on both surfaces. Dark green in color, yellow green fall color, overall 2-3ft long.
- Flowers, Seeds, & Fruits: Large panicle of aromatic purple flowers that bloom in spring. Eight to 16" panicle of lavender lilac fragrant flowers in early summer; .4 to .5" yellow-brown drupe, up to 3/4 inch in diameter in hanging clusters, ripen in the fall and persist all winter.
- Habitat: Chinaberry grows well in full sun and a wide range of soil types. It is frequently seen along highways, fence rows and other waste areas.
- Reproduction/Spread: Chinaberry reproduces by seeds and spreads by avian seed dispersal. It is also creates rapidly spreading thickets.





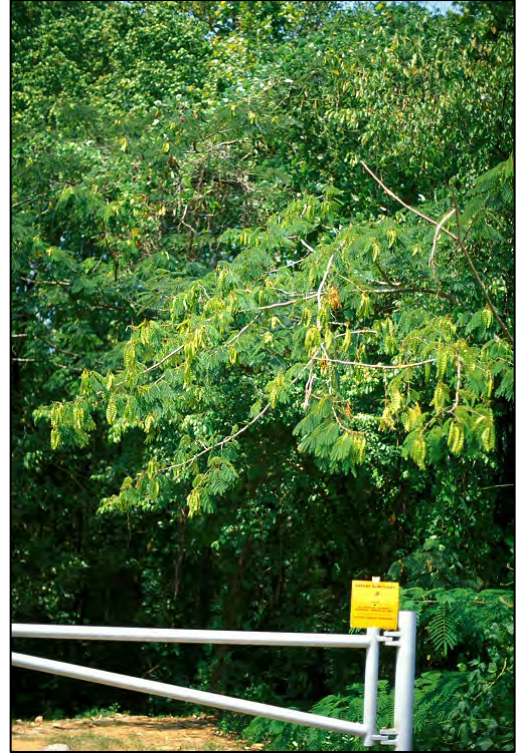
### 13 - English ivy (*Hedera helix*)

- **Plant:** English ivy is an evergreen climbing vine. Vines attach to the bark of trees, brickwork, and other surfaces by way of numerous, small rootlike structures, which exude a gluelike substance. Older vines are known to reach a foot in diameter.
- **Leaves:** Dark green, waxy, somewhat leathery above with pale veins and lighter green below, and are arranged alternately along the stem. English ivy has many recognized leaf forms, the most common being a 3-lobed leaf with a heart-shaped base. Leaves in full sun are often unlobed, oval and have wedge-shaped bases. Twig is slender, light green but later turning light brown with aerial rootlets.
- **Flowers, Fruits, & Seeds:** Umbrella-like clusters of small, greenish-white flowers appear in the fall if sufficient sunlight is available. Fruits mature in Spring and are 1/4 inch across, black with a fleshy outer covering enclosing one to a few hard, stone-like seeds.
- **Habitat:** Woodlands, forest edges, fields, hedgerows, coastal areas, salt marsh edges, and other upland areas, especially where some soil moisture is present.
- **Reproduction/Spread:** English ivy reproduces vegetatively and by seed, which is dispersed to new areas primarily by birds. New plants grow easily from cuttings or from stems making contact with the soil.



#### 14 - Mimosa “Silk Tree” (*Albizia julibrissin*)

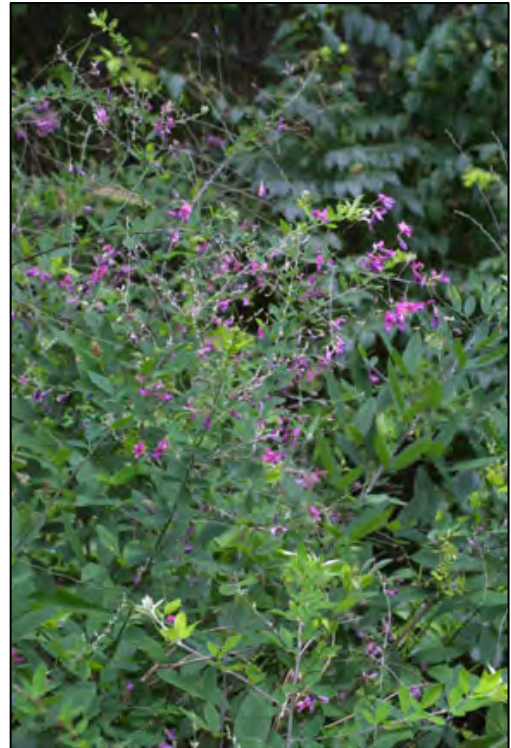
- Plant: Small to medium-sized tree that can grow up to 20-40 feet tall. The bark is light brown, nearly smooth, and generally thin with lens shaped areas along the stem.
- Leaves: The attractive fern-like leaves are finely divided, 5-8 inches long by about 3-4 inches wide, and alternate along the stems.
- Flowers, Seeds, & Fruit: Showy and fragrant pink flowers, about 1½ inches long, that resemble pom-poms and are arranged in panicles at the ends of branches. Fruits are flat, straw-colored pods about 6 inches long containing light brown oval-shaped seeds about ½ inch in length. Pods ripen in August to September and begin to disintegrate soon after, but remain on the trees into winter.
- Reproduction/Spread: Vegetatively and by seed.
- Habitat: Disturbed areas, areas with full sun, along roadsides and open vacant lots in urban/suburban areas, and along riparian areas. Mimosa can tolerate partial shade but is seldom found in forests with full canopy cover, or at higher elevations (above 900 m or 3,000 ft), it is capable of growing in a wide range of soil conditions.





## 15 – Shrubby Bushclover (*Lespedeza bicolor*)

- Description: Deciduous, upright, open, loosely branched, spreading shrub, becoming unkept with age. Rapid growth rate, growing 6 to 9' tall and 6 to 8' wide.
- Leaves are alternate, trifoliate, each leaflet 3/4" to 2" long and two-third's to as much in width, broadly oval or obovate, midrib terminating in a small bristle, middle leaflet larger and longer petioluled than others, dark green (rich green) above, pale below, glabrous or sparsely covered with appressed pubescence on both sides.
- Flowers, Seeds, & Fruits: Perfect, rosy-purple, 1/2" long, produced in 2 to 5" long racemes on current season's growth and are borne from the leaf axils of the uppermost 2" of the shoot; July-August; not really overwhelming Downy, ovate, 1/3" long, one-seeded pod.
- Habitat: Shrubby bushclover prefers full sun and well drained soil. It is pH adaptable. It is found in fields, open woodlands, clearings, fence and hedge rows, and along roadsides.
- Reproduction/Spread: Sexual reproduction by seed propagation and vegetative as well, it will sprout from the root crown after top kill.





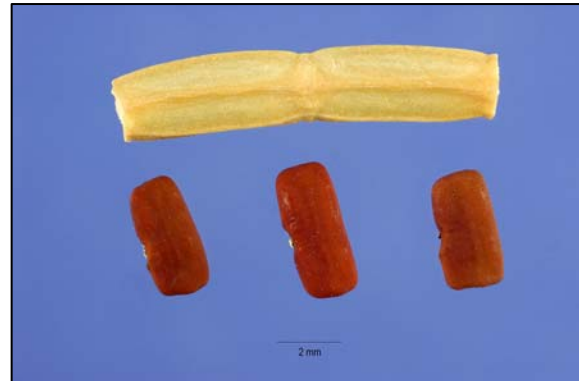
## 16 – Beefsteak plant (*Perilla frutescens*)

- Description: Small, freely branching annual herbs that reach between eighteen and thirty inches in height. Stems and leaves have a very strong characteristic odor.
- Leaves are small ovate and deeply-toothed, generally purple or green and arranged in an opposite formation along the four-sided stem.
- Flowers, Seeds, & Fruits: Small bell-shaped flowers are white and purple with a distinctive ring of fine hairs along the bottom. They may be arranged in a terminal cluster or within the leaf axils and appear between July and October.
- Habitat: Beefsteak plants are prominent along roadsides, pastures, fields, and woodlands. Rapidly spread to disturbed areas where they disrupt native ecosystems.
- Reproduction/Spread: Sexual reproduction by seed.



## 17 - Crown-vetch (*Coronilla varia*)

- Plant: Perennial herbaceous plant, growing 2 - 6' long stems with a reclining and trailing growth pattern. In winter and early spring crown vetch can be easily recognized as brown unsightly patches.
- Leaves: Pinnately (feather-like) compound leaves, ranging from 5 to 10 cm in length, with 15 - 25 pairs of oblong leaflets.
- Flowers, Fruits, & Seeds: Flowers are clustered in flat-topped umbels ranging from pink, lavender to white on extended stalks (5 to 15 cm long), which grow from the leaf axils; blooming from May through August. Slender seeds are contained in finger-like pods; they remain viable in the soil for 15 years. The four-angled legume is from 1.5-5.5 cm long. It has from three to seven one-seeded segments.
- Habitat: Along roadsides, fields, and road cuts. It does well rocky dry sites as well as moist well-drained areas. It is intolerant of shade but will tolerate sparse shade along the edge of forested areas. It grows in a wide range of climactic conditions from Zone 3 to 7.
- Reproduction/Spread: Crown vetch spreads vegetatively by underground roots or rhizomes and by seeds.



## 18 – Periwinkle (*Vinca minor*)

- Description: Creeping, rapidly growing perennial evergreen vine that can reach up to six inches in height. It spreads along the ground and roots along the stems to form large clonal colonies.
- Leaves are elliptical, oblong to oval, each about an inch in length, alternate along thin stems, clustering at stem terminals, and shiny dark green.
- Flowers, Seeds, & Fruits: The flowers are solitary in the leaf axils and are produced mainly from early spring to mid summer but with a few flowers still produced into the autumn; they are violet-purple, 1-1.5" diameter, with a five-lobed corolla. The fruit is a pair of follicles 1" long, containing numerous seeds. Fruits are inconspicuous and brown.
- Habitat: Periwinkle prefers partial shade to shade and moist, well-drained soil. It is prominent along roadsides, fields, and woods.
- Reproduction/Spread: Vegetative reproduction by rooting stolons.





## 19 - Princess tree (*Paulownia tomentosa*)

- Plant: Small to medium sized tree in the figwort family (Scrophulariaceae) that reaches 30 to 60 feet in height; bark is rough, gray-brown and interlaced with shiny, smooth areas; stems are olive to dark brown, hairy and markedly flattened where stems and branches meet.
- Leaves: Large, hairy on upper surfaces, broadly oval to heart-shaped and sometimes shallowly three-lobed and in three pairs along the stem.
- Flowers, Fruits and Seeds: Conspicuous upright clusters of showy, pale violet, fragrant flowers open in the spring before the leaves appear; fruit is a brown capsule with four compartments that may contain several thousand tiny winged seeds; fruits mature in the fall and remain on the tree, providing a handy identification aid.
- Habitat: Along roadsides, streambanks, and forest edges. It tolerates infertile and acid soils and drought conditions. It easily adapts to disturbed habitats, including previously burned areas, forests defoliated by pests (such as the gypsy moth) and landslides and can colonize rocky cliffs and scoured riparian zones where it may compete with rare plants in these marginal habitats.
- Reproduction/Spread: Seed or root sprouts; growing more than 15 feet in a single season.





## 20 - Russian Olive (*Elaeagnus angustifolia*)

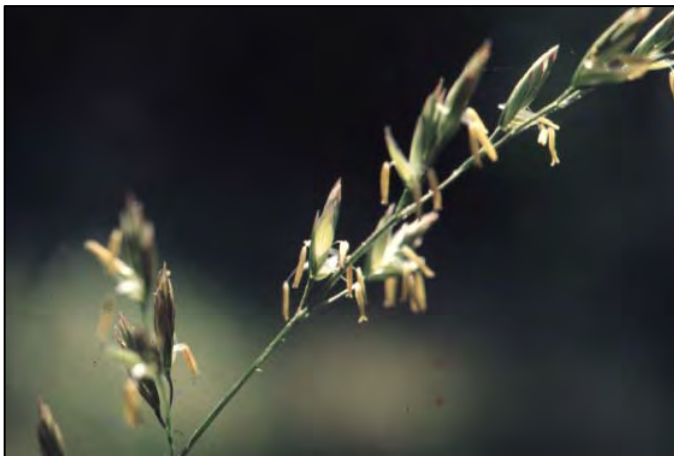
- Description: Deciduous, thorny shrub or small tree growing to 40 feet, rounded in outline, moderate to rapid growth rate, can become leggy, loose, and irregular. Smooth and gray bark when young, becoming irregularly ridged and furrowed later. Young branches are silvery and scaly, and may bear thorns. Later developing a shiny light brown color; buds are small, silvery-brown and rounded, covered with 4 scales.
- Leaves are alternate, simple, 1 to 3 inches long, 1/2 inch wide, linear or lanceolate in shape with an entire (smooth) margin. Leaves are dull green to almost gray (rusty) and distinctly scaly above, silvery and scaly below. Leaves hold late into fall.
- Flowers, Seeds, & Fruits: Highly aromatic, bell shaped flowers produced in clusters of 1-3 together, 3/8 to 5/8 inch long, with a four-lobed creamy yellow corolla lacking petals, appearing in spring. Berry-like achene, silvery reddish brown fruit, 1/2 inch long, sweet and edible but quite dry, maturing in late summer.
- Habitat: Russian olive grows well in full sun/open exposure and a range of soil types. It is drought and salt tolerant and dislikes summer heat. Russian olive is found along roadsides, abandoned fields, and pastures. It can fix nitrogen in its roots, enabling it to grow on bare, mineral substrates.
- Reproduction/Spread: Russian olive reproduces by seeds and spreads by avian seed dispersal and water. It may also spread through sprouting from the root crown.





## 21 - Tall fescue (*Festuca elatior* (*F. pratensis*))

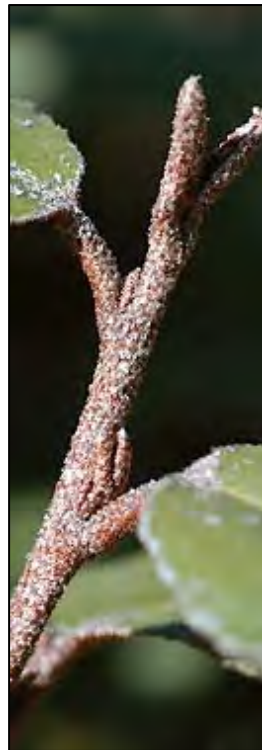
- Plant: Tall fescue is a cool season, perennial, sod-forming bunchgrass. It is a coarse and long-lived grass, with each bunch having 10 to 30 hollow stems, also known as culms, that are 1 - 6 ft. tall (0.5-2 m).
- Leaves: 4 to 24 in. (10-61 cm) long and 0.2 to 4.0 in. (4-10 mm) wide. Mature panicles have a purplish cast which helps to distinguish them from other grasses. The ciliate auricles (earlike structures at the base of the leaf) help to distinguish tall fescue from meadow fescue (*Festuca pratensis*).
- Flowers: The culms bear a branched flowering structure called a panicle with 5 to 15 flower spikelets that are ½ to ¾ in. (10-19 mm) long, each spikelet containing 3 to 10 florets.
- Habitat: Agricultural fields and pastures, former tall-grass prairie, and disturbed and waste areas such as highway and railroad right of ways. Tall fescue tolerates nutrient poor, compacted, and acidic soils.
- Reproduction/Spread: By vegetative means and by seed. Viable seeds can be dispersed by grazing animals and birds and remain in the seedbank for a long time.





## 22 – Thorny Elaeagnus (*Elaeagnus pungens*)

- **Description:** Large, rapidly growing evergreen shrub that grows between six and ten feet in height, reaching a maximum of fifteen feet. Dense, spreading mound with long, loose, thorny arching branches. Very irregular in outline, with long slender branches often sticking up above the rest of the crown. Produces root suckers. Bark is scaly reddish brown and smooth when young, with orange lenticels. Twig is silvery scaly or red-brown scaly, may bear thorns, later developing a shiny light brown color; buds are small, silvery-brown and rounded, covered with 4 very loose scales.
- **Leaves** are evergreen, alternate, simple, thick, 2 to 4 inches long, half (or less) as wide, oval to lanceolate, with entire to wavy margins that may be crisped with brown scales, shiny waxy green and distinctly scaly above, silvery and scaly below and on the petiole.
- **Flowers, Seeds, & Fruits:** Bell-shaped flower, 1/2 to 5/8 inch long, distinctly fragrant, lacking petals, pale yellow to white, appearing in late fall. Fruit is berry-like oval achene, red covered with silver scales, 1/2 to 3/4 inch long, sweet, juicy and edible, matures in spring.
- **Habitat:** Thorny elaeagnus prefers sun to partial shade and can grow in a range of soil types, including dry to wet conditions. It is drought, salt spray and pollution tolerant. Thorny elaeagnus can be found in a variety of habitats and is often planted in highway medians and parking lots as an ornamental screen. It can grow naturally in woody areas and on stream banks.
- **Reproduction/Spread:** Thorny elaeagnus reproduces primarily by seed. It also sprouts from the root crown and sends up root suckers.



### 23 - Weeping lovegrass (*Eragrostis curvula*)

- Description: Weeping lovegrass is an introduced, perennial, warm-season, densely tufted bunchgrass with a large fibrous root system. Culms can be pith-filled to hollow; they are erect and 24 to 60 inches (60-150 cm) tall. The inflorescence is a lax, open panicle, commonly 8 to 10 inches long. It is characterized by erect, stiff, slender stems with dark green, very narrow, arching foliage, 1/16 to 1/8 inch wide.
- Leaves are primarily basal and abundant. Culm leaves are 8 to 12 inches (20-30 cm) long; basal leaves can be much longer.
- Flowers, Seeds, & Fruits: The inflorescence is a panicle 4 to 16 inches (10-40 cm) long. Spikelets are five-to twelve-flowered; the lemma is unawned. Flowering in Virginia commences in late June early July. The fruit is a caryopsis.
- Habitat: Weeping lovegrass grows on dry to moist sites in pastures, fields, roadsides, and disturbed areas.
- Reproduction/Spread: Weeping lovegrass reproduces by seeds; it does not have rhizomes or stolons. In most places weeping lovegrass does not actively colonize adjacent nonplanted sites.



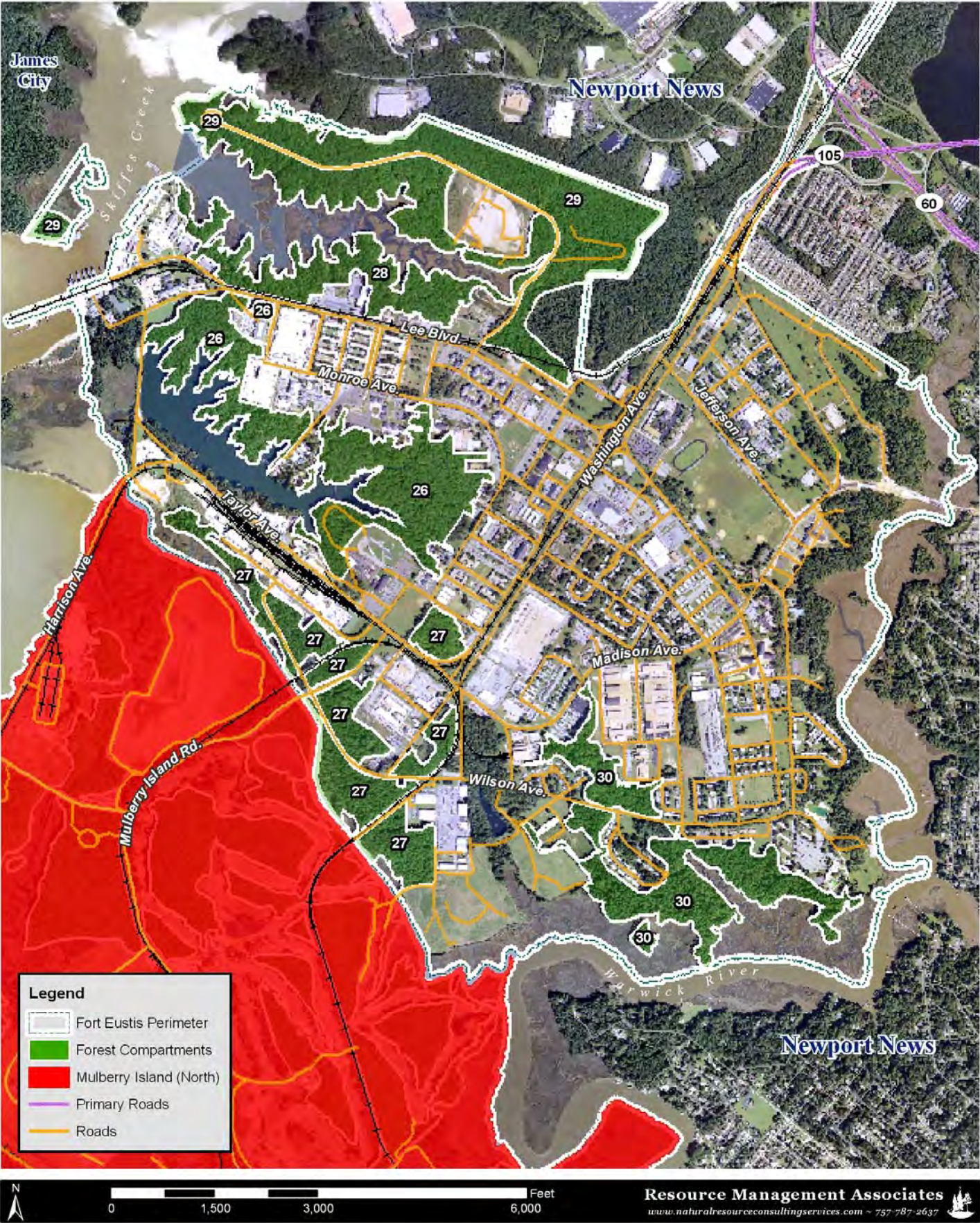
## **5.0 - Forest Compartments**

In 1997, Terwilliger Consulting, Inc. (TCI) prepared a Forest Inventory and Vegetative Assessment for the purpose of developing forest management recommendations. Pursuant to this project, forested compartments were identified and delineated based on the similarity of dominant Forest vegetation types, size classes, stocking, and age. The delineation of vegetative compartment boundaries also considered the presence of natural or man-made boundaries such as roadways, power lines, drainage systems and/or existing land uses so that management recommendations could most effectively be implemented while supporting the training mission of the Army. TCI presented 38 draft forested compartment boundaries, six (6) compartments are located on the Main Post area, identified as compartments 26 through 30, and compartment 32 consisting of 600.17 acres. Compartment 32 has since come under the jurisdiction of Virginia department of Game and Inland Fisheries (VGIF), it has therefore been removed from the 38 compartments and equally omitted from this inventory. The resulting acreage for the Main Post compartments is 584.17. Eighteen (18) compartments are located on the Mulberry Island North, identified as compartments 10 through 25, 31, and 33 through 35, consisting of 1,446.6 acres. The remaining 12 compartments are located on Mulberry Island South, they are labeled 1 through 9, and 36 through 38, and consist of 784.5 acres.

In order to verify the current status of the compartments originally identified in the 1997 project, a list of all development and forest management projects since 1997 was provided to TCI by DPW. A comparative change analysis using 2004 aerial photographs was conducted to adjust compartment boundaries based on the landcover changes since 1997. Compartment acreage was then recomputed using a Geographic Information System (GIS) and the revised compartment boundaries were submitted to the Conservation Branch for review and approval prior to conducting the vegetation inventory. Reference is made to Figure: 5.1B, titled Ft. Eustis, VA ~ Main Post: Forest Compartments and Figure: 5.0B, titled Ft. Eustis, VA ~ Mulberry Island (North): Forest Compartments and Figure: 5.0C, titled Ft. Eustis, VA ~ Mulberry Island (South) Forest Compartments for the locations and adjusted boundaries for each forest compartment.



Ft. Eustis, VA ~ Main Post: Forest Compartments





# Ft. Eustis, VA ~ Mulberry Island (North): Forest Compartments





# Ft. Eustis, VA ~ Mulberry Island (South): Forest Compartments





## 6.0 - Timber Inventory and Management Plan

### Objective

Conduct a timber inventory to precisely determine the species composition and volume of all forestlands on Fort Eustis.

### 6.1 - Inventory Methodology

In order to adequately assess the structure of all forestlands, each stand/vegetative compartment was sampled by means of a multi-phased, stratified sampling technique, the sampling units being; strategically selected plots within each vegetative compartment. Stratification having been achieved by previous stand compartmentalization based on similar ecological characteristics and topographic fragmentation. Sampling was conducted according to the following conditional sampling intensities:

- One plot per ten acres for compartments with a total acreage less than or equal to fifty acres.
- One plot per fifteen acres for compartments with a total acreage greater than fifty acres.

\* Each compartment, regardless of size, was sampled a minimum of three times (three plots).

The following sampling methods were then applied to assess forestland composition:

- Canopy (timber) - Quantitative, variable-plot sampling by means of a 10 basal area factor (BAF) prism at each plot center point, resulting in plot sizes of variable probability with respect to the sawtimber component.
- Ground Cover, Shrubs, & Saplings - Quantitative sampling method such as that described by James and Shugart (1970), Aud. Field Notes 24: 727-736.

Multidimensional data were collected on two levels, plot and tree. Plot-level data pertained to the overall stand/compartment composition and volume, while tree-level data pertained to the tree composition within a particular plot. The following figures illustrate data elements collected in the field:

PLOT LEVEL FIELD DATA SHEET		Plot #:
Plot forest cover type (SAF):	Dominant species / species representing the majority of onsite stocking	
Age of dominant tree (stand age):	Age of dominant species. Determined by increment bore at breast height	
Diameter growth (5yr & 10yr):	Growth rate determined for five and ten year intervals. Measurec by increment bore	
Height of dominant tree:	Tree height measured by clinometer (ground level to tip of the apical meristem)	
Crown closure (%):	Measure of ground area covered by canopy. Measured by densiometer	
Average slope:	Slope, measured by clinometer	
Invasive/disease/insect or mechanical damage, description & % affected:	Account of invasive species present and description of adverse tree conditions	
Description:	Brief plot description	

\* SAF (Society of American Foresters)

TREE LEVEL FIELD DATA SHEET		Plot #:
Tree #:	Given as: <u>Compartment #</u> - <u>Plot letter</u> - <u>Tree #</u>	
Tree species:	Scientific and common name of tree species being assessed	
Tree DBH:	Tree diameter measured 4.5' above ground by caliper	
Tree height:	Tree height measured by clinometer (ground level to tip of the apical meristem)	
Merchantable tree height (to 4" top):	Tree height measured from stump (1') to point where diameter is 4", given as # of 16' logs	
Crown class:	Tree's position in the canopy: Open, Dominant, Co-dominant, Intermediate, or Overtopped	
Crown height (live crown ratio):	Height of tree crown, measured by clinometer	
Crown basal diameter:	Measurement of diameter, given as an average	
Tree condition:	Overall tree assessment of tree health: Good, Fair, or Poor	
Tree quality:	Classification of log quality/growing stock: Acceptable, Unacceptable, Cull, or Dead	
Forest product:	Given as: Sawtimber, Pulpwood, or Not Applicable (Cull trees)	
Diameter growth:	Growth rate determined for five and ten year intervals. Measurec by increment bore	
Tree damage; location & severity:	Assessment of physical tree damage and its location	

Tenth-acre circular plots and vertical point sampling was utilized for quantitative descriptions of ground cover, understory, and canopy layers for the assessment of wildlife habitat. Shrubs and saplings were described by species and number of stems/acre. Ground cover was described by the percent of area covered by species.

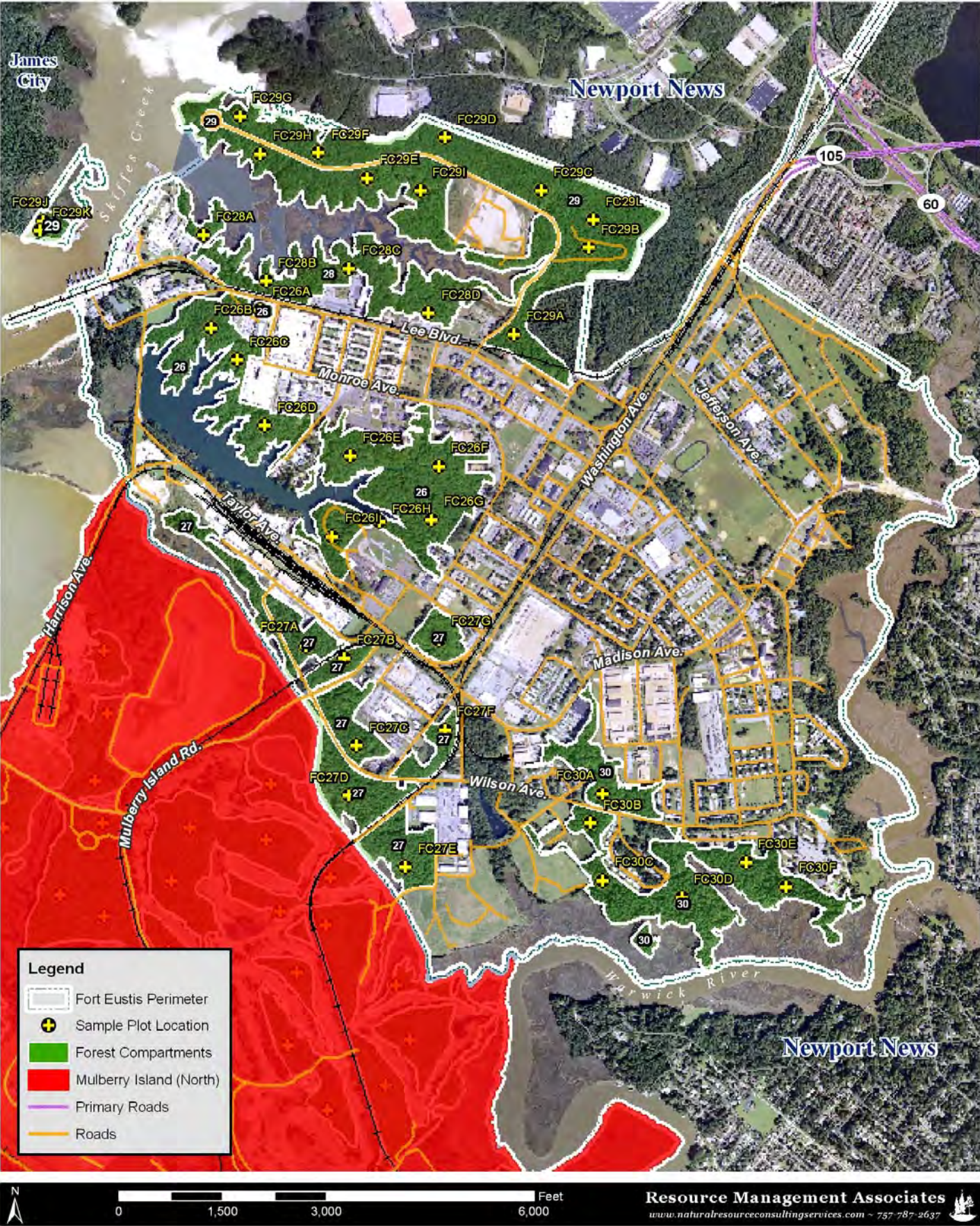
Ground cover, shrub, and sapling species were described by determining abundance by top 5 species present and percent canopy closure for each strata by a quantitative sampling method such as that described by James and Shugart (1970), Aud. Field Notes 24: 727-736.

Reference is made to Figure: 6.1A, titled Ft. Eustis, VA ~ Main Post: Sample Plot Locations, Figure: 6.1B, titled Ft. Eustis, VA ~ Mulberry Island (North): Sample Plot Locations and Figure: 6.1C, titled Ft. Eustis, VA ~ Mulberry Island (South): Sample Plot Locations which depict the locations of all sample plots where data collection occurred for to this project.



Figure: 6.1A

# Ft. Eustis, VA - Main Post: Sample Plot Locations





# Ft. Eustis, VA ~ Mulberry Island (North): Sample Plot Locations





# Ft. Eustis, VA ~ Mulberry Island (South): Sample Plot Locations



## **6.2 - Management Tools**

### **Pre-commercial Thinning**

Pre-commercial thinning is a management tool used primarily in overstocked forestland between 5 and 10 years of age. Predominant tree/sapling species are determined and optimum post-thinning stocking levels and tree spacings are defined prior to this silvicultural practice. Generally 10' spacing between residual trees or 435-450 trees/acre are prescribed for loblolly pine stands. Experienced hand crews using gasoline powered brush cutters identify dominant desirable species (depending on management objectives) and remove surrounding trees to achieve the prescribed stocking levels. Releasing the desirable trees from competition greatly accelerates their growth rate and overall vigor of the stand and can lower the risk of insect and/or disease conditions

This practice can also be modified to develop either pine/hardwood or hardwood/pine stand(s) depending upon pre-existing species composition/numbers. Hardwoods such as mixed oak species are typically more durable (longer lived) than pines and could allow a longer rotation before a final harvest is necessary. Additionally, oak and hickory species, as well as black gum can provide foraging opportunities for a variety of wildlife. Less desirable species such as red maple and sweetgum should be felled (cut) during the precommercial thinning process. Targeted trees (trees that are felled) are non-merchantable and left on site where they will eventually decompose. This silvicultural practice does not generate revenue.

### **Commercial Thinning**

Commercial thinning is a management tool used in overstocked stands, usually when the stand is between the ages of 18-28 years of age. The objective of a commercial thinning operation is to provide additional growing space to the most desirable, healthier trees in the forest stand. Optimum post-thinning stocking levels are established prior to the practice and ideal spacing between the trees are defined. Generally 20' -25' spacing between residual trees or 80-110 trees/acre are prescribed. In order to justify a commercial thinning operation, at least one or more acres are required to justify the cost of moving harvesting equipment to the site. Packaging smaller, adjacent compartments in a commercial thinning contract may be used to attract buyers to perform this practice. Although thinning typically generates limited revenue, the primary value accrues to the residual forest by improving its quality and growth rate. Commercial thinning equipment is very expensive and most thinning contractors must be highly productive and generate considerable volume of harvested pulpwood to cover their expenses. It is very important to design thinning projects so that unnecessary delays occur. Thinning projects behind the Range training areas must occur so the contractor can work without interruption. Therefore, close coordination with Range control will be necessary to assure unrestricted access occurs for as long a period possible. A discount in the price for the pulpwood may be necessary to balance a contractor's lost productivity in the event range activities interfere with the project.

### **Selective Harvest**

A selective harvest is a management tool generally applied to relatively mature stands where selected, saw timber-sized trees are removed to enhance species composition according to defined management objectives. The primary goal of a selective harvest for Fort Eustis would be the removal of mature loblolly pine and/or less desirable hardwoods such as red maple and sweetgum and the protection of species that have longer life spans such as white oak, cherrybark oak and black gum. Applications of this tool could increase overall forest health and enhance opportunities to accommodate concentrated troop or vehicle use. Additionally, wildlife habitat could be significantly improved by removing mature loblolly and less



desirable species found in the upper canopy which will stimulate the development of more diverse understory by allowing sunlight to penetrate to the forest floor. A selective harvest should be carefully designed and supervised to ensure proper selection and protection of the residual trees occurs.

### **Clear Cut Harvest**

Clear cutting is a management tool used in the Coastal Plain of Virginia to establish monoculture forest types, predominately pine plantations. Typically, all the trees in the forest are harvested and any residual vegetation on the site is controlled by the use of herbicides and/or prescribed burning prior to planting or natural regeneration. Although clear cutting might be less applicable to multiple land management objectives (which are typically found on Fort Eustis), this management tool would be practical in clearing aircraft approach zones and as a silvicultural practice that should be conducted in mesic forests that contain a homogenous, over mature loblolly pine. In these situations a clear-cut may be necessary to re-establish a younger forest more capable of responding to the range of tools outlined above in order to work towards a more diverse forest type, more suitable for multiple-use objectives.

### **Prescribed Burning**

Prescribed fire can be an important and effective tool in land management. However, a thorough understanding of ecology, natural resources and experience in using prescribed fire is necessary to determine if this tool will meet specific objectives. The improper application of prescribed fire may exacerbate the objective being addressed by its use and cause unnecessary safety risks.

Thus, the specific objective or desired vegetative condition must first be identified. Once the objective is established, the land manager should determine if prescribed fire, one of several vegetative management tools, is the most appropriate tool to meet the identified objective. The proximity of Fort Eustis to urban areas must be considered to ensure the use of prescribed fires does not create any off-site adverse impacts. Smoke management planning is designed to carefully identify sensitive areas and specific meteorological conditions that should be followed to reduce potential adverse impacts. Incorporating these recommendations will minimize risk and maximize safety to personnel, equipment, and resources.

Prior to utilizing prescribed fire, its objectives must be carefully determined and confirmed. Prescribed fires can be used to reduce hazardous fuel accumulations, prepare sites for seeding and planting, dispose of logging or organic debris, improve wildlife habitat, manage competing vegetation, manage endangered species, improve access for training purposes, as a tool to expose unexploded ordnance in Range Training Areas and non-combustible surface items associated with archeological sites. The control of prescribed fire is very similar to the suppression of wildfire, and it is a valuable learning experience for training and maintaining the fire fighting skills of experienced personnel. Prescribed burning can serve all of these purposes at Fort Eustis and be a valuable element of the forest and wildlife management programs

### **Hazard Reduction:**

Forest fuels in pine stands accumulate rapidly and may build up 8"-12" depths with fuel loading of 12 tons/acre. Fires that occur during "worst case" or summer drought conditions can be difficult to control and result in extensive timber mortality. Prescribed fire is the most practical way to reduce dangerous accumulations of combustible fuels under pine stands. Wildfires that burn in areas where fuels have been reduced by prescribed fires cause less damage and are much easier to control.

It is not always necessary to completely burn large acreage compartments to reduce fire hazard. Creating breaks in fuel continuity often can create opportunities to reduce wildlife fire intensity and aid in the control of wildfires. Dividing consistent vegetation compartments into smaller units and

selectively burning a variety of compartments over several years can provide hazard reduction. This will also enhance wildlife habitat by diversifying the vertical structure of vegetation. Finally, creating vegetation diversity will enhance training opportunities within training areas by providing a variety of cover and concealment options.

#### *Noxious Flora Control:*

Noxious, exotic and/or invasive plants can adversely impact natural ecosystems by displacing indigenous species. Common Reed or Phragmites (*Phragmites australis*) is an example of a dominant invasive species on Fort Eustis. Training and construction activities are likely the principal causes of colonization of these species into new areas. Transportation of root stock of Phragmites inadvertently occurs if equipment operates in areas of infestation, and then without completely cleaning off soil-containing root stocks, the equipment is subsequently operated in un-infested areas.

Combinations of burning and herbicide applications are the primary tools for Common Reed management. Late winter or spring fires will eliminate the standing dead stems of Phragmites and will increase the effectiveness of subsequent herbicide application. Repeated annual use of these tools over a three (3) year period may be required to control Common Reed infestations.

#### *Control of Ectoparasites:*

Noxious insects such as ticks and mosquitoes are present on Fort Eustis and can influence field and outdoor classroom training activities. Optimum parasite habitat includes low-lying, dense grassland and scrub/shrub and forest with well developed scrub/shrub vegetational communities. These habitats dominate many training and range areas on Fort Eustis.

The distribution of ticks among hospitable habitats is probably the result of selective usage by primary host-carrying immature ticks (Seminer and Hair, 1973). Several studies have shown that ticks were more abundant on neonatal fawns captured from "dense" than from "open" (less brush cover, fewer brush species, less accumulated mulch) areas (Samuel and Trainer, 1970).

Mosquito populations also closely correspond to these habitats. Mosquitoes typically are less active in open areas characterized with windy conditions and subject to desiccating winds and temperatures.

Despite the abundance of these pests, they are representative of the ecosystem and should only be managed within those areas where conflict occurs with intensive human use. Typical control techniques would involve chemicals that may adversely impact the ecosystem. A more benign approach would be to manage the habitat to create conditions less favorable for the buildup of mosquito and/or tick populations. In order to ensure minimal impact on the ecosystem, habitat manipulations should be targeted to those priority areas involving outdoor classroom and training activities. Prescribed fires may be used to reduce the density of scrub/shrub communities within forest training areas to allow greater air circulation and less favorable mosquitoes and biting flies and reduce low vegetation that harbors ticks.

#### *Wildlife Habitat Improvement:*

Prescribed fire for wildlife habitat improvement is a recommended practice where loblolly pine is the dominant overstory species. Periodic fires tend to favor early succession herbaceous and woody plants that favor open understory conditions. Following a fire, mineral soil is exposed creating a favorable seedbed for establishment. The seeds of many wildlife desirable plant species, such as berries and hard mast, are generally dispersed by wildlife and quickly colonize burned areas. These plants will dominate



a site for several years and will be gradually reduced in abundance by plant succession. Prescribed fire is then used to "restart" the successional process.

A patchwork of burned and unburned area tends to maximize vertical and horizontal vegetational diversity thereby creating maximum habitat opportunities. The quality and quantity of wildlife foods is generally enhanced as herbaceous vegetation and hardwood sprouts become more abundant within the surface layers of a pine forest.

Warm season grasses are increasingly being used to provide habitat and cover and are well adapted to management with fire. Spring fires are used to remove old growth from established stands, provide control of weed competition and increase the abundance of insects for a food source for nesting ground birds.

Burning warm season grasses typically occurs between March and April. The ideal time occurs when the Warm season grass has begun to grow and reaches approximately 1" in height

#### *Site Preparation/Reforestation:*

Prescribed fire can be an effective tool to prepare sites for reforestation, habitat development and restoration projects. Fire as a tool is especially important on poorly drained soils as found over much of the land associated with Range Training Areas. During seasonally wet periods, usually beginning during mid-December through mid-May, the water table is typically at the surface or closely to the surface. In cases where vegetation management is necessary, heavy equipment use can severely impact the structure of the soil and exacerbate internal drainage. Fire is a low impact method to clear undesirable woody vegetation from sites and prepare the sites for reforestation and seeding. Prescribed fire also recycles nutrients making them available for new vegetation establishment.

Advance planning is necessary for site preparation burns since most are conducted the early spring following a timber harvest and prior to active re-growth. Since this period is typically late spring and early summer, when water tables can be high, fire line construction should be done the preceding fall during a period of low water table and low soil moisture. In this way, operations minimize adverse impacts to the natural resources and environment.

If natural regeneration of loblolly pine is the objective, prescribed burning should be done prior to seed dispersal. Pine seed within the cones are mature by October. Between October and January, cones gradually open and seeds are dispersed by wind. In most years by January, 90% of loblolly seeds have been dispersed. Seedling germination and establishment is generally complete by mid-July. Therefore, prescribed burning for reforestation should be completed between July and September in anticipation of a fall/winter seeding period.

#### *Training Area Improvement:*

Many training activities are conducted on Fort Eustis. Outdoor classroom and field training exercises are conducted within designated training areas. Outdoor classroom typically are semi-improved and may offer sitting areas and restroom facilities, while field training exercise areas may have foot and vehicle paths and/or trails.

The primary objective of vegetation management associated with outdoor classrooms should be to provide optimum environmental conditions to maximize the learning experience. During the summer months, high summer air temperatures and biting insects can affect the effectiveness of outdoor

classroom training. In order to mitigate these conditions, mid and understory vegetation should be eliminated to improve airflow. On smaller areas, using hand tools including the selective application of approved herbicides can most effectively provide vegetation control, especially if improvements to the site are at risk if fire is used to control vegetation. Otherwise, fire may be the best tool to provide vegetation control.

Generally, dividing the Training Area into smaller areas and conducting rotational prescribed fires can maximize field-training activities that develop tactical island concealment cover/camouflage skills. In order to maximize vertical vegetational diversity, a Training Area should be divided into at least three (3) compartments for rotational burning. At least three (3) years should be allowed between burns. Therefore, the oldest compartment should support mid-story vegetation approximately 10'-15' in height, which should provide sufficient cover for most Army vehicles. Much of the forest on the Range Training Area is supported on wetland soils which if allowed to develop without intervention will develop into a well developed under-story, mid -story and over-story. Some areas of undisturbed vegetation should be reserved to provide a broad range of realistic training opportunities that may be encountered under actual combat situations.

Certain areas within the Range Training Area have been used extensively for long periods of time for training utilizing a variety of munitions. Over the years a significant amount of these munitions, included unexploded ordinance, have accumulated in the forest within the training areas and overtime have been covered by both hardwood and evergreen leaves. During the control of forest fires, the Range Safety Office has reported the fires have ignited some of this ordinance.

#### *Archaeological Site Improvement:*

Cultural resources are present on Fort Eustis. Cultural resources are found above and below ground. The decomposition process has largely degraded the organic composition of above ground cultural resources, such as woody material. Any subsurface excavations including the installations of new firebreaks should be coordinated with Conservation Branch to insure the protection of cultural and natural resources.

Existing cultural resources that likely would be present are generally those more durable items such as bricks, glassware, shards, and metal-based artifacts. Many of these sites were once in an open or grassland state and over the years have become re-established with woody vegetation. Renovating these sites can be very difficult due to the possibility of ground disturbance that may move these cultural resources and diminish or destroy their historical juxtaposition. Earthworks are particularly vulnerable when woody vegetation becomes established. Many times trees become anchored to the earthworks and may be uprooted by strong winds. Over time, the integrity of earthworks can be diminished.

Prescribed fire may also be used to eliminate cover prior to conducting archeological fieldwork. Immediately following a fire and prior to vegetation re-establishment, prior excavations and land disturbance is more readily discernable. Durable manmade debris piles are typically revealed, which may indicate cultural resources. The risk of sub-surface disturbance to artifacts associated with prescribed fire is minimal. However, the installation of permanent and/or temporary firebreaks usually involves trenching or digging as deep as 8"-12" into the mineral soil and can adversely impact important cultural resources. In order to avoid unintentional disturbance of known sites the perimeter of these sites should be clearly designated by painting bands on regularly spaced trees around the perimeter of each known site.



### *Unexploded Ordinance:*

Many areas on Fort Eustis, particularly on Mulberry island have been used for training activities for decades and contain accumulated unexploded ordinance that has become overgrown with forest floor cover. Plowing new firebreaks should be avoided and fire suppression should be excluded except when working from established fire lines. Many of these sites have not been thoroughly evaluated by EOD. Following all wildfires, Directorate of Plans, Training, Mobilization and Security should be contacted with a request to conduct surface sweeps to recover any surface UXO. Following all prescribed burns and/or wildfires, a systematic visual inspection should be conducted to identify unknown areas that may contain UXO s. Any new locations that are identified should be clearly posted.

### **Buffers:**

Forested buffers are recommended in forest management plans because they are effective in softening the transition from intensively managed forestland(s) to other land uses. They are a useful tool in managing the aesthetics of forests if they block the view of unattractive forest management activities and extremely important in protecting water quality. Federal, state and/or local laws may mandate forested buffers, primarily in and along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas. In 1990, Secretary of Defense representing the Department of Defense (DOD) and Environmental Protection Agency (EPA) entered into a Cooperative Agreement concerning Chesapeake Bay activities. Prior to this agreement the DOD completed a water quality assessment study to determine the relative impact of its activities on the water quality and living resources of this estuary and agreed to cooperate to implement the goals and objectives of the Chesapeake Bay Agreement. Within this document, Fort Eustis was identified as an installation with a significant impact potential on the Bay's water quality. In addition the DOD agreed to participate with state, regional, local and other Federal agencies to "improve effectiveness of Chesapeake Bay activities within its existing programs of natural resources conservation and environmental quality management"; and, during project planning, to "develop, and implement best management practices (BMPs) for nonpoint source pollution control on leased farmland, commercial forest land, and on all other DOD lands. In addition the DOD agreed to ensure that all DOD projects and activities at Fort Eustis do not conflict with policies, standards and activities in the States' Non-point Source Management Programs pursuant to the Federal Consistency provisions in Section 319 of the Clean Water Act. Therefore DOD has made a commitment to participate, plan, direct funding and conduct audits and inspections on Fort Eustis to protect water quality and the Chesapeake Bay, including the incorporation of vegetative buffers and other BMP's.

### *No-Cut Buffers:*

Buffers where silvicultural practices are prohibited.

### *Riparian "No-Cut Buffers:*

Buffers adjacent to streams, ponds, waterways where silvicultural practices are prohibited. Typically, the recommended buffer widths for the 2007 Timber Inventory and Forest Management Plan are 50' - 75', however, an assessment should be made prior to planned silvicultural activities to determine if buffer widths are sufficient to support logging equipment or should be increased to minimize windthrow, and/or ensure that soil profiles/water quality are protected.

### *Selective-Cut Buffers:*

Primarily aesthetic buffers that are adjacent to roadways, buildings, power-lines, and railways where some harvesting is permitted. Trees targeted for removal should be mature loblolly pine, and weakened, suppressed and/or damaged trees that are, or may become a hazard. The buffer should be clearly defined and trees targeted for removal within the buffer should be clearly marked. Typically, the recommended

selective cut buffer widths for the 2007 Timber Inventory and Forest Management Plan are 50'-75', however an assessment should be made prior to planned silvicultural activities to determine if buffer widths should be customized to further enhance aesthetics or to protect soil profiles.

### **Management Classifications:**

There are three management classifications used by the Army as follows:

1. Manageable without limitations
2. Manageable with limitations
3. Non-manageable

Each forest compartment was evaluated to determine the appropriate classification to guide the development of recommendations. Reference is made to Figure: 6.2A, Fort Eustis, VA ~ Forest Compartment Management Classifications. Since most forest compartments serve multiple Army objectives, from training, recreation, cultural resource and all compartments are subject to either state and/or federal resource protection guidelines and/or regulations no compartment was considered manageable without limitations. A few compartments, all located on Mulberry Island were classified as unmanageable due primarily to access issues that would require building roads across tidal marsh. Therefore the majority of the forest compartments were considered manageable with limitations.



# Ft. Eustis, VA - Forest Compartment Management Classifications





### **6.3 - Interviews**

Tim Christensen, Chief, Conservation Branch, Environmental Division, Directorate of Public Works

Mr. Christensen is responsible for management of land, forest, and fish and wildlife resources of Fort Eustis and ensures compliance with Federal and State environmental reviews, regulations and laws. Mr. Christensen served as the project point of contact and provided resource data, overviews of natural resource projects since the last Forest Inventory and Management Plan conducted in 1997.

James Dolan, Wildlife Biologist, Conservation Branch, Environmental Division, Directorate of Public Works

Mr. Dolan is responsible for the management of wildlife resources on Fort Eustis. In addition, Mr. Dolan shares responsibility of maintaining the Geographic Information System (GIS) used by the Environmental Division. Mr. Dolan provided background material on wildlife populations, the hunting program, Threatened and Endangered Species and archeological sites found on the installation. Five Bald Eagle nests were reported to be present on the installation, although one nest tree may have recently fallen. The deer hunting program has had very good success in reducing deer densities since the 1997 forest evaluation.

Terry Sanders, Forester, Conservation Branch, Environmental Division, Directorate of Public Works

Mr. Sanders is responsible for the management of forestry and urban forestry resources. He has provided invaluable assistance through his institutional knowledge of the people and resources on Fort Eustis. Mr. Sanders identified the source of critical information located within and outside of DPW that greatly supported this project.

Tessa Martin-Bashore, ITAM Coordinator, Training Division, Directorate of Plans, Training, Mobilization and Security.

Ms. Martin-Bashore is responsible for training land management and the ITAM program. One of the primary functions of the ITAM coordinator is to monitor and assess damage associated with training activities and the coordination of remediation. One of the programs she is involved in is the Land Condition Training Analysis. This program is used at other Army installations and provides for the monitoring of training lands to insure environmental degradation does not occur as a result of the overuse of training lands. The vegetation sampling being conducted pursuant to this project and designation of sampling points with a mapping grade Global Positioning system, may support this program. Future data collection at any of the sampling points used in this project may be able to provide baseline information on the status of vegetation. Excessive training impacts would likely diminish the quality, diversity and abundance of ground cover and understory vegetation.

### **6.4 - Aerial Imagery**

In conjunction with the literature review and personnel interviews, research was conducted on the availability of aerial imagery that would provide the most recent view of the land cover found on Fort Eustis. Contact was made with Alan Mills, Resource Specialist assigned to Fort Lee. Mr. Mills recently obtained true color, orthorectified, aerial images for Fort Lee using a private contractor. Fort Lee is similar in size to Fort Eustis and the cost of the flight and images was \$12,000.



A private company was contacted to identify satellite coverage for Fort Eustis. 2006 color aerial images were available, taken by a Quickbird satellite. This imagery consisted of approximately 32 sq. kilometer coverage with 2 foot resolution taken in December, 2006. This imagery, however, had off-nadir angles of 27 degrees, which much less than preferable for accurate orthomosaic construction. The image was therefore not purchased. A second set of imagery was also available. This imagery was June, 2004 2' True Terrain aerial imagery, which was highly accurate and ideal for compartment revisions, it was therefore purchased both for use in the field work phase of this project and for office GIS editing needs.

The Virginia Geographic Information network (VGIN), a state agency, responsible for maintaining aerial imagery for the Commonwealth, during the spring of 2007, contracted to have leaf-off, true color, ortho-rectified aerial images for the entire state. These images are of very high quality with resolutions of less than 1 meter. These images will not be available for acquisition until late December to January. While the availability of these images will not be in time to support the Forest Management Plan, the acquisition of these images will afford a superior, cost effective tool for the future use by Fort Eustis land management personnel. Copies of these images will be obtained and transferred to the Conservation Branch as soon as they become available.

## ***6.5 - Description of Forest Compartments and Management Recommendations***

In order to more effectively provide details on the land cover and it's relationship to the programmatic mission of Fort Eustis, the property was divided into three primary areas, the Main Post, Mulberry Island – North and Mulberry Island – South.

### **6.51 - Main Post**

The Main Post area of Fort Eustis is shown on Figure: 5.0A, Fort Eustis, VA ~ Main Post: Forest Compartments. This area supports five forest vegetation compartments labeled compartments 26 thru 30. The dominant land cover is administrative buildings, housing and associated infrastructure including roads and utility lines on the upland flat areas. Forest cover occupies the remaining area and covers approximately 584.17 acres. The majority of this forestland is largely located on land with development constraints, such as steep slopes and forest wetlands. The use of the forest on the Main Post area is primarily for troop tactical training and outdoor recreation. Primary considerations with any silvicultural activities in this area include: water quality and aesthetic protection and enhancements; maintaining forest health in support of training activities.

Forested areas adjoining ponds, the river, perennial and intermittent streams or Riparian forests are invaluable for protecting water quality by the filtration of surface and subsurface water flows before discharge occurs in the adjacent water bodies. Concurrently these riparian forests represent very valuable wildlife habitat by providing food and cover for small mammals and various species of birds. These forest riparian buffers also provide aesthetic screens that buffer training activities from the public waters. At the minimum riparian areas should be maintained and/or created beginning at the edge of the water/upland interface and should be a minimum of 100' in width or to the crest of adjoining slopes.

Removal of any of the natural vegetation on steep slopes for construction of forest management should only be done following careful examination of the necessity and/or benefits due to the risk of soil

erosion and potential for water quality degradation.

**Main Post Forest Compartment Descriptions and  
Management Recommendations: Compartments 26-30**



## Ft. Eustis Forest Compartment Analysis

- Main Post -

Compartment # 26

### Compartment Details

**Location:** Main Post (Supports Training Areas: 7 & 8)

**2007 Comp. Acreage:** 133.05

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 74-134

**Avg. Growth Rate:** 5yr, 0.27 / 10yr, 0.51

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** butt damage(4%)

**Invasives:** Japanese honeysuckle(0.2%), Japanese stiltgrass(0.1%)

#### Soils Data

**Site Index Range (Soils):** 77-86

**Site Index Range (Curve):** 92-105

**Average Slope:** 0.78

#### Soil Types:

Bohicket-msc, Craven-Uchee-cx, Emporia-cx, Johnston-cx, Peawick-sl, Slagle-fsl, Udorthents-Dumps-cx, Udorthents-l

### Compartment Description

Compartment 26 is found on the north and east sides of Eustis Lake. The surrounding land is frequently cut by streambeds and steep ravines that drain towards the lake, which serves as a large storm water impoundment area. There is tremendous edge habitat along this manmade lake which is providing valuable cover and foraging habitat for neotropical migratory songbirds. Although the compartment is used heavily for military training and frequently for recreation (hiking, jogging, etc.), wildlife use appears to be moderate. Deer tracks, antler rubs and beaver knowings are present near the easternmost finger of the lake. The compartment consists primarily of a mature, mixed hardwood/pine forest type. The dense upper canopy is dominated by American beech, tulip poplar, sweetgum, red maple, a variety of oak species, loblolly, and Virginia pine. The commercial value of the timber within the compartment is as medium to large hardwood/soft hardwood saw timber, with a smaller component of medium to large pine saw timber. In its current capacity, the forest is highly valuable for a variety of functions such as filtering of nutrients/soil stabilization (protecting water quality), wildlife food/shelter, troop training, and aesthetics.



<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	7592.66	25	39	308.24	1010203
H. Hardwood	4326.94	16	36	264.72	575700
S. Hardwood	3301.28	17	26	199.6	439236
Total:	15220.88	58	100		2025138
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0	0	0	0	
H. Hardwood	1.72	19	10	229	
S. Hardwood	1.88	20	11	250	
Total:	3.6	39	21	479	

**Vegetative Class Dominance**

<b>Trees</b>	<b>% Canopy Closure:</b>	94.98
	<b>Dominant Species:</b>	tulip poplar, cherrybark oak, American beech, sweetgum, loblolly pine
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	358.22
	<b>Dominant Species:</b>	sweetgum, yellow poplar, red maple, American beech, loblolly pine
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	28.89
	<b>Dominant Species:</b>	American holly, black highbush blueberry, flowering dogwood
<b>Groundcover</b>	<b>Overall Cover:</b>	0.28
	<b>Dominant Species:</b>	slender woodoats, muscadine, sweetgum, sensitive fern, broad beechfern

**Management Recommendations**

This compartment is subdivided by natural drainage systems and steeply sloped ravines, which will make commercial logging impractical. The forest vegetation within this compartment is critical in preventing erosion and filtering excessive nutrients/contaminants from nearby roads, parking lots and administrative buildings. Additionally the compartment is used for training (confidence course) and recreation such as walking and trail running. Forest management activities should be limited to maintain the health and vigor of the residual trees. Conduct annual exams to identify hazardous trees in these primary use areas. Hazard trees should be carefully dropped and left on-site to limit soil disturbance and possible injury to neighboring trees/structures. In the event of future construction or site clearing within this compartment, consideration should be given to remove trees within the "footprint" of construction/clearing as well as over mature loblolly in the general vicinity.



## Ft. Eustis Forest Compartment Analysis

- Main Post -

Compartment # 27

### Compartment Details

**Location:** Main Post (Supports Training Areas: 6, 14A, 14B, & 29)  
**2007 Comp. Acreage:** 110.09  
**Forest/Veg. Type:** Pine/Hardwood  
**Age Range:** 50-125  
**Avg. Growth Rate:** 5yr, 0.27 / 10yr, 0.58  
**T/E Species:** None  
**Disease/Insect Damage:** red heart(4%)  
**Mechanical Damage:** butt damage(14%)  
**Invasives:** None

#### Soils Data

**Site Index Range (Soils):** 75-90

**Site Index Range (Curve):** 72-106

**Average Slope:** 1.43

#### Soil Types:

Augusta-fsl, Bethera-sl, Bohicket-msc, Chickahominy-sl, Craven-Uchee-cx, Emporia-cx, Emporia-fsl, Slagle-fsl, Udorthents-Dumps-cx, Udorthents-l, Yemasee-fsl

### Compartment Description

This compartment is located north of the golf course and south of compartment 26. It is extremely fragmented by railroad tracks, roads, development, and drainage features. The forest is composed mostly of a mature hardwood/pine forest type. Medium to large saw timber-sized tulip poplar, white oak, American beech, and loblolly pine dominate the dense upper canopy throughout much of the compartment, however, a younger aged pine stand is present north of the intersection of Wilson Avenue and the Mulberry Island Road. This stand (established 1957) is composed of a heavily stocked loblolly pine forest type, with signs of natural mortality, most likely attributed to the overcrowded conditions. Currently the commercial value of this relatively younger stand is as small to medium saw timber with some small piling and pine/hardwood pulpwood. Throughout most of the compartment, the midstory and the herbaceous layers are dense and diverse, except north of Taylor Avenue where the forest understory is kept in a park-like state by periodic mowing.



<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	7927.72	36	47	220.33	872763
H. Hardwood	4075.51	17	34	240.94	167336
S. Hardwood	1520	7	11	207.3	448673
Total:	13526.23	60	93		1488772
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.66	7	3	72	
H. Hardwood	1.42	11	9	156	
S. Hardwood	2.24	29	13	247	
Total:	4.31	46	24	475	

**Vegetative Class Dominance**

<b>Trees</b>	<b>% Canopy Closure:</b>	93.08
	<b>Dominant Species:</b>	loblolly pine, white oak, southern red oak, willow oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	527.43
	<b>Dominant Species:</b>	sweetgum, red maple, loblolly pine, American holly, cherrybark oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	59.43
	<b>Dominant Species:</b>	wax myrtle, swamp bay, black highbush blueberry
<b>Groundcover</b>	<b>Overall Cover:</b>	0.40
	<b>Dominant Species:</b>	muscadine, cinnamon fern, blue huckleberry, slender woodoats, black huckleberry

**Management Recommendations**

Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2012 for the majority of this compartment. Two areas that should be excluded from the selective harvest are the area immediately west of the Natural Resources Office and another area found near the intersection of Taylor and Washington Avenue. Both of these areas should be reevaluated in 2018. The majority of the loblolly pine found within the compartment is over mature and showing some indications of decline. Red heart fungus was noted in 43% of sampled areas. Additionally, declining growth rates found in core samples (tree borings) indicate loss of vigor which may increase the likelihood of future insect/disease problems. Install 50'-75' riparian "no-cut" buffers along Chesapeake Bay Preservation Act Resource Protection Areas. Install 50'-75' aesthetic "selective-cut" buffers around the road system and administrative buildings. Attempts should be made to remove the majority of the pines and weakened, suppressed, or damaged species within the aesthetic "selective-cut" buffer, due to the likelihood they may become a hazard to roadways, power lines and administrative buildings. Trees targeted for removal should be clearly marked. Vegetation maintenance in forested areas by using tractor-like mowing devices can cause significant injury to trees by damaging tree stems (butts) and roots (compaction), similar to that which is found north of Taylor Avenue. The use of mulch and selective use of herbicide should be considered as an alternative management method.



## Ft. Eustis Forest Compartment Analysis

- Main Post -

Compartment # 28

### Compartment Details

**Location:** Main Post (Supports Training Area: 27)  
**2007 Comp. Acreage:** 61.95  
**Forest/Veg. Type:** Hardwood/Pine  
**Age Range:** 87-107  
**Avg. Growth Rate:** 5yr, 0.32 / 10yr, 0.55  
**T/E Species:** None  
**Disease/Insect Damage:** red heart(2%)  
**Mechanical Damage:** None  
**Invasives:** Japanese honeysuckle(0.3%)

#### Soils Data

**Site Index Range (Soils):** 77-77

**Site Index Range (Curve):** NA

**Average Slope:** 1.45

#### Soil Types:

Bohicket-msc, Craven-Uchee-cx, Emporia-cx, Johnston-cx, Levy-sc, Peawick-sl, Udorthents-l

### Compartment Description

This narrow compartment is located north of Lee Boulevard and south of a brackish tidal wetland. It is composed of ridge-like uplands with large, steeply sloped ravines that protrude out into tidal wetlands. The majority of the upper forest canopy is dominated by large mature hardwood species such as American beech, white oak, and tulip poplar. Midstory species include dogwood, American holly, mockernut hickory, and an occasional small American elm. A recent tree planting project is present outside of the compartment in an open field north of the go-kart tracks, where various hardwood species and southern longleaf pine have been planted.



**Forest Product Volume Summary****Sawtimber Product**

Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	3546.64	8	18	433.2	219714
H. Hardwood	5785.82	31	50	183.69	358432
S. Hardwood	2049.38	10	15	211.13	126959
Total:	11381.85	49	83		705106

**Pulpwood Product**

Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.
Pine	1.3	5	5	80
H. Hardwood	2.03	13	13	126
S. Hardwood	1.36	13	8	84
Total:	4.69	30	25	290

**Vegetative Class Dominance**

<b>Trees</b>	<b>% Canopy Closure:</b>	93.60
	<b>Dominant Species:</b>	American beech, white oak, tulip poplar, loblolly pine
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	481.00
	<b>Dominant Species:</b>	sweetgum, American beech, common persimmon, red maple, flowering dogwood
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	533.00
	<b>Dominant Species:</b>	blue huckleberry, American holly, pawpaw
<b>Groundcover</b>	<b>Overall Cover:</b>	0.30
	<b>Dominant Species:</b>	blue huckleberry, muscadine, pawpaw, white oak, sweetgum

**Management Recommendations**

Conduct annual inspections for insect/disease, hazard trees, and excessive erosion from storm water. This narrow compartment should be considered non-commercial due to its importance as a water quality buffer. The forest vegetation within this compartment is critical in preventing erosion and filtering excessive nutrients/contaminants from nearby roads, parking lots and administrative buildings.



## Ft. Eustis Forest Compartment Analysis

- Main Post -

Compartment # 29

### Compartment Details

**Location:** Main Post (Supports Training Areas: 1, 2, & 3)

**2007 Comp. Acreage:** 183.31

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 36-113

**Avg. Growth Rate:** 5yr, 0.39 / 10yr, 0.76

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** rutting(minimal)

**Invasives:** Japanese honeysuckle(0.4%), Japanese stiltgrass(0.2%), common reed(0.2%)

#### Soils Data

**Site Index Range (Soils):** NA

**Site Index Range (Curve):** 79-107

**Average Slope:** 1.25

**Soil Types:**

Beaches, Bohicket-msc, Craven-Uchee-cx, Emporia-cx, Johnston-cx, Newflat-sl, Peawick-sl, Udorthents-l

### Compartment Description

This compartment contains two noncontiguous areas. The first, being the northernmost forested area on the base. This area consists of a large, mixed hardwood forest type that's found within varying topography ranging from steep ravines to moist flatwoods. Species in the upper canopy include tulip poplar, American beech, sweetgum, and mixed oaks. Prevalent midstory species are American hornbeam, dogwood, American holly, and red maple. Herbaceous layer/ground cover species include paw paw, christmas fern, and rare clubmoss. Pit & mounding from manmade foxholes and windthrown trees are present throughout the compartment and are likely providing ideal habitat for a variety of forest dwelling amphibians. The other (noncontiguous) portion of the compartment, accessed by boat, is found east of TA-27 (Third Port). This area contains a maritime loblolly pine forest that was established in 1970. Frequent tidal over wash is evident by debris found in and near the sampling areas. Loblolly pine and sweetgum are dominant upper canopy species with eastern red cedar found frequently in the midstory. Ground cover is relatively sparse and composed mostly of common reed.



<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
<b>Sawtimber:</b>	<b>Vol/Acre</b>	<b>Trees/Acre</b>	<b>Basal Area/Ac.</b>	<b>Avg. Size</b>	<b>Total Comp. Vol.</b>
Pine	2687.72	18	18	152.83	492686
H. Hardwood	3136.91	13	28	235.79	575028
S. Hardwood	5521.1	23	41	239.2	1012073
Total:	11345.73	54	87		2079786
<b>Pulpwood Product</b>					
<b>Pulpwood:</b>	<b>Cords/Acre</b>	<b>Trees/Acre</b>	<b>Basal Area/Ac.</b>	<b>Total Cords/Comp.</b>	
Pine	3.17	33	15	580	
H. Hardwood	2	29	12	367	
S. Hardwood	3.39	36	18	622	
Total:	8.56	97	45	1569	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	94.40
	<b>Dominant Species:</b>	tulip poplar, American beech, sweetgum, cherrybark oak, loblolly pine
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	433.33
	<b>Dominant Species:</b>	sweetgum, American hornbeam, American beech, flowering dogwood, American holly
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	498.33
	<b>Dominant Species:</b>	pawpaw, American holly, wax myrtle, northern spicebush, muscadine
<b>Groundcover</b>	<b>Overall Cover:</b>	0.26
	<b>Dominant Species:</b>	pawpaw, muscadine, rare clubmoss, partridgeberry, Christmas fern

### Management Recommendations

Conduct annual inspections for insect/disease/invasives/hazard trees and reevaluate growth rates/forest health in 2018. In the event of an insect, disease, or invasive species outbreak that might jeopardize forest health, consider silvicultural practices, such as selective harvesting, that would substantially limit the amount of damage and minimally compromise the existing vegetation screen. Hazard trees should be "felled" (carefully so as not to damage adjacent trees) and either chipped/shredded or left on site to decompose. Currently, the forest appears healthy and is providing ideal habitat for a variety of wildlife. The dense upper canopy along the interface between the tidal creek and fresh water streams provides cover for neotropical migratory songbirds, perching opportunities for wading birds (herons and egrets), and also renders foraging opportunities for an array of small mammals and resident birds. Historically, the compartment area has been used for troop training, which was apparent by the considerable amount of low threshold ground disturbances, primarily pit & mound (fox holes), which could possibly be used as breeding pools for the threatened salamander, Maybee's salamander (*Ambystoma mabeei*). Maybee's salamander has been found in the Newport News area (Grafton area sinkhole pond complex) and is listed as a threatened salamander in Virginia. It is threatened by habitat fragmentation, aquatic and terrestrial habitat loss, road mortality, and alteration of hydrology mostly due to urbanization. Based on the Facility Master Plan, a portion of this compartment may be placed in a more intensive land use (TACT Equip Maint. Fac.). Pursuant to the environmental assessment associated with this potential project, a comprehensive evaluation of the status/population of the Maybee's salamander should occur. The compartment also serves as a valuable vegetation screen (buffer) abutting undeveloped private land that could possibly minimize potential conflict between military and private land uses.



## Ft. Eustis Forest Compartment Analysis

- Main Post -

Compartment # 30

### Compartment Details

**Location:** Main Post (Does not support any training areas)

**2007 Comp. Acreage:** 95.77

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 46-119

**Avg. Growth Rate:** 5yr, 0.24 / 10yr, 0.5

**T/E Species:** None

**Disease/Insect Damage:** red heart(3%)

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(24%), Japanese honeysuckle(2%)

#### Soils Data

**Site Index Range (Soils):** 75-88

**Site Index Range (Curve):** 78-78

**Average Slope:** 1.25

#### Soil Types:

Altavista-fsl, Augusta-fsl, Bohicket-msc, Craven-Uchee-cx, Dragston-fsl, Emporia-cx, Emporia-fsl, Johnston-cx, Slagle-fsl, Udorthents-Dumps-cx, Udorthents-l

### Compartment Description

The majority of the forest within this sloping, relatively narrow, fragmented compartment is a mature hardwood/pine forest type, although sampling immediately north of Wilson Avenue found a heavily stocked pine/hardwood forest type (est. 1961). Signs of disturbances from historic training are present throughout the compartment and are found in or near 50% of the sample areas. Large tulip poplar, sweetgum, cherrybark oak, and loblolly pine make up the majority of the upper canopy species. Dense, diverse herbaceous layers are found in uplands and mesic flatwoods throughout the compartment. The forest within this compartment is enhancing water quality by trapping sediment and nutrients from nearby developed areas (non-point source pollution) and is additionally providing valuable habitat for migrating neotropical songbirds and resident species that are attracted to the riparian habitat adjoining the Warwick River.



<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	8154.31	27	42	303.04	780938
H. Hardwood	2402.66	6	17	391.74	230103
S. Hardwood	4922.18	16	35	307.1	471398
Total:	15479.15	49	49		1482439
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	1.05	14	5	100	
H. Hardwood	0.83	15	5	79	
S. Hardwood	4.08	33	23	390	
Total:	5.95	63	33	570	

**Vegetative Class Dominance**

<b>Trees</b>	<b>% Canopy Closure:</b>	96.20
	<b>Dominant Species:</b>	tulip poplar, sweetgum, cherrybark oak, loblolly pine
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	346.67
	<b>Dominant Species:</b>	yellow poplar, sweetgum, American hornbeam, flowering dogwood, black cherry
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	1,022.67
	<b>Dominant Species:</b>	pawpaw, eastern poison ivy, northern spicebush, Japanese honeysuckle, roundleaf greenbrier
<b>Groundcover</b>	<b>Overall Cover:</b>	0.53
	<b>Dominant Species:</b>	Japanese stilt grass, yellow poplar, pawpaw, Christmas fern, eastern poison ivy

**Management Recommendations**

Conduct annual inspections for insect/disease, hazard trees, and excessive erosion from storm water. The narrow forested area on the north side of Wilson Avenue should be considered non-commercial due to its importance as a vegetation buffer. The forest in this area abuts a large drain that flows underneath Wilson Avenue and eventually into the Warwick River. The forest vegetation is critical in preventing erosion and filtering nutrients/contaminants from nearby roads, parking lots, administrative buildings and base housing. The forested area on the south side of Wilson Avenue provides the same function, however, it is considerably larger. Based on the Facility Master Plan, some of this area may be placed in a more intensive land use (executive homes). Once development plans are finalized, a detailed vegetation management plan should be devised that incorporates recommended forest practices within or in close proximity to the proposed housing area. The current Facility Master Plan indicates proposed construction in the vicinity of an over mature pine/hardwood forest type. Once plans are finalized, a selective harvest is recommended. The selective harvest would target trees within the construction footprint, hazard/over mature trees in close proximity, and accessible, loblolly pine, tulip poplar, red maple, and sweetgum. The use of logging equipment and offsite removal of vegetation could significantly aid in site clearing and possibly produce some revenue. Install 50'-75' riparian "no-cut" buffers in Chesapeake Bay Protection Act Resource Protection Areas. Long-lived specimen trees such as white oaks should be protected during new construction where practical. The remaining forest within the compartment should be retained for aesthetics and environmental protection (water quality).



## **Main Post – Management Considerations:**

### **Training**

Training on the Main Post is conducted on 11 sites. The perimeter of these sites are depicted on Figure: 2.2A, titled Fort Eustis, VA ~ Main Post: Training Areas. A description of the types of training within each Training area can be found in Table 2.2A – titled Fort Eustis Training Areas.. Training areas 1 through 3 are used for Tactical Bivouac and LandNav purposes. These areas are all located within vegetation compartment 29. This forest compartment contains a large amount of yellow poplar along moist, but well drained ravines and moist upland flats. Yellow poplar requires moist well aerated soils and is adversely impacted by soil compaction. As aeration is diminished, gradual tree top die-back occurs. Yellow poplar wood is very brittle and during periods of high winds and/or storm conditions, the risks of personal injury and/or damage to equipment from falling branches and limbs increases. Any Bivouac sites should avoid areas with high concentrations of Yellow Poplar. Discussion with the ITAM Coordinator, Tess Martin-Bashore indicated a request had been made to remove potentially hazardous trees along the boundary between TA-7 and the EST Building. In order to most effectively accommodate this risk while protecting the value of the riparian forest, the trees to be removed to insure only those trees classified as hazardous are removed. If too many trees are removed, especially on poorly drained land or adjacent to the shoreline of the pond, the risk of additional windthrow of the residual trees could greatly increase.

In addition Ms.Martin-Bashore indicated that a general goal of ITAM is to maintain a basal area of 70 sq.ft./acre of forest within Bivouac sites to insure sufficient spacing between trees is present to support training requirements. In order to work towards this goal prior to any silvicultural activity, the perimeter of several bivouac sites should be identified and reserve trees should be clearly designated and performance standards established whereby during the selective harvest special attention is devoted to the residual reserve trees to insure the tops and main stems of these trees are protected during the harvest. In addition, reserve trees should represent long-lived, healthy and durable species including mixed oaks, hickory rather than those trees that would not withstand training impacts or have unique character that may interfere with the intended training use such as the Yellow poplar, Sweetgum and Red maple.

Training areas 8 and 9 are located within vegetation compartment 26. This compartment is extremely dissected by natural drainage systems leading to Eustis Lake. The vegetation within this compartment supports a diversity of uses from training to passive outdoor recreation while also providing invaluable water quality protection along the steep slopes leading to Eustis Lake. All of the forest along the shoreline, up to the crest of the slope and a 50' upland corridor should be reserved and protected from disturbance. Protecting the leaf litter on the forest floor by restricting access will protect water quality by allowing filtration of non-point source pollution from surface water flows discharging into Eustis Lake.

All of the training activities on the Main Post, excepting the skeet and trap range, have not and do not involve live-firing activities, little metal contamination of the trees is likely and the limitations for access are not as restrictive as found on Mulberry Island. The ability to actively manage this forest is generally less complicated and easier to administer than applying similar management tools on Mulberry Island.

### **Cultural Resources**

A Phase 1 Archeological Survey for Fort Eustis was completed by MAAR Associates, Inc. in April of 1989. Thirty-eight archeological resources were indentified within the Main Post Area. Assuming riparian areas are protected, standard Best Management Practices (BMP's) are followed, and the majority of the upland soils are well drained and will support timber harvesting equipment without subsurface disturbance impacts of forest management practices should have little impact on sub surface cultural resources. However, prior to any forest management practices, particularly timber harvesting, the perimeter of all above-ground cultural resources, such as earthworks or foundations of home sites should be clearly designated and protected from all disturbance including equipment activity.

## **6.52 - Mulberry Island (North)**

The Mulberry Island (North) vegetational compartments of Fort Eustis are shown on Figure: 5.0B, titled Ft. Eustis, VA ~ Mulberry Island (North): Forest Vegetation compartments. This portion of Mulberry Island supports 18 vegetation compartments, labeled 10 through 25, 31 and 33 through 35. The dominant land cover is forest, tidal wetlands and managed grassland associated with the golf course and Felker Airfield. The majority of the land in this portion of the Post is located on land with development constraints involving low-lying land with seasonally high surface water tables and tidal wetlands. However, an improved road, Mulberry Island Road, and a system of secondary unimproved roads and trails provides seasonal access to most of the vegetation compartments within this portion of the post. A rail bed is also present and is supported by an solid foundation of stone and fill. Improvements to this road bed would likely provide the best access/egress for the removal of forest products. Along this rail bed, relatively large areas where brick, concrete rubble and other construction debris have historically been deposited. During the planning of any forest harvesting activities these areas would support forest product loading areas and mitigate the risk of cultural resource impacts. The dominant Army use of this portion of the Post is associated with the operations of Felker Airfield, troop tactical training and outdoor recreational activities.

In oder to most effectively support the Airfield and training activities within this portion of the post, vegetation management activities should include the maintenance of vegetation surrounding Felker field to maintain and/or enhance safe aircraft approach zones clear of vegetation obstructions. In addition vegetation or land cover management is necessary to maintain and enhance training activities, protect water quality and wildlife habitat; and maint forest health. The production of forest products can occur with management limitations on most of the compartments within this portion of the post.

### **Mulberry Island (North)Forest Compartment Descriptions and Management Recomendations: Compartments 10-25, 31, & 33-35**



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 10

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 23)

**2007 Comp. Acreage:** 53.49

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 25-84

**Avg. Growth Rate:** 5yr, 0.68 / 10yr, 0.95

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(72%), Japanese honeysuckle(32%)

#### **Soils Data**

**Site Index Range (Soils):** 88-88

**Site Index Range (Curve):** 84-100

**Average Slope:** 1.20

#### **Soil Types:**

Altavista-fsl, Augusta-fsl, Bohicket-msc, Chickahominy-sl, Craven-Uchee-cx, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

Forest Compartment 10 lies north of Range 3 and 4, east of Range 1(Fort Eustis/Newport News Police Department Pistol & Shotgun Range). The forest within this compartment is fragmented by railroad tracks and a large wetland. Forest types are primarily mixed hardwood/pine with establishment dates ranging from 1923 to 1982. A dense herbaceous layer consisting of a mosaic of wetland and upland vegetation, most likely attributed to historical disturbances from manmade ditches, training, and railroad construction, is apparent throughout 75% of the sample areas. The majority of large pine saw timber within this compartment can be found north of Range 3. Tree heights in this area are approximately 110' with an average diameter at breast height (DBH) of 22".



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	4211.17	17	25	243.64	225256
H. Hardwood	0	0	0	0	0
S. Hardwood	703.21	4	5	170.3	37614
Total:	4914.38	21	30		262870
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.96	12	5	51	
H. Hardwood	0	0	0	0	
S. Hardwood	7.96	83	40	426	
Total:	8.92	95	45	477	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	93.24
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	546.00
	<b>Dominant Species:</b>	common persimmon, sweetgum, northern red oak, loblolly pine, black oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	923.00
	<b>Dominant Species:</b>	Japanese honeysuckle, devil's walkingstick, American beautyberry, muscadine, eastern redcedar
<b>Groundcover</b>	<b>Overall Cover:</b>	0.87
	<b>Dominant Species:</b>	Japanese stilt grass, Japanese honeysuckle, common ladyfern, Virginia creeper, Christmas fern

### Management Recommendations

Conduct annual inspections for insect/disease and reevaluate in 2018. Sampling within the compartment found a pine/hardwood plantation with establishment dates from 1967-1982 as well as a mature, pine hardwood stand established between 1923-1927. It is likely that in 2018, the younger component of pine/hardwood within this compartment will become commercially valuable as saw timber and could be managed with the mature pine/hardwood.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 11

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 24 & Pistol Range impact area)

**2007 Comp. Acreage:** 78.21

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 13-104

**Avg. Growth Rate:** 5yr, 0.69 / 10yr, 1.33

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(43%), common reed(6%), Japanese honeysuckle(1%), autumn olive(0.2%)

#### **Soils Data**

**Site Index Range (Soils):** 88-90

**Site Index Range (Curve):** 74-98

**Average Slope:** 0.80

#### **Soil Types:**

Altavista-fsl, Augusta-fsl, Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

Forest Compartment 11 (a portion of Training Area 24) is located west of Range 1 (Fort Eustis/Newport News Police Department Pistol & Shotgun Range) and is bounded by tidal wetlands on the north and west, the range previously mentioned on the east, and railroad tracks on the south. The majority of the compartment is partially seasonally flooded and contains a variably stocked pine/hardwood forest type (established 1995) consisting of loblolly pine, sweetgum, red maple, and mixed oak species with large hardwood mast species which were protected (reserved) from a prior timber harvest. The remaining forest type consists of large, mature pine/hardwood (est. 1902-1954) found within buffer strips that were left adjacent to tidal and non-tidal wetlands, the rail road, and Range 1. Sporadic windthrow is common within the buffers, as well as large, loblolly pine snags which are likely providing nesting cavities for woodpecker species and small mammals.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	5561.7	23	30	246.03	434981
H. Hardwood	764.33	3	6	233.57	59778
S. Hardwood	255.57	2	2	136.6	19988
Total:	6581.6	28	38		514747
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.64	16	4	50	
H. Hardwood	0.37	4	2	29	
S. Hardwood	4.96	62	26	388	
Total:	5.97	81	32	467	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	77.46
	<b>Dominant Species:</b>	loblolly pine, sweetgum, red maple
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	447.20
	<b>Dominant Species:</b>	sweetgum, loblolly pine, southern red oak, cherrybark oak, red maple
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	166.40
	<b>Dominant Species:</b>	wax myrtle, American beautyberry, roundleaf greenbrier, devil's walkingstick, muscadine
<b>Groundcover</b>	<b>Overall Cover:</b>	0.67
	<b>Dominant Species:</b>	Japanese stilt grass, slender woodoats, common reed, sawtooth blackberry, Japanese honeysuckle

## Management Recommendations

Conduct annual inspections for insect/disease and reevaluate in 2012 for a commercial thinning/partial harvest. The stocking within the core of this compartment is variable and an assessment will need to be made in 2012 to evaluate crown closure and crown class to determine if a commercial thinning is practical. If a commercial thinning becomes practical, also consider a selective harvest within the buffers that were left previously. The buffers are performing functions such as protecting water quality and aesthetic/safety screens as well as wildlife corridors, however a large percentage of the stocking is over mature loblolly pine. It would be necessary to carefully designate trees for removal so that the original objective(s) of the buffer(s) are minimally compromised and that Chesapeake Bay Resource Protection Area guidelines are followed.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 12

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 24)

**2007 Comp. Acreage:** 12.04

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 14-16

**Avg. Growth Rate:** 5yr, 0.87 / 10yr, 1.75

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** rutting(moderate)

**Invasives:** Japanese stiltgrass(82%), Japanese honeysuckle(7%), common reed(7%)

#### **Soils Data**

**Site Index Range (Soils):** 85-90

**Site Index Range (Curve):** 85-100

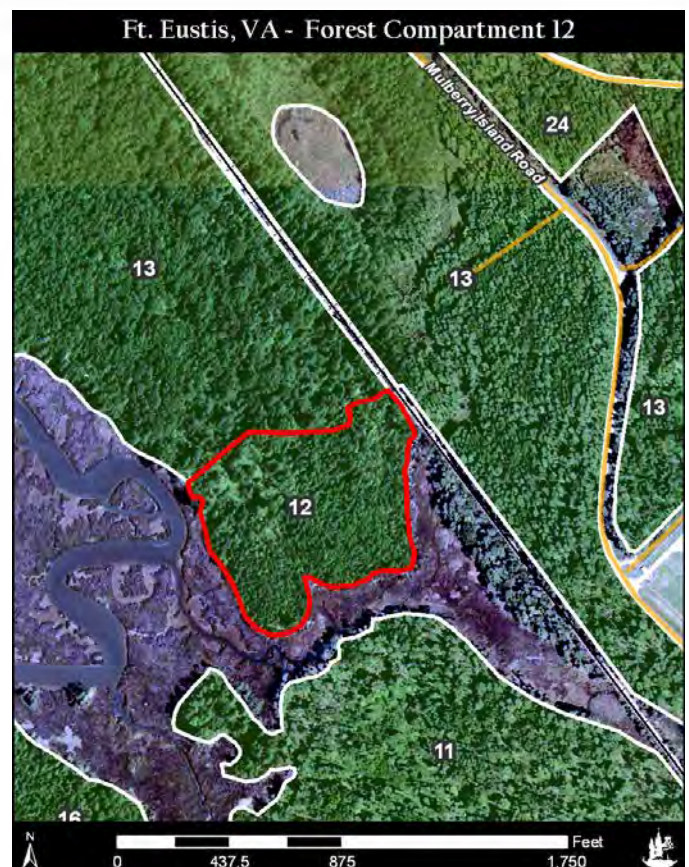
**Average Slope:** 0.67

**Soil Types:**

Bohicket-msc, Newflat-sl, State-s, Tetotum-sl

### **Compartment Description**

This small, variably stocked, pine/hardwood compartment is located south of compartment 13. It abuts the railroad west of Mulberry Road and is bounded by tidal and non-tidal wetlands on its remaining eastern, southern, and western borders. The compartment appears to have been clearcut with the exception of a few widely scattered black cherry, black locust, and sweetgum trees. Loblolly pine and sweetgum are the dominant upper canopy species (mostly pulpwood-sized) and are growing to heights of approximately 40'. Japanese stilt grass is abundant in the compartment, and present in all sampling points. Common reed is also present, however, only within two sample points that abut moderately rutted wetlands.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	0	0	0	0	0
H. Hardwood	360.99	2	3	191.37	4346
S. Hardwood	0	0	0	0	0
Total:	360.99	2	3		4346
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	6.51	117	37	78	
H. Hardwood	0.43	2	3	5	
S. Hardwood	2.41	37	13	29	
Total:	9.35	156	53	113	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	94.61
	<b>Dominant Species:</b>	loblolly pine, sweetgum
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	953.33
	<b>Dominant Species:</b>	sweetgum, common persimmon, loblolly pine, black locust, cherrybark oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	190.67
	<b>Dominant Species:</b>	American beautyberry
<b>Groundcover</b>	<b>Overall Cover:</b>	0.92
	<b>Dominant Species:</b>	Japanese stilt grass, ground ivy, Japanese honeysuckle, Pennsylvania smartweed, common reed

## Management Recommendations

Conduct annual inspections for insect/disease and reevaluate in 2012 for a commercial thinning. This small compartment would be impractical to thin unless timed in conjunction with compartment 11.



## *Ft. Eustis Forest Compartment Analysis*

### **- Mulberry Island (North) -**

### **Compartment # 13**

#### **Compartment Details**

**Location:** Mulberry Island (Supports Training Areas: 22, 23, & 24)

**2007 Comp. Acreage:** 177.13

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 21-112

**Avg. Growth Rate:** 5yr, 0.5 / 10yr, 1.1

**T/E Species:** None

**Disease/Insect Damage:** red heart(1%)

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(49%), Japanese honeysuckle(10%), shrubby bushclover(0.4%), English ivy(0.1%)

#### **Soils Data**

**Site Index Range (Soils):** 80-95

**Site Index Range (Curve):** 77-118

**Average Slope:** 0.48

#### **Soil Types:**

Augusta-fsl, Bohicket-msc, Bojac-sl, Chickahominy-sl, Craven-Uchee-cx, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

#### **Compartment Description**

Forest Compartment 13 is likely one of the most variable compartments on Fort Eustis. An array of forest types and establishment dates along with varying hydrology are present throughout. The northern portion of the compartment appears to be used extensively for troop training, and consists of a commercially thinned, upland pine forest type established in 1964. Dense shrubby lespedeza is frequently found dominating the herbaceous/shrub layers. A selectively cut hardwood/pine stand (primarily sweetgum) that regenerated in 1984-1986 is found west of the railroad tracks with Japanese stilt grass prevalent in the herbaceous layer. The central portion of the compartment contains a mixed hardwood forest type composed mostly of sweetgum and a few widely scattered hardwood mast species with establishment dates that range from 1914-1971. This area has extensive ditching which has substantially changed hydrology as evidenced by a mosaic of hydrophytic and upland species. The southern portion of the compartment is composed of a variably aged (established 1942-1961), adequately stocked, hardwood/pine forest type which is found on slightly drier soils. Merchantable pine saw timber is found in scattered pockets throughout the compartment, however, the majority can be found on the east side of the railroad tracks.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	6872.92	34	41	201.22	1217401
H. Hardwood	995.86	5	10	193.99	176396
S. Hardwood	3384.09	19	28	177.39	599424
Total:	11252.88	58	79		1993222
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.63	5	3	111	
H. Hardwood	1.76	13	10	311	
S. Hardwood	8.35	103	43	1478	
Total:	10.73	121	56	1900	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	94.64
	<b>Dominant Species:</b>	sweetgum, loblolly pine, black cherry
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	408.00
	<b>Dominant Species:</b>	sweetgum, cherrybark oak, flowering dogwood, loblolly pine, black cherry
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	392.00
	<b>Dominant Species:</b>	wax myrtle, Japanese honeysuckle, muscadine, eastern poison ivy, saw greenbrier
<b>Groundcover</b>	<b>Overall Cover:</b>	0.79
	<b>Dominant Species:</b>	Japanese stilt grass, Japanese honeysuckle, slender woodoats, Virginia creeper, Christmas fern

### Management Recommendations

Conduct annual inspections for insect/disease and consider a selective harvest in 2012 for the southern portion of this compartment. The southern portion contains pockets of large, merchantable pine saw timber along with some smaller mixed oaks and sweetgum and red maple. Consider placing 50'-75' aesthetic selective-cut buffers along Mulberry Road and the ammunition storage area. Trees targeted for removal should include the majority of the loblolly pine and suppressed, weakened, or damaged tree species that may become a hazard to roadways, powerlines, or buildings. Install 50'-75' riparian "no-cut" buffers along Chesapeake Bay Preservation Act Resource Protection Areas.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 14

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 23)

**2007 Comp. Acreage:** 35.35

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 18-21

**Avg. Growth Rate:** 5yr, 0.83 / 10yr, 2.2

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** rutting(minimal)

**Invasives:** Japanese stiltgrass(85%), Japanese honeysuckle(18%)

#### **Soils Data**

**Site Index Range (Soils):** 85-88

**Site Index Range (Curve):** 85-110

**Average Slope:** 1.25

**Soil Types:**

Augusta-fsl, Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

Forest Compartment 14 is found on gently sloping soils and consists of an adequate to heavily stocked pine/hardwood forest type that has regenerated from a clearcut that occurred in 1989-1990. Loblolly pine and sweetgum are dominant in the upper canopy growing to heights of 60'. Vegetation density found in the herbaceous layer is variable, and extremely dense in areas with an open upper canopy.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	677.77	14	8	49.29	23959
H. Hardwood	0	0	0	0	0
S. Hardwood	0	0	0	0	0
Total:	677.77	14	8		23959
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	5.7	87	28	202	
H. Hardwood	0	0	0	0	
S. Hardwood	6.97	151	40	246	
Total:	12.67	239	68	448	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	95.00
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	1,495.00
	<b>Dominant Species:</b>	sweetgum, northern red oak, loblolly pine, common persimmon
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	455.00
	<b>Dominant Species:</b>	devil's walkingstick, wax myrtle, American beautyberry, muscadine, Japanese honeysuckle
<b>Groundcover</b>	<b>Overall Cover:</b>	0.72
	<b>Dominant Species:</b>	Japanese stilt grass, Japanese honeysuckle, Jack in the pulpit, sweetgum, smallspike false nettle

### Management Recommendations

Conduct annual inspections for insect/disease and consider a commercial thinning within 2008-2013. Extensive rutting was noted during data collecting, most likely from previous harvesting operations. Consider timing the thinning when seasonal water tables are low to prevent further rutting and soil compaction. Protect water quality by limiting stream/ditch crossings and the installation of 50'-75' "no-cut" riparian buffers along Chesapeake Bay Preservation Act Resource Protection Areas.



## Ft. Eustis Forest Compartment Analysis

- Mulberry Island (North) -

Compartment # 15

### Compartment Details

**Location:** Mulberry Island (Supports Training Areas: 23 & 26)

**2007 Comp. Acreage:** 143.7

**Forest/Veg. Type:** Pine

**Age Range:** 31-105

**Avg. Growth Rate:** 5yr, 0.55 / 10yr, 1.13

**T/E Species:** None

**Disease/Insect Damage:** red heart(1%), southern pine beetle(1%)

**Mechanical Damage:** storm damage(4 trees)

**Invasives:** Japanese stiltgrass(16%), Japanese honeysuckle(6%), autumn olive(0.1%)

#### Soils Data

**Site Index Range (Soils):** 86-90

**Site Index Range (Curve):** 61-109

**Average Slope:** 0.90

**Soil Types:**

Augusta-fsl, Bohicket-msc, Chickahominy-sl, Levy-sc, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### Compartment Description

Forest Compartment 15 is fragmented by tidal wetlands into three noncontiguous areas. The northernmost area is an island, completely surrounded by tidal wetlands. The northern portion of this island contains an adequately stocked pine/hardwood forest type established in 1962. The quality of pine is poor to fair with tree heights of 57'. The hardwood component consists of persimmon, black cherry, and sweetgum. The southern portion of the island consists primarily of an adequate to heavily stocked pine/hardwood forest type which was established in 1976. The central portion of this compartment is variably aged and variably stocked as well. The northern portion of this area consists of an adequate to heavily stocked pine/hardwood forest type. Upper canopy species are predominantly loblolly pine, sweetgum, and black cherry (established 1971-1974). A mature forest type consisting of large pine/hardwood saw timber (established 1935-1943) is also present in an area abutting an open field. This area appears to have been used historically for deer hunting as evidenced by several deteriorating tree stands that are nailed/bolted to trees. The southern portion of this compartment consists of a mature, large pine/hardwood forest type with tree heights in excess of 100'. The majority of the loblolly pine is large saw timber-sized (fair to good quality), however, some of the loblolly is declining. Core samplings indicate very slow growth rates and some visual indicators of red heart fungus are present. The hardwood component (also saw timber-sized) consists of a variety of oaks (primarily white oak) and sweetgum.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	9996.72	47	60	210.89	1436529
H. Hardwood	1262.14	6	12	220.02	181369
S. Hardwood	1057.04	7	10	144.8	151897
Total:	12315.9	60	82		1769795
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	1.61	19	8	231	
H. Hardwood	1.07	15	6	154	
S. Hardwood	2.08	23	11	299	
Total:	4.76	57	25	684	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	91.08
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	332.80
	<b>Dominant Species:</b>	common persimmon, sweetgum, blackgum, loblolly pine, flowering dogwood
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	904.80
	<b>Dominant Species:</b>	wax myrtle, common sweetleaf, Japanese honeysuckle, American beautyberry, muscadine
<b>Groundcover</b>	<b>Overall Cover:</b>	0.27
	<b>Dominant Species:</b>	Japanese stilt grass, slender woodoats, Christmas fern, whitegrass, New York fern

### Management Recommendations

Conduct annual inspections for insect/disease and consider a selective harvest in 2008-2012 within the central and southern portions of this compartment. The central portion contains a historic brickyard where restrictions protecting the integrity of the site exist. Existing parameters which limit/prohibit harvesting near this archaeological site must be considered in the harvest design and clearly stated in a timber sale contract. Implement 50'-75' riparian "no-cut" buffers along the compartment's interface with the Warwick River and other Chesapeake Bay Preservation Act Resource Protection Areas that may be applicable. The northern portion of this compartment is younger and growth rates are still fair. Consider managing this compartment area with the northern portion of compartment 24, which is similar in age and characteristics.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 16

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 24 & Pistol Range impact area)

**2007 Comp. Acreage:** 81.78

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 31-83

**Avg. Growth Rate:** 5yr, 0.24 / 10yr, 0.55

**T/E Species:** None

**Disease/Insect Damage:** red heart(5%)

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(42%), tree-of-heaven(12%), Japanese honeysuckle(3%)

#### **Soils Data**

**Site Index Range (Soils):** 86-86

**Soil Types:**

**Site Index Range (Curve):** 86-112

Altavista-fsl, Augusta-fsl, Bohicket-msc, Craven-Uchee-cx, State-s, Tetotum-sl

**Average Slope:** 0.68

### **Compartment Description**

Access to this compartment, which lies west of the Fort Eustis/Newport News Police Department Pistol & Shotgun Range (Range 1), involves walking along abandoned, deteriorating railroad tracks that cross a tidal drain/wetland. Ectoparasites (mainly ticks) are abundant throughout, most likely attributed to the deer population which use this isolated compartment for bedding. A variety of forest types and habitats are present within the forest compartment. The majority of the compartment consists of an upland, over mature, maritime pine/hardwood forest type established 1924-1930. Large pine snags, as well as several large windthrown trees are common. The shrub layer is dense with wax myrtle and beautyberry, however, a few non-native invasive Chinaberry saplings are also present. Chinaberry is a deciduous tree/shrub that can grow to 50' and out compete native vegetation. The compartment also contains an upland, heavily stocked, hardwood/pine forest type established in 1976, which is found near the northeastern edge of the compartment. Dominant upper canopy species are primarily pulpwood-sized sweetgum, loblolly pine, black cherry, and cherrybark oak.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	6344.74	21	36	308.95	518873
H. Hardwood	704.36	5	8	139.95	57603
S. Hardwood	2411.32	10	18	247.78	197198
Total:	9460.42	35	62		773673
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.53	4	2	43	
H. Hardwood	1.05	12	6	86	
S. Hardwood	7.45	87	42	609	
Total:	9.02	103	50	738	

## Vegetative Class Dominance

<i>Trees</i>	<i>% Canopy Closure:</i>	92.86
	<i>Dominant Species:</i>	loblolly pine, sweetgum, cherrybark oak
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	748.80
	<i>Dominant Species:</i>	tree of heaven, sweetgum, blackgum, black cherry
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	1,424.80
	<i>Dominant Species:</i>	Chinaberrytree, American beautyberry, saw greenbrier, wax myrtle, muscadine
<i>Groundcover</i>	<i>Overall Cover:</i>	0.62
	<i>Dominant Species:</i>	Japanese stilt grass, tree of heaven, slender woodoats, American beautyberry, smallspike false nettle

## Management Recommendations

Due to access issues, this compartment is considered non-manageable.





## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	3868.58	22	27	176.6	410302
H. Hardwood	988.35	4	10	268.82	104825
S. Hardwood	3179.51	13	24	240.42	337218
Total:	8036.44	39	61		852345
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	2.82	49	16	299	
H. Hardwood	1.02	12	6	108	
S. Hardwood	5.05	80	29	535	
Total:	8.88	141	50	942	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	93.53
	<b>Dominant Species:</b>	sweetgum, loblolly pine, tulip poplar, swamp chestnut oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	475.43
	<b>Dominant Species:</b>	sweetgum, flowering dogwood, cherrybark oak, sourwood
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	475.43
	<b>Dominant Species:</b>	American beautyberry, muscadine, Japanese honeysuckle, wax myrtle, flowering dogwood
<b>Groundcover</b>	<b>Overall Cover:</b>	0.61
	<b>Dominant Species:</b>	Japanese stilt grass, Christmas fern, New York fern, broad beechfern, Japanese honeysuckle

### Management Recommendations

Conduct annual inspections for insect/disease and consider a commercial thinning/selective harvest within 2008-2013. The compartment consists primarily of a young, adequate to heavily stocked hardwood/pine forest that could be greatly enhanced by a commercial thinning. This silvicultural practice, although typically performed earlier in the growing stages, would enhance forest health and wildlife foraging opportunities. Consider a selective harvest within the pocketed, more mature areas in conjunction with the thinning operation. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 18

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 28)

**2007 Comp. Acreage:** 80.15

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 19-74

**Avg. Growth Rate:** 5yr, 0.61 / 10yr, 1.21

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** rutting(moderate)

**Invasives:** Japanese stiltgrass(16%), Japanese honeysuckle(2%), autumn olive(1%)

#### **Soils Data**

**Site Index Range (Soils):** 86-95

**Site Index Range (Curve):** 59-101

**Average Slope:** 1.15

**Soil Types:**

Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

This compartment is composed of four islands. The center island, which is the largest and the only area that is manageable (with limitations), is connected to Forest Compartment 19 by a road that crosses over a tidal drain. It appears that this road may have once been interconnected with abandoned railroad tracks found in Forest Compartment 17, linking the three compartments. The northern portion of the island consists primarily of an upland, hardwood/pine forest type (established in 1942). Ground cover is relatively sparse, as is the shrub/sapling layer. The middle and southern tip of the center island consist of a variable stocked mixture of loblolly pine, sweetgum, and an occasional black oak with establishment dates ranging from 1968 to 1984. Wax myrtle and beautyberry are common in the shrub layer with Japanese stilt grass often found as the dominant ground cover.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	2951.1	28	24	104.49	236531
H. Hardwood	1072.02	6	12	176.82	85923
S. Hardwood	631.99	4	6	142.49	50654
Total:	4655.11	39	42		373107
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	4.07	75	22	326	
H. Hardwood	3.22	31	20	258	
S. Hardwood	5.5	71	30	441	
Total:	12.79	176	72	1025	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	93.73
	<b>Dominant Species:</b>	sweetgum, loblolly pine, tulip poplar, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	1,005.33
	<b>Dominant Species:</b>	loblolly pine, sweetgum, black oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	944.67
	<b>Dominant Species:</b>	roundleaf greenbrier, wax myrtle, American beautyberry, Japanese honeysuckle, Virginia creeper
<b>Groundcover</b>	<b>Overall Cover:</b>	0.34
	<b>Dominant Species:</b>	Japanese stilt grass, yellow crownbeard, slender woodoats, roundleaf greenbrier, black cherry

## Management Recommendations

Conduct annual inspections for insect/disease and reevaluate growth rates in 2018. The central island (which is the only island accessible for management considerations) is variably aged and stocked and appears healthy.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 19

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 28)

**2007 Comp. Acreage:** 75.45

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 49-71

**Avg. Growth Rate:** 5yr, 0.3 / 10yr, 0.62

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(24%), Japanese honeysuckle(12%), tree-of-heaven(2%), beefsteak plant(0.4%), Chinese privet(0.2%)

#### **Soils Data**

**Site Index Range (Soils):** 86-88

**Soil Types:**

**Site Index Range (Curve):** 85-108

Bohicket-msc, Levy-sc, State-s, Tetotum-sl, Udorthents-l

**Average Slope:** 0.60

### **Compartment Description**

The majority of the forest within this compartment is mature and composed of a pine/hardwood forest type. The pine is variably stocked, good quality, medium to large saw timber. Hardwood species in the upper canopy consist primarily of cherrybark oak, black walnut, black gum, sweetgum, black cherry, persimmon, and black locust. Significant storm damage is evident near the southern tip in an area that appears to have been previously infected with southern bark beetle. This area is blanketed with coastal sweet pepperbush, beautyberry, and muscadine, with black locust and ailanthus dominating the sapling layer. An upland hardwood/pine forest type established in 1951 is also present within this compartment, with Japanese stilt grass dominant in the herbaceous layer. Extensive earthworks are frequently encountered, which are most likely associated with Fort Crafford, an historic site listed on the National Register of Historic Places. Deteriorating tree stands with spikes driven into trees are also common, an indication that the compartment has been historically used for deer hunting.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	5633.67	13	32	420.29	425060
H. Hardwood	396.53	1	4	398.62	29918
S. Hardwood	1783.1	9	16	204.24	134535
Total:	7813.3	23	52		589514
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0	0	0	0	
H. Hardwood	0.6	3	4	45	
S. Hardwood	1.64	28	10	124	
Total:	2.24	31	14	169	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	86.33
	<b>Dominant Species:</b>	loblolly pine, cherrybark oak, sweetgum, blackgum
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	145.60
	<b>Dominant Species:</b>	sweetgum, common persimmon,
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	956.80
	<b>Dominant Species:</b>	wax myrtle, muscadine, roundleaf greenbrier, American beautyberry, devil's walkingstick
<b>Groundcover</b>	<b>Overall Cover:</b>	0.58
	<b>Dominant Species:</b>	Japanese stilt grass, common selfheal, Japanese honeysuckle, muscadine, whitegrass

### Management Recommendations

Conduct annual inspections for insect/disease and consider a selective harvest in 2018. The mature loblolly pine is likely to experience a net reduction in volume from declining growth rates within the next 5 – 10 years. Reduced vigor will also likely increase the risk of insect/disease. Additionally, install 50'-75' riparian "no-cut" buffers in Chesapeake Bay Preservation Act Resource Protection Areas. Certain restrictions protecting the integrity of the Fort Crafford exist and must be further studied prior to harvest design. Existing parameters which limit/prohibit harvesting near this archaeological site must be followed in the harvest design and clearly defined in a timber sale contract.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 20

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Areas: 20, 21, & 28)

**2007 Comp. Acreage:** 69.48

**Forest/Veg. Type:** Pine

**Age Range:** 35-62

**Avg. Growth Rate:** 5yr, 0.46 / 10yr, 0.94

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** butt damage(5%), rutting(minimal)

**Invasives:** Japanese stiltgrass(26%), tree-of-heaven(5%), Japanese honeysuckle(3%)

#### **Soils Data**

**Site Index Range (Soils):** 88-88

**Site Index Range (Curve):** 74-103

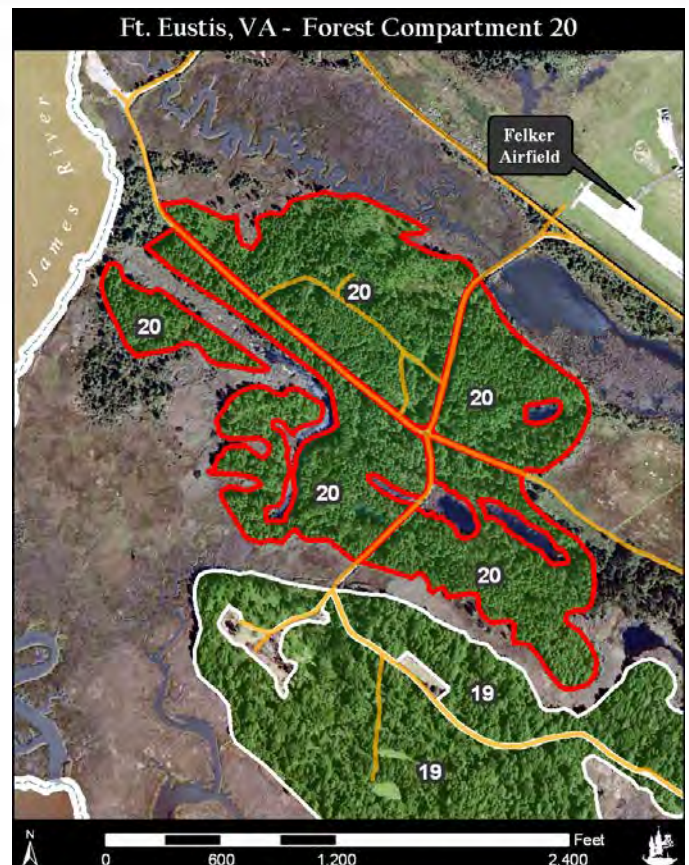
**Average Slope:** 0.30

**Soil Types:**

Altavista-fsl, Bohicket-msc, Chickahominy-sl, Levy-sc, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

This compartment is dissected by drainage systems and roads. The upland areas are very narrow and relatively low in elevations and are composed of a pine/hardwood forest type with establishment dates that range from 1945 to 1962. Upper canopy species consist of loblolly pine (80' tall), with a mixture of cherrybark oak, sweetgum, white oak, and willow oak. Black cherry, persimmon, and dogwood are common throughout the midstory. This compartment appears to be used extensively for troop training.



**Timber & Vegetation Inventory****Forest Product Volume Summary****Sawtimber Product**

Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	7749.38	35	52	220.26	538427
H. Hardwood	1193.07	6	12	191.92	82894
S. Hardwood	501.18	4	4	133.94	34822
Total:	9443.62	45	68		656143

**Pulpwood Product**

Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.
Pine	0.97	12	6	67
H. Hardwood	1.32	14	8	91
S. Hardwood	5.95	59	32	414
Total:	8.24	85	46	572

**Vegetative Class Dominance**

<i>Trees</i>	<i>% Canopy Closure:</i>	93.13
	<i>Dominant Species:</i>	loblolly pine, cherrybark oak, sweetgum, white oak
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	343.20
	<i>Dominant Species:</i>	loblolly pine, sweetgum, tree of heaven, black oak, southern crabapple
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	436.80
	<i>Dominant Species:</i>	wax myrtle, eastern baccharis, muscadine, Japanese honeysuckle, American beautyberry
<i>Groundcover</i>	<i>Overall Cover:</i>	0.46
	<i>Dominant Species:</i>	Japanese stilt grass, saltmeadow cordgrass, eastern poison ivy, smallspike false nettle, Japanese honeysuckle

**Management Recommendations**

Conduct annual inspections for insect/disease and consider a prescribed burn in 2008-2010 for the northern portion of the compartment and a selective harvest in 2018 for the southern portion (south of the cross roads intersection). The selective harvest should be conducted congruently with compartment 19. In the event of a planned prescribed burn, existing firebreaks must be improved and consideration should be given to adding additional firebreaks.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 21

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 19)

**2007 Comp. Acreage:** 46.61

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 28-73

**Avg. Growth Rate:** 5yr, 0.43 / 10yr, 1.01

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** storm damage(2 trees), rutting(minimal)

**Invasives:** Japanese stiltgrass(36%), Japanese honeysuckle(11%)

#### **Soils Data**

**Site Index Range (Soils):** 85-88

**Site Index Range (Curve):** 87-115

**Average Slope:** 0.60

**Soil Types:**

Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

The majority of this compartment (65%) consists of a variably aged, hardwood forest type which is predominantly small to medium saw timber sized sweetgum with a few widely scattered oaks that were reserved from an earlier harvest. The southeastern portion of the compartment is primarily a heavily stocked, medium saw timber sized pine forest type that was established in 1966-1967. Signs of training are present throughout 40% of the compartment sample areas (mostly historic, low threshold disturbances such as foxholes).



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	9338.36	60	60	155.38	435261
H. Hardwood	1487.41	7	14	222.32	69328
S. Hardwood	337.71	1	2	445.74	15741
Total:	11163.48	68	76		520330
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	1.7	20	8	79	
H. Hardwood	2.36	36	14	110	
S. Hardwood	3.3	42	18	154	
Total:	7.36	98	40	343	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	95.76
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	488.80
	<b>Dominant Species:</b>	sweetgum, common persimmon, cherrybark oak, black cherry, blackgum
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	301.60
	<b>Dominant Species:</b>	Japanese honeysuckle, wax myrtle, roundleaf greenbrier, muscadine, American beautyberry
<b>Groundcover</b>	<b>Overall Cover:</b>	0.58
	<b>Dominant Species:</b>	Japanese stilt grass, Japanese honeysuckle, smallspike false nettle, Virginia creeper, sawtooth blackberry

## Management Recommendations

Conduct annual inspections for insect/disease and reevaluate growth rates in 2018. Although the pine component is merchantable, growth rates are fairly vigorous.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 22

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 17C)

**2007 Comp. Acreage:** 51.29

**Forest/Veg. Type:** Pine

**Age Range:** 94-116

**Avg. Growth Rate:** 5yr, 0.28 / 10yr, 0.57

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** storm damage(3 trees)

**Invasives:** Japanese honeysuckle(1%)

#### **Soils Data**

**Site Index Range (Soils):** NA

**Site Index Range (Curve):** NA

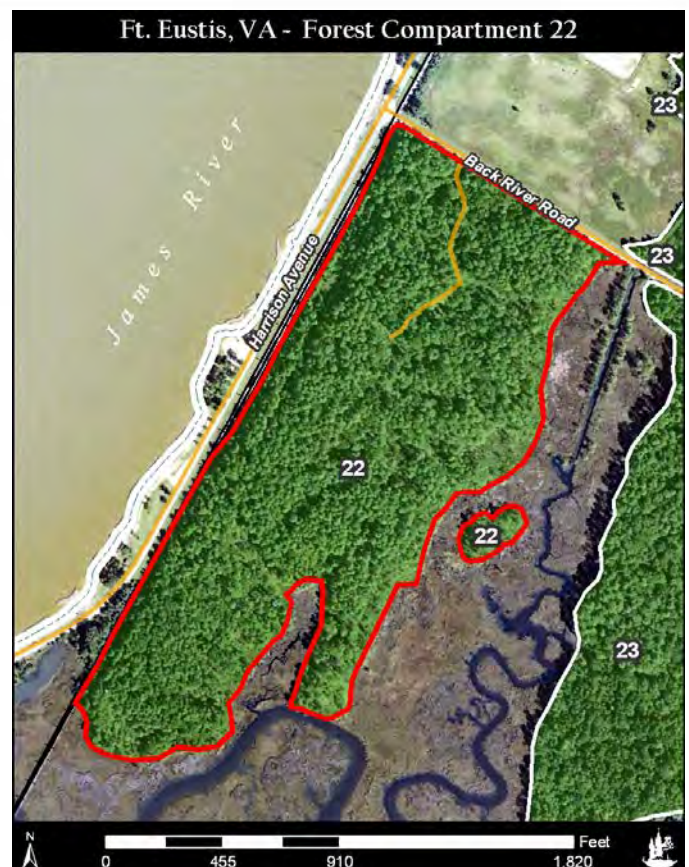
**Average Slope:** 0.67

**Soil Types:**

Bohicket-msc, Newflat-sl, Tetotum-sl, Udorthents-l

### **Compartment Description**

Compartment 22 is found just south of the intersection of Harrison Avenue and Back River Road. The compartment is fragmented into two parts, the smallest of which is a tiny island located east of the main compartment land mass. The majority of the compartment is gently sloping, with mature, good quality, adequately stocked pine/hardwood saw timber. Nontidal wetlands are adjacent to all sampled areas. Pit & mound disturbances from foxholes and windthrown trees are widely scattered throughout the compartment.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	13548.71	41	73	331.65	694913
H. Hardwood	511.56	6	7	92.92	26238
S. Hardwood	1948.67	11	17	174.54	99947
Total:	16008.93	97	97		821098
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0	0	0	0	
H. Hardwood	2.87	35	17	147	
S. Hardwood	0	0	0	0	
Total:	2.87	35	17	147	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	83.03
	<b>Dominant Species:</b>	loblolly pine, sweetgum
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	294.67
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak, swamp chestnut oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	433.33
	<b>Dominant Species:</b>	roundleaf greenbrier, trumpet creeper, eastern poison ivy
<b>Groundcover</b>	<b>Overall Cover:</b>	0.51
	<b>Dominant Species:</b>	common rush, roundleaf greenbrier, slender woodoats, woolgrass, sweetgum

### Management Recommendations

Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2013. The loblolly pine within this compartment is over mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus (although red heart fungus was not found in plot samples). The declining growth rates found in core samples (tree borings) indicate loss of vigor which may increase the likelihood of future insect/disease problems. Implement 50'-75' riparian "no-cut" buffers in Chesapeake Bay Protection Act Resource Protection Areas and 75' wide aesthetic "selective-cut" buffers along the rail road (parallel with Harrison Ave.) and Back River Road, in which trees targeted for removal should be clearly marked. Trees to be removed within the "selective-cut buffers" would be unhealthy loblolly pine and less desirable hardwoods such as red maple and sweetgum.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 23

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Areas: 15 & 17A)

**2007 Comp. Acreage:** 83.79

**Forest/Veg. Type:** Pine

**Age Range:** 48-106

**Avg. Growth Rate:** 5yr, 0.34 / 10yr, 0.68

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** storm damage(4 trees), rutting(moderate)

**Invasives:** common reed(4%), Japanese stiltgrass(0.2%), Japanese honeysuckle(0.2%)

#### **Soils Data**

<b>Site Index Range (Soils):</b> 88-88	<b>Soil Types:</b>
<b>Site Index Range (Curve):</b> 90-91	Altavista-fsl, Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl,
<b>Average Slope:</b> 0.38	Udorthents-l

### **Compartment Description**

Forest Compartment 23 is fragmented into three areas separated by tidal and nontidal drains and Back River Road. The northernmost area, which lies northeast of the DPW Bulk Storage, is predominantly a mature, pine/hardwood forest type with varying hydrology. Loblolly pine, cherrybark oak, and southern red oak are common in the dense upper canopy, while persimmon and black cherry are found frequently in the midstory. Groundcover is typically scarce, most likely attributed to the limited amount of sunlight able to reach the forest floor. South of this area, lies the center of the compartment, which is located southeast of the DPW Bulk Storage area, abutting Back River road on the south. The forest consists of adequately stocked, medium saw timber sized loblolly pine, established in 1959. Common reed is present underneath the upper canopy, where it has likely spread from an adjacent dredge spoil site. The southern portion of the compartment is bounded by Back River Road on the north, tidal wetlands on the west and south, and Mulberry Road and the airfield on the east. A mature pine/hardwood forest type is present (established 1901-1914) and can be found in both uplands and areas that are seasonally wet. The pine component is showing signs of decline as evidenced by red heart fungus and greatly reduced growth rates over the previous 10 years. Minor rutting and windthrown trees are frequently observed within the compartment.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	13145.71	42	68	313.31	1101479
H. Hardwood	966.28	5	8	210.05	80965
S. Hardwood	286.4	1	2	539.84	23998
Total:	14398.39	47	78		1206441
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.39	5	2	33	
H. Hardwood	3.39	30	20	284	
S. Hardwood	2.27	21	13	190	
Total:	6.05	55	35	507	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	93.82
	<b>Dominant Species:</b>	loblolly pine, cherrybark oak, southern red oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	260.00
	<b>Dominant Species:</b>	sweetgum, swamp chestnut oak, cherrybark oak, red maple, blackgum
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	121.33
	<b>Dominant Species:</b>	wax myrtle, roundleaf greenbrier, black highbush blueberry
<b>Groundcover</b>	<b>Overall Cover:</b>	0.39
	<b>Dominant Species:</b>	blue huckleberry, slender woodoats, switchgrass, common reed, rice cutgrass

### Management Recommendations

Conduct annual inspections for insect/disease and consider a selective harvest in 2008-2012 for the central and southern portions of this compartment. Growth rates were fairly vigorous in the northern portion of this compartment, found northeast of the DPW Bulk Storage. The loblolly pine within the central and southern portion of the compartment is over mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus. The declining growth rates found in core samples (tree borings) indicate loss of vigor which may increase the likelihood of future insect/disease problems. Implement 50'-75' riparian "no-cut" buffers in Chesapeake Bay Preservation Act Resource Protection Areas and 75' wide aesthetic "selective-cut" buffers along Mulberry Island and Back River Roads. Trees targeted for removal within the "selective-cut" buffer should include the majority of the loblolly pine and suppressed, weakened, or damaged tree species that may become a hazard to roadways, powerlines, or buildings. Additionally, install a "no-cut" buffer (prohibiting harvesting) around the permanently flooded area that's found near the middle of the southern portion of the compartment. Timing of timber harvesting within this compartment should occur when seasonal water tables are low.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 24

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 23)

**2007 Comp. Acreage:** 74.39

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 24-37

**Avg. Growth Rate:** 5yr, 0.78 / 10yr, 1.8

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(10%), Japanese honeysuckle(7%), autumn olive(0.3%)

#### **Soils Data**

**Site Index Range (Soils):** 85-95

**Site Index Range (Curve):** 96-117

**Average Slope:** 0.75

**Soil Types:**

Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

This compartment is a heavily stocked pine/hardwood forest type, most of which is pulpwood sized. Loblolly pine and sweetgum are dominant in the upper canopy, reaching heights of nearly 80'. The majority of forest was established in 1983-1984, however, a slightly more mature age class is found near the northeast corner (established 1970). A large, nontidal wetland system with a moderate amount of snags lies near the center of the compartment and likely provides ideal habitat for a variety of amphibians and waterfowl.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	4341.47	47	36	91.61	322962
H. Hardwood	883.14	4	8	251.3	65697
S. Hardwood	0	0	0	0	0
Total:	5224.62	51	44		388659
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	7.41	101	36	552	
H. Hardwood	0.64	7	4	48	
S. Hardwood	2.42	29	12	180	
Total:	10.48	138	52	780	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	94.99
	<b>Dominant Species:</b>	loblolly pine, sweetgum
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	884.00
	<b>Dominant Species:</b>	sweetgum, cherrybark oak, common persimmon, yellow poplar, mockernut hickory
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	416.00
	<b>Dominant Species:</b>	Japanese honeysuckle, muscadine, Virginia creeper, wax myrtle, American beautyberry
<b>Groundcover</b>	<b>Overall Cover:</b>	0.42
	<b>Dominant Species:</b>	Japanese stilt grass, slender woodoats, Japanese honeysuckle, common rush, eastern poison ivy

### Management Recommendations

Conduct annual inspections for insect/disease and consider a Commercial Thinning within 2008-2013 for the southern portion of this compartment which can generally be described as the compartment area located north of Mulberry road and south of a large wetland. Designate a riparian "no-cut" buffer prohibiting any thinning activity within 50'-75' of hydric soils found on the edge of the large wetland. Consider timing the commercial thinning with compartment 25. Reevaluate growth rates in 2018 for the northern portion of this compartment (pine forest type) and consider managing this area with the northern portion of compartment 15 (of similar age and characteristics).



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 25

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 23)

**2007 Comp. Acreage:** 18.96

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 20-27

**Avg. Growth Rate:** 5yr, 1.15 / 10yr, 2.43

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(68%), Japanese honeysuckle(12%), common reed(1%), Johnson-grass(0.3%)

#### **Soils Data**

**Site Index Range (Soils):** 88-88

**Site Index Range (Curve):** 82-95

**Average Slope:** 0.50

#### **Soil Types:**

Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl

### **Compartment Description**

The majority of the compartment (a portion of TA-23) consists primarily of a heavily stocked, pine/hardwood forest type that was established in 1985-1986. Loblolly pine and sweetgum (both species are mostly pulpwood sized) are growing to heights of 50-55' and make up the majority of the dense upper canopy. Several invasive species such as tree-of-heaven, autumn olive, and common reed are common throughout the compartment.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	302.1	6	3	49.43	5728
H. Hardwood	0	0	0	0	0
S. Hardwood	0	0	0	0	0
Total:	302.1	6	3		5728
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	5.55	83	30	105	
H. Hardwood	0.66	10	3	12	
S. Hardwood	5.59	96	33	106	
Total:	11.8	189	67	224	

### Vegetative Class Dominance

<i>Trees</i>	<i>% Canopy Closure:</i>	92.97
	<i>Dominant Species:</i>	loblolly pine, sweetgum
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	1,161.33
	<i>Dominant Species:</i>	sweetgum, loblolly pine, cherrybark oak, common persimmon
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	312.00
	<i>Dominant Species:</i>	American beautyberry, Japanese honeysuckle
<i>Groundcover</i>	<i>Overall Cover:</i>	0.79
	<i>Dominant Species:</i>	Japanese stilt grass, Japanese honeysuckle, New York fern, sweet woodreed, yellow crownbeard

### Management Recommendations

Conduct annual inspections for insect/disease and consider a Commercial Thinning within 2008-2013. Consider timing a commercial thinning in conjunction with planned clearing or site enhancements in this vicinity. Logging equipment could be utilized to remove vegetation and substantially limit costs of additional site clearing equipment and debris disposal. Consider timing the commercial thinning with the southern portion of compartment 24.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 31

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Areas: 14B & 23 and Pines Golf Course)  
**2007 Comp. Acreage:** 222.45  
**Forest/Veg. Type:** Pine/Hardwood  
**Age Range:** 35-137  
**Avg. Growth Rate:** 5yr, 0.4 / 10yr, 0.86  
**T/E Species:** None  
**Disease/Insect Damage:** red heart(2%)  
**Mechanical Damage:** storm damage(7 trees), rutting(moderate)  
**Invasives:** Japanese stiltgrass(15%), Japanese honeysuckle(0.2%)

#### **Soils Data**

**Site Index Range (Soils):** 85-90

**Site Index Range (Curve):** 71-109

**Average Slope:** 0.55

#### **Soil Types:**

Altavista-fsl, Augusta-fsl, Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl, Tomotley-fsl, Udorthents-l

### **Compartment Description**

This compartment encompasses Pines Golf Course. The forest within this compartment is fragmented and is primarily composed of a pine hardwood forest type. Upper canopy species are variably stocked and consist primarily of loblolly pine, sweetgum, red maple, tulip poplar, and a variety of oak species. Sample areas include wetland fringes where the herbaceous layer is dense, as well as gently sloping uplands nearly devoid of ground cover. Historic ground disturbance (piles) and rutting of soils are found in or in close proximity to 50% of the sample areas. Although the majority of the forest is narrow, it is vital in filtering nutrients and other chemicals associated with golf course maintenance activities.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	10459.92	46	59	228.68	2326809
H. Hardwood	2121.41	10	20	213.15	471908
S. Hardwood	1036.06	6	9	181.64	230471
Total:	13617.38	61	89		3029187
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	1.33	14	6	297	
H. Hardwood	1.45	10	8	321	
S. Hardwood	3.44	47	20	765	
Total:	6.22	72	34	1383	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	95.68
	<b>Dominant Species:</b>	sweetgum, loblolly pine, red maple, tulip poplar
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	630.93
	<b>Dominant Species:</b>	sweetgum, loblolly pine, red maple, cherrybark oak, southern red oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	27.73
	<b>Dominant Species:</b>	wax myrtle
<b>Groundcover</b>	<b>Overall Cover:</b>	0.37
	<b>Dominant Species:</b>	Japanese stilt grass, slender woodoats, New York fern, whitegrass, blue huckleberry

### Management Recommendations

Conduct annual inspections for insect/disease and hazard trees. The forest within this compartment is variably aged, narrow, extremely fragmented, and vital in filtering nutrients/contaminants from the golf course. Hazard trees/branches should be removed in areas where they may jeopardize the safety of personnel using or maintaining the golf course.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 33

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 28)

**2007 Comp. Acreage:** 4.1

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 93-102

**Avg. Growth Rate:** 5yr, 0.6 / 10yr, 1.02

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** storm damage(5 trees)

**Invasives:** common reed(2%), tree-of-heaven(2%)

#### **Soils Data**

**Site Index Range (Soils):** 91-91

**Site Index Range (Curve):** NA

**Average Slope:** 0.00

**Soil Types:**

Altavista-fsl, Augusta-fsl, Bohicket-msc

### **Compartment Description**

This island compartment experiences periodic sandy over wash and has suffered significant storm damage. The forest type is primarily hardwood pine established in 1905. It is likely that this island previously consisted of a much heavier pine component, which over the years, has succumbed to windthrow and periodic tidal flooding. Midstory saplings/shrubs include swamp bay, American holly, black locust, beautyberry, and the invasive tree-of-heaven. Regeneration of loblolly pine is present in 33% of the sample areas with storm damage. Muscadine is often found in storm damaged areas as well, frequently climbing into the upper canopy.



## Timber & Vegetation Inventory

### Forest Product Volume Summary

#### Sawtimber Product

Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	2263.06	10	17	224.69	9279
H. Hardwood	936.62	3	10	287.11	3840
S. Hardwood	0	0	0	0	0
Total:	3199.69	13	27		13119

#### Pulpwood Product

Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.
Pine	0.62	6	3	3
H. Hardwood	0.47	4	3	2
S. Hardwood	0.57	3	3	2
Total:	11.67	13	10	7

### Vegetative Class Dominance

<i>Trees</i>	<i>% Canopy Closure:</i>	62.45
	<i>Dominant Species:</i>	sweetgum, southern red oak, loblolly pine
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	260.00
	<i>Dominant Species:</i>	swamp bay tree of heaven
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	1,820.00
	<i>Dominant Species:</i>	American beautyberry, saw greenbrier, muscadine, Jesuit's bark
<i>Groundcover</i>	<i>Overall Cover:</i>	0.60
	<i>Dominant Species:</i>	slender woodoats, Virginia wildrye, saw greenbrier, saltmeadow cordgrass, American beautyberry

### Management Recommendations

Due to access limitations, this forest compartment is considered as non-manageable.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 34

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 28)

**2007 Comp. Acreage:** 23.38

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 62-88

**Avg. Growth Rate:** 5yr, 0.23 / 10yr, 0.42

**T/E Species:** bald eagle

**Disease/Insect Damage:** None

**Mechanical Damage:** storm damage(8 trees)

**Invasives:** common reed(5%), Japanese stiltgrass(5%)

#### **Soils Data**

**Site Index Range (Soils):** 86-86

**Site Index Range (Curve):** 77-105

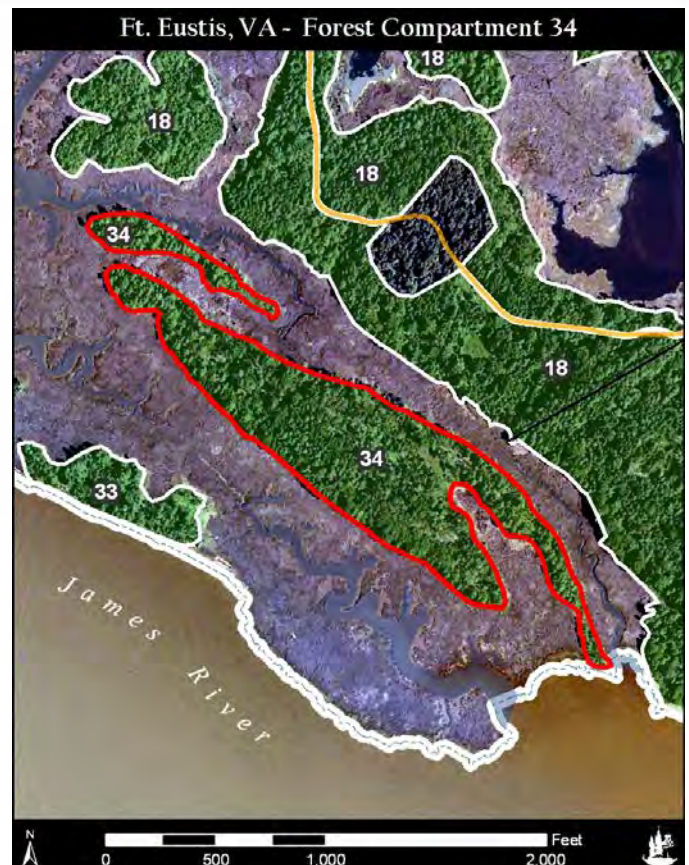
**Average Slope:** 1.50

**Soil Types:**

Altavista-fsl, Bohicket-msc, State-s, Tetotum-sl

### **Compartment Description**

This forest compartment is an island, surrounded by tidal marsh, which consists of a mature, variably stocked hardwood/pine forest type. The island has suffered significant storm damage as evidenced by several leaning trees, broken snags, and trees that are completely blown over (windthrow). The residual upper canopy is now dominated by cherrybark oak, loblolly pine, sweetgum, black gum, and willow oak. Sixty-seven percent of sample areas have adequate loblolly pine regeneration present. A bald eagle nest exists within this compartment (Dolan, J., 2007), but was not observed by the forest inventory team while collecting data.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	7481.89	16	40	465.12	174927
H. Hardwood	1420.23	3	10	439.98	33205
S. Hardwood	4053.62	19	33	212.91	94774
Total:	12955.75	38	83		302905
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0	0	0	0	
H. Hardwood	1.54	38	10	36	
S. Hardwood	1.91	31	10	45	
Total:	3.45	69	20	81	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	89.09
	<b>Dominant Species:</b>	cherrybark oak, loblolly pine, sweetgum
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	502.67
	<b>Dominant Species:</b>	loblolly pine, sweetgum, blackgum
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	433.33
	<b>Dominant Species:</b>	American beautyberry, roundleaf greenbrier, wax myrtle, swamp bay, flowering dogwood
<b>Groundcover</b>	<b>Overall Cover:</b>	0.54
	<b>Dominant Species:</b>	slender woodoats, American beautyberry, common reed, tall oatgrass, swamp bay

### Management Recommendations

This compartment is noncommercial and can be found on an island where a bald eagle nest exists. Although the bald eagle has been delisted, and no longer considered an endangered or threatened species, it is protected by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (North) -

Compartment # 35

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 24 & Pistol Range impact area)

**2007 Comp. Acreage:** 8.76

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 55-91

**Avg. Growth Rate:** 5yr, 0.25 / 10yr, 0.48

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(43%), Japanese honeysuckle(19%), Chinese privet(1%)

#### **Soils Data**

**Site Index Range (Soils):** 86-86

**Soil Types:**

**Site Index Range (Curve):** 81-91

Bohicket-msc, State-s, Tetotum-sl

**Average Slope:** 0.00

### **Compartment Description**

This island compartment consists of a mature, mixed hardwood pine forest type, found on maritime fringes and mostly mesic soils. Loblolly pine, sweetgum, cherrybark oak, black cherry, hackberry, and black walnut are prevalent in the upper canopy with American holly, bayberry, and beautyberry found frequently in the shrub layer. The compartment has a small rise in elevation near the middle of the island where a small patch of tree-of-heaven exists. A few saplings of the invasive Chinaberry, as well as Chinese privet, in shrub form (another invasive), are also present on the south end of the island.



## Timber & Vegetation Inventory

### Forest Product Volume Summary

#### Sawtimber Product

Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	8050.86	18	43	459.72	70526
H. Hardwood	642.78	3	7	248.27	5631
S. Hardwood	1515.79	5	13	320.97	13278
Total:	10209.43	25	63		89435

#### Pulpwood Product

Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.
Pine	0	0	0	0
H. Hardwood	1.13	14	7	10
S. Hardwood	3.17	47	20	28
Total:	4.3	61	27	38

### Vegetative Class Dominance

<i>Trees</i>	<i>% Canopy Closure:</i>	89.25
	<i>Dominant Species:</i>	loblolly pine, sweetgum, cherrybark oak, black cherry, hackberry
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	173.33
	<i>Dominant Species:</i>	sweetgum
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	1,386.67
	<i>Dominant Species:</i>	American beautyberry, wax myrtle, saw greenbrier, Chinese privet, Japanese honeysuckle
<i>Groundcover</i>	<i>Overall Cover:</i>	0.82
	<i>Dominant Species:</i>	Japanese stilt grass, Japanese honeysuckle, slender woodoats, American beautyberry, yellow crownbeard

### Management Recommendations

Due to access limitations, this forest compartment is considered as non-manageable.



## **Mulberry Island (North) - Management Considerations:**

### **Training**

Training on Mulberry Island (North) portion of Ft. Eustis is conducted on 14 areas as depicted on Figure: 2.2B, titled Ft. Eustis – Mulberry Island (North): Training Areas. All of these training areas except TA-15, TA-18, TA-20 and the pistol and shotgun range R-1 are conducted within forest vegetation compartments. The soils that occur within Mulberry Island (North) are generally characterized as being more poorly drained than those found on the Main Post area of Fort Eustis. The seasonally high water table is close to the surface during December through late March in most years. Hurricanes during the fall can generate large amounts of rainfall and can elevate the ground water table as early as September or October which can create access problems to many of the low lying compartments.

The existing, unimproved secondary road system leading to the training areas is navigable with all-terrain vehicles (ATV's) throughout the year. However once ATV's leave the road/trail systems rutting and subsequent soil erosion would typically occur during any period associated with high water tables. Subsurface water movement in an undisturbed soil profile typically occurs both horizontally and vertically during drier portions of the year. Any rutting or use of vehicles that disturbs the soil profile at any time during the year will inhibit water movement and will diminish drainage capacity leading to wetter conditions for longer periods than what would occur in an undisturbed soil profile.

While training activities need to represent a variety or range of combat situations, including driving under adverse conditions, consideration should be given to identifying those areas on the secondary road system that would generate off-site non-point source discharges and incorporate Best Management Practices, including Erosion and Sediment Control and reinforcing low-lying areas with geo-textile mats and the application of stone to reinforce the road beds. Otherwise training restrictions during wet periods should be considered to protect the long-term use of these sites for training activities.

### **Felker Airfield**

Felker Airfield is used for fixed and rotary-wing operations. The Federal Aviation Administration (FAA) establishes requirements for minimum safety heights for obstructions with aircraft approach zones. These zones are established based on the classification of the airfield. These classification are base on the use of the airfield for precision, non-recision or visual approaches. Felker Airfield is considered non-precision. Therefore, a 34/1 unobstructed slope beginning from the end of the runway outward is required. These regulations prohibit vegetation, especially trees from penetrating these slopes.

In order to met these minimum requirements, woody vegetation within the approach zone will need to be managed so as not to penetrate the specified slopes. When forest encroaches into these approach zones a timber harvest should occur. Following a timber harvest, regrowth will need to be maintained. The soils within these approach zones are very poorly drained. Due to the limitations of high water table and need to restrict equipment activity on these sites management tools including the application of herbicides and/or prescribe burning should be used for vegetation control.

Before the application of fire as a vegetation control tool, a fire/smoke management plan needs to be developed by the Conservation Branch and coordinated with the Airfield Safety Officer and the Post Fire Department and any other stakeholders that may have interest.

### **Recreation/Golf Course**

The Office of Outdoor Recreation provides developed recreational facilities such as outdoor pools, tennis courts, the skeet and trap field and golf course. This office also works with the Conservation Branch to conduct and manage the hunting program. Most of the forest supported at the Golf Course are mature and vigor is declining. Due to the intensive use of this facility by military personnel, retirees and their guest special consideration should be given to conducting annual hazard tree inventory, maintenance and removal when necessary. Several large dead branches around the fairways will likely accumulate over time and the risk to personnel will increase without annual intervention.

### **6.53 - Mulberry Island – South**

The Mulberry Island – South vegetation compartments are shown on Figure:5.0C, titled Ft. Eustis, VA ~ Mulberry Island (South): Forest Vegetation Compartments. This area supports 12 vegetation compartments, labeled 1 through 9, and 36 through 38. The dominant land cover in these compartments is forest and tidal wetlands. The majority of this area is located on land with significant environmental constraints which will limit the use of many traditional forest management tools.

#### **Mulberry Island (South)Forest Compartment Descriptions and Management Recommendations: Compartments 1-9 & 36-38**



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 01

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)  
**2007 Comp. Acreage:** 10.18  
**Forest/Veg. Type:** Hardwood  
**Age Range:** 74-78  
**Avg. Growth Rate:** 5yr, 0.35 / 10yr, 0.78  
**T/E Species:** None  
**Disease/Insect Damage:** None  
**Mechanical Damage:** storm damage(4 trees)  
**Invasives:** Japanese stiltgrass(18%), Japanese honeysuckle(3%)

#### **Soils Data**

<b>Site Index Range (Soils):</b> NA	<b>Soil Types:</b>
<b>Site Index Range (Curve):</b> 72-73	Bohicket-msc, State-s, Tetotum-sl
<b>Average Slope:</b> 0.00	

### **Compartment Description**

This forest compartment is located at the southernmost tip of Mulberry Island, bounded on the west by the James River and on the east by the Warwick River. The upper canopy is relatively open and consists of species such as black walnut, hackberry, and a few, widely scattered loblolly pines. Muscadine, saw greenbrier, and roundleaf greenbrier are abundant, climbing in the midstory to heights of 25-30'. Virginia wild rye and yellow crownbeard are prevalent in the herbaceous layer, seemingly unaffected by the juglone produced from the black walnuts. Windthrow (blown over trees), along with broken topped trees, are present in or near all sampled areas within the compartment, most likely attributed to storm damage from Hurricane Isabel. Signs of historic human disturbance are abundant, especially near the southern tip.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	280.66	1	3	413.29	2857
H. Hardwood	1568.77	13	20	117.95	15970
S. Hardwood	1100.09	4	10	252.74	11199
Total:	2949.52	18	33		30026
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.35	1	3	4	
H. Hardwood	3.41	33	20	35	
S. Hardwood	0	0	0	0	
Total:	3.76	34	23	39	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	86.33
	<b>Dominant Species:</b>	black walnut, hackberry, loblolly pine
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	86.67
	<b>Dominant Species:</b>	sweetgum, common hackberry, black walnut
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	156.00
	<b>Dominant Species:</b>	muscadine, American beautyberry, roundleaf greenbrier, saw greenbrier
<b>Groundcover</b>	<b>Overall Cover:</b>	0.82
	<b>Dominant Species:</b>	Virginia wildrye, yellow crownbeard, Japanese stilt grass, Japanese honeysuckle, switchgrass

## Management Recommendations

Conduct annual inspections for insect/disease/invasives. There is little commercial value found in the poor quality black walnuts and hackberry trees, and the relatively few loblolly pines that are of saw timber size are found in Chesapeake Bay Preservation Act Resource Protection Areas. The loblolly pines are, however, currently providing perching opportunities for raptors such as the bald eagle and may additionally provide future nesting opportunities. Tree-of-heaven saplings were found on occasion while traversing through the compartment. The invasive nature of this species combined with sparse competition and a relatively open upper canopy are cause for concern. It is recommended that consideration be given to installing control methods/techniques to limit its dispersion. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 02

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)

**2007 Comp. Acreage:** 110.07

**Forest/Veg. Type:** Pine

**Age Range:** 59-71

**Avg. Growth Rate:** 5yr, 0.37 / 10yr, 0.81

**T/E Species:** None

**Disease/Insect Damage:** red heart(5%)

**Mechanical Damage:** rutting(minimal), storm damage(10 trees)

**Invasives:** Japanese stiltgrass(53%), princess tree(2%), Japanese honeysuckle(1%)

#### **Soils Data**

**Site Index Range (Soils):** 86-88

**Soil Types:**

**Site Index Range (Curve):** 84-107

Augusta-fsl, Bohicket-msc, Chickahominy-sl, Levy-sc, State-s, Tetotum-sl

**Average Slope:** 0.14

### **Compartment Description**

This forest compartment is found on predominantly moist soils and is composed of a mature, pine/hardwood timber type that was established between 1936-1943. The upper canopy is primarily composed of large loblolly pine, sweetgum, and mixed oak species, however, several different vegetation communities with varying hydrologic conditions are present, ranging from uplands with hardwood/pine to pine/hardwood fringes on non-tidal depressions. Large, loblolly pines with heights of 115' are common, some of which are possibly contaminated with metal/shrapnel. Sweetgum, persimmon, and dogwood are dominant in the midstory. Shrub/sapling species present include wax myrtle, beautyberry, American holly, swamp bay, and spicebush. Japanese stilt grass, which is highly invasive, is found within the herbaceous layer of 85% of the sampled areas. Craters from historical aerial bombing/artillery with large trees growing within them are scattered throughout the compartment. These depressions, although dry at the time of sampling, are most likely providing ideal habitat for forest dwelling amphibians.





## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	9284.53	19	44	490.05	1021948
H. Hardwood	417.21	1	3	559.44	45923
S. Hardwood	1893.33	9	14	205.74	208399
Total:	11595.08	29	61		1276270
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0	0	0	0	
H. Hardwood	0.24	1	1	27	
S. Hardwood	3.6	43	19	396	
Total:	3.84	44	20	423	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	92.86
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	364.00
	<b>Dominant Species:</b>	sweetgum, swamp bay, cherrybark oak, common persimmon, red maple
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	601.71
	<b>Dominant Species:</b>	American beautyberry, muscadine, swamp bay, wax myrtle, eastern poison ivy
<b>Groundcover</b>	<b>Overall Cover:</b>	0.58
	<b>Dominant Species:</b>	Japanese stilt grass, smallspike false nettle, yellow crownbeard, Christmas fern, Japanese honeysuckle

## Management Recommendations

Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2013. The loblolly pine within this compartment is mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus. Declining growth rates indicate loss of vigor which may increase the likelihood of future insect/disease problems. The goal of the selective harvest would be the removal of the loblolly pine and less desirable hardwoods such as red maple and sweetgum and the protection of species that have longer life spans such as white oak, cherrybark oak and black gum, which typically are good mast producers. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas. A selective harvest is mentioned as a management recommendation/consideration that would benefit the forests' current and/or foreseeable health, however, conditional constraints must also be considered such as limited access attributed to training and eagle management zones. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities

## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 03

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)

**2007 Comp. Acreage:** 59.13

**Forest/Veg. Type:** Pine

**Age Range:** 25-31

**Avg. Growth Rate:** 5yr, 0.57 / 10yr, 1.31

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(20%), Japanese honeysuckle(2%)

#### **Soils Data**

**Site Index Range (Soils):** 86-86

**Soil Types:**

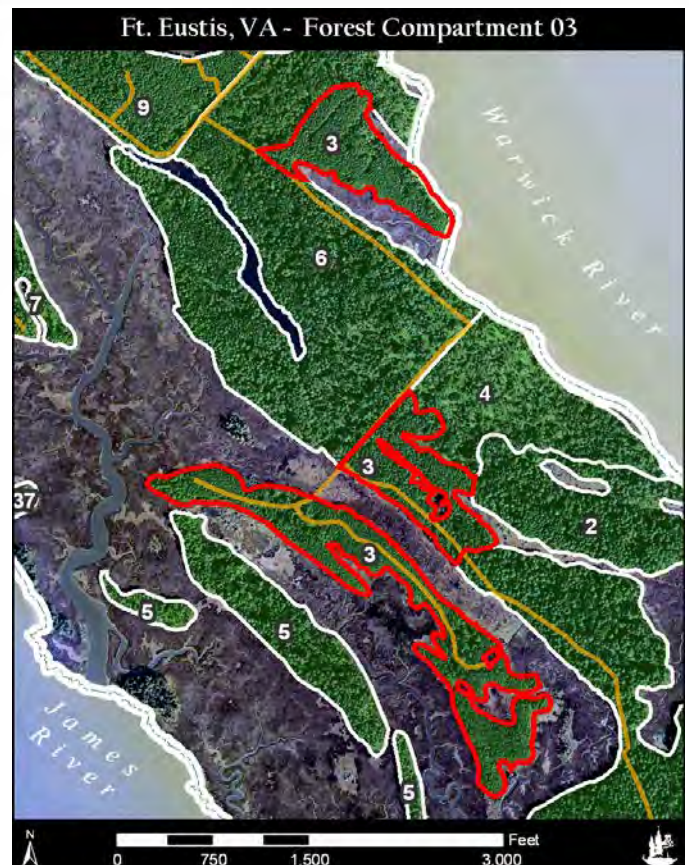
**Site Index Range (Curve):** 82-100

Augusta-fsl, Bohicket-msc, Chickahominy-sl, Levy-sc, State-s, Tetotum-sl

**Average Slope:** 0.63

### **Compartment Description**

This forest compartment is fragmented into three separate areas. The southernmost portion of the compartment, which is found on an island bisected by a soil road, should be considered non-manageable. The mainland compartment areas (northern and central) consist primarily of a heavily stocked, loblolly pine forest type established between 1976-1982. Evidence of a prior pre-commercial thinning is still visible in the northern portion of the compartment (cut stumps).



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	3614.24	60	38	59.88	213710
H. Hardwood	0	0	0	0	0
S. Hardwood	0	0	0	0	0
Total:	3614.24	60	38		213710
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	17.83	254	98	1054	
H. Hardwood	0	0	0	0	
S. Hardwood	0	0	0	0	
Total:	17.83	254	98	1054	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	94.58
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	26.00
	<b>Dominant Species:</b>	sweetgum
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	533.00
	<b>Dominant Species:</b>	swamp bay, American beautyberry, Japanese honeysuckle, muscadine, devil's walkingstick
<b>Groundcover</b>	<b>Overall Cover:</b>	0.25
	<b>Dominant Species:</b>	Japanese stilt grass, Japanese honeysuckle, swamp bay, slender woodoats, American beautyberry

### Management Recommendations

Conduct annual inspections for insect/disease and consider a commercial thinning within 2008-2013. The forest within this fragmented compartment consists primarily of heavily stocked, loblolly pine. The accessible, mainland areas (appx. 28 acres combined) could be greatly enhanced by a commercial thinning. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 04

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)  
**2007 Comp. Acreage:** 28.53  
**Forest/Veg. Type:** Hardwood  
**Age Range:** 27-75  
**Avg. Growth Rate:** 5yr, 0.63 / 10yr, 1.03  
**T/E Species:** bald eagle  
**Disease/Insect Damage:** None  
**Mechanical Damage:** None  
**Invasives:** Japanese stiltgrass(80%), Japanese honeysuckle(2%)

#### **Soils Data**

**Site Index Range (Soils):** NA

**Site Index Range (Curve):** 86-89

**Average Slope:** 0.33

**Soil Types:**

Augusta-fsl, Bohicket-msc, State-s, Tetotum-sl

### **Compartment Description**

The upper canopy within this compartment is generally open, and dominated by black walnut, sweetgum, and black cherry. A few of the black walnuts are large enough to be commercially valuable as saw timber, however the majority are of poor quality. The compartment appears to be a reclaimed old field with a scarce sapling/shrub layer and a dense, mat-like groundcover consisting of Japanese stilt grass, yellow crownbeard, and Virginia wild rye. Sixty-seven percent of the sampled areas contain impact craters from historical artillery/bombing. Thirty-three percent of the sampled areas exhibit varying degrees of storm damage (broken tops/windthrown trees).



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	0	0	0	0	0
H. Hardwood	1765.67	12	20	141.92	50375
S. Hardwood	0	0	0	0	0
Total:	1765.67	12	20		50375
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0	0	0	0	
H. Hardwood	1.44	15	10	41	
S. Hardwood	1.62	20	10	46	
Total:	3.06	35	20	87	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	88.97
	<b>Dominant Species:</b>	black walnut, sweetgum, black cherry
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	364.00
	<b>Dominant Species:</b>	sweetgum, black walnut, swamp bay
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	728.00
	<b>Dominant Species:</b>	muscadine, roundleaf greenbrier, wax myrtle, Japanese honeysuckle, saw greenbrier
<b>Groundcover</b>	<b>Overall Cover:</b>	0.98
	<b>Dominant Species:</b>	Japanese stilt grass, yellow crownbeard, Virginia wildrye, smallspike false nettle, ebony spleenwort

### Management Recommendations

Conduct annual inspections for insect/disease/invasives. This compartment is very similar in age and species composition to compartment one. Little commercial value is present except for an occasional saw timber-sized black walnut tree, however, wildlife use seems to be high especially from white-tailed deer. Tree-of-heaven saplings were found on occasion while traversing through the compartment. The invasive nature of this species combined with sparse competition and a relatively open upper canopy are cause for concern. It is recommended that consideration be given to installing control methods/techniques to limit its dispersion.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 05

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)

**2007 Comp. Acreage:** 24.5

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 115-136

**Avg. Growth Rate:** 5yr, 0.12 / 10yr, 0.22

**T/E Species:** bald eagle

**Disease/Insect Damage:** red heart(4%)

**Mechanical Damage:** storm damage(2 trees)

**Invasives:** None

#### **Soils Data**

**Site Index Range (Soils):** 88-88

**Site Index Range (Curve):** NA

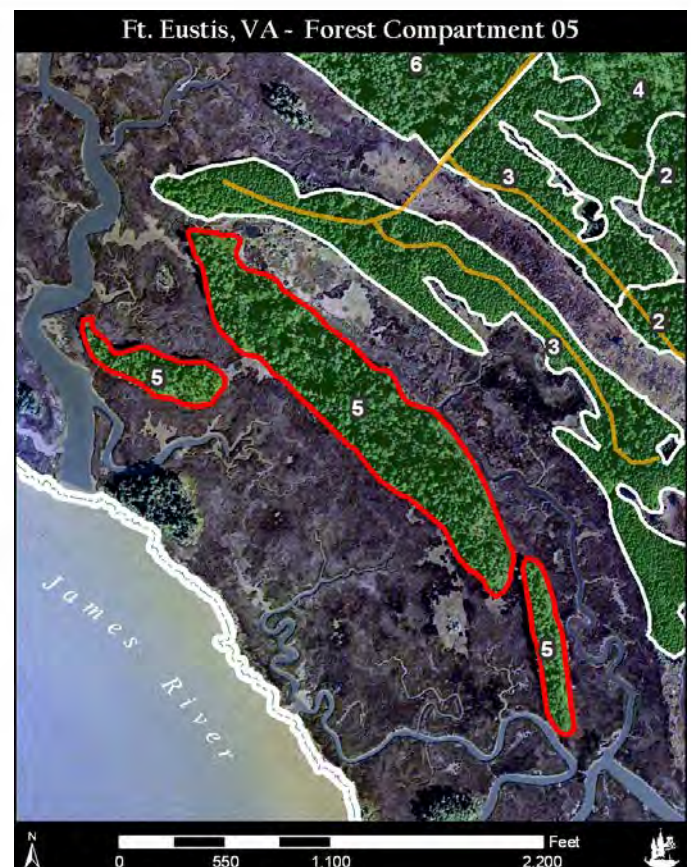
**Average Slope:** 0.33

**Soil Types:**

Bohicket-msc, State-s, Tetotum-sl

### **Compartment Description**

This compartment is fragmented (three islands) and consists primarily of a mature, maritime hardwood/pine forest type established in the late 1800s. The upper canopy consists of a variety of mature, large hardwood mast producing species such as cherrybark oak, white oak, southern red oak, and large loblolly pine that tower to heights over 115'. Red heart fungus with visual indicators of swollen knots or conks are present in a few loblolly pines, which is not uncommon considering their maturity. Although the infected pines may be structurally unsound, they can provide great habitat for woodpecker species, therefore, consideration should be given regarding the necessity of control/removal, especially in habitat where there is little human activity (safety considerations are minimal) and environmental restrictions/accessibility that could make timber harvesting difficult. Mast produced by the mixed species of oak is likely providing foraging opportunities for a variety of wildlife such as white-tailed deer. Storm damage is significant in 33% of sample areas within the compartment. Regeneration in the most heavily damaged area consists primarily of sapling sized sweetgum, black cherry, and swamp bay, with muscadine creating a dense covering over the majority of the windthrown trees. A bald eagle nest exists within this compartment (Dolan, J., 2007), however, it was not observed by the forest inventory team while collecting data.





## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	5791	25	37	228.46	141880
H. Hardwood	581.24	1	3	642.9	14240
S. Hardwood	1097.25	5	10	22.02	26883
Total:	7469.49	31	50		183003
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	2.17	31	10	53	
H. Hardwood	0.97	10	7	24	
S. Hardwood	3.71	53	20	91	
Total:	6.85	94	37	168	

### Vegetative Class Dominance

<i>Trees</i>	<i>% Canopy Closure:</i>	82.85
	<i>Dominant Species:</i>	loblolly pine, sweetgum, cherrybark oak
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	225.33
	<i>Dominant Species:</i>	sweetgum, northern red oak, white oak
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	1,300.00
	<i>Dominant Species:</i>	American beautyberry, swamp bay, wax myrtle
<i>Groundcover</i>	<i>Overall Cover:</i>	0.56
	<i>Dominant Species:</i>	American beautyberry, muscadine, dogfennel, Japanese stilt grass, roundleaf greenbrier

### Management Recommendations

Due to access issues, the forest within this fragmented (three islands) compartment should be considered non-manageable. Currently, a bald eagle nest exists on the westward side of the large, middle island. Although the bald eagle has been delisted, and not currently considered an endangered or threatened species, it is protected by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).

## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 06

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)

**2007 Comp. Acreage:** 101.55

**Forest/Veg. Type:** Hardwood/Pine

**Age Range:** 66-93

**Avg. Growth Rate:** 5yr, 0.26 / 10yr, 0.53

**T/E Species:** bald eagle

**Disease/Insect Damage:** None

**Mechanical Damage:** None

**Invasives:** Japanese stiltgrass(47%), Japanese honeysuckle(14%), princess tree(1%)

#### **Soils Data**

**Site Index Range (Soils):** 85-88

**Site Index Range (Curve):** 85-110

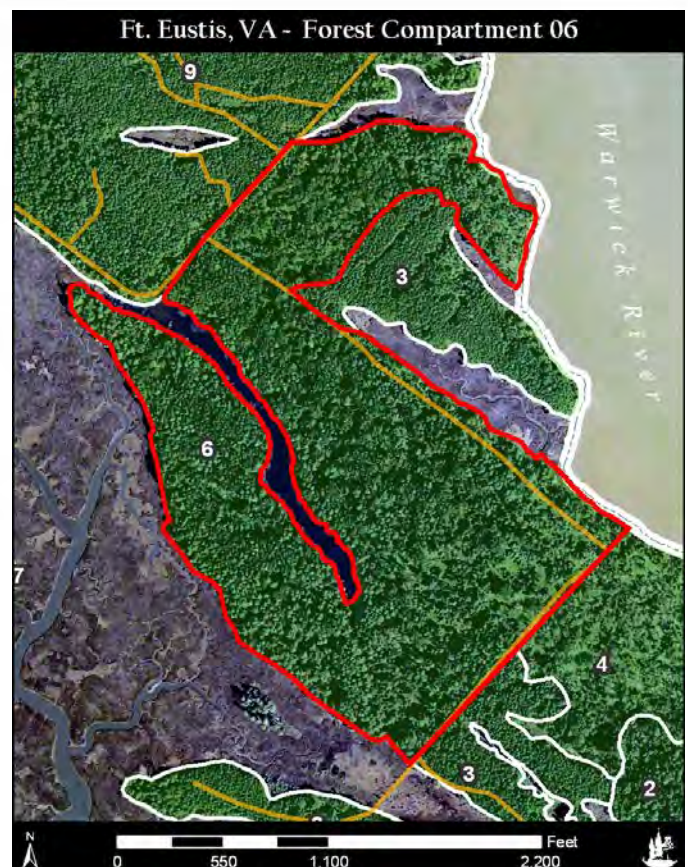
**Average Slope:** 0.27

**Soil Types:**

Augusta-fsl, Bohicket-msc, Chickahominy-sl, Levy-sc, State-s, Tetotum-sl

### **Compartment Description**

This forest compartment consists of a variety of timber types and age classes. A mature pine/hardwood forest type, established in 1936, lies south of a large, finger-like wetland that nearly divides the compartment. Large, loblolly pine and sweetgum are dominant in the upper canopy, some of which are growing in the bottoms of impact craters and are possibly contaminated with metal/shrapnel. The remainder of the compartment (north of the wetland finger) is composed of mature, merchantable, hardwood and hardwood/pine forest types consisting of a variety of oak species, a few scattered black walnuts, red maples, and loblolly pines. Storm damage is most significant north of the wetland finger, with minor to significant damage in or near approximately 30% of all sample areas within the compartment. A bald eagle nest exists within this compartment (Dolan, J., 2007), however, it was not observed by the forest inventory team while collecting data.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	4974.03	11	24	447.79	505112
H. Hardwood	1366.69	4	11	313.06	138787
S. Hardwood	5397.23	22	39	243.36	548089
Total:	11737.94	38	74		1191988
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0	0	0	0	
H. Hardwood	0.2	2	1	21	
S. Hardwood	3.13	30	19	318	
Total:	3.34	31	20	339	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	89.59
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	156.00
	<b>Dominant Species:</b>	loblolly pine, sweetgum, common persimmon, flowering dogwood
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	906.29
	<b>Dominant Species:</b>	swamp bay, muscadine, wax myrtle, American beautyberry, Japanese honeysuckle
<b>Groundcover</b>	<b>Overall Cover:</b>	0.70
	<b>Dominant Species:</b>	Japanese stilt grass, slender woodoats, sweet woodreed, yellow crownbeard, swamp bay

## Management Recommendations

Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2013. The loblolly pine within this compartment is mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus. Additionally, declining growth rates indicated loss of vigor which may increase the likelihood of future insect/disease problems. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas. Currently, an active bald eagle nest is found within this compartment. Training and proposed silvicultural practices should adhere to eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 07

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)  
**2007 Comp. Acreage:** 104.05  
**Forest/Veg. Type:** Hardwood/Pine  
**Age Range:** 34-93  
**Avg. Growth Rate:** 5yr, 0.39 / 10yr, 0.86  
**T/E Species:** None  
**Disease/Insect Damage:** None  
**Mechanical Damage:** storm damage(4 trees)  
**Invasives:** Japanese stiltgrass(12%), Japanese honeysuckle(2%)

#### **Soils Data**

<b>Site Index Range (Soils):</b> 85-88	<b>Soil Types:</b>
<b>Site Index Range (Curve):</b> 75-102	Altavista-fsl, Augusta-fsl, Bohicket-msc, Bojac-sl, Levy-sl, Newflat-sl, State-s,
<b>Average Slope:</b> 0.14	Tetotum-sl

### **Compartment Description**

This forest compartment is bounded by the James River, tidal creeks, and tidal marshlands. The predominant forest type is adequate to heavily stocked pine/hardwood established between 1968-70. The loblolly pine component is mostly pulpwood, with some small piling and small saw timber. Other species present within this maritime forest are beautyberry, wax myrtle, swamp bay, eastern baccharis, and climbing vines such as roundleaf greenbrier, muscadine, and poison ivy. A more mature hardwood/pine forest type is found adjacent to the James River and near the southern tip of the compartment, with establishment dates ranging from 1913-1962. Storm damage is moderate in this older forest, leaving the upper canopy fairly open, dominated by large, scattered saw timber-sized cherrybark oak, sweetgum, and loblolly pine species. Hercules club, slender woodoats, beautyberry, muscadine, and greenbrier are also present throughout these disturbed areas.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	3917.09	26	29	149.41	407573
H. Hardwood	1614.05	7	14	224.61	167942
S. Hardwood	1801.28	9	16	191.86	187426
Total:	7332.41	43	59		762937
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	1.08	12	6	112	
H. Hardwood	1.14	8	7	119	
S. Hardwood	2.15	36	13	223	
Total:	4.37	56	26	455	

## Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	86.93
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	304.57
	<b>Dominant Species:</b>	swamp bay, sweetgum, common persimmon, loblolly pine, cherrybark oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	765.14
	<b>Dominant Species:</b>	American beautyberry, roundleaf greenbrier, muscadine, saw greenbrier, wax myrtle
<b>Groundcover</b>	<b>Overall Cover:</b>	0.60
	<b>Dominant Species:</b>	slender woodoats, Japanese stilt grass, Christmas fern, roundleaf greenbrier, saw greenbrier

## Management Recommendations

Conduct annual inspections for insect/disease/bridge condition and reevaluate in 2018. Currently, there are two age classes found in this compartment as a result of a partial harvest that occurred in 1970. The more mature age class is showing some reduction in vigor, however, there is insufficient timber volume to warrant a commercial harvest at the present time. It is expected that in 2018, the younger pine component found within this compartment will become mature and large enough to commercially harvest as saw timber. Consideration should be given to include both age classes in a selective harvest. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within the Chesapeake Bay Preservation Act Resource Protection Areas. The mature pine, although a much smaller component of the compartment overall, does create a risk of a future southern pine beetle infestation that could possibly spread throughout the pine. Normally, southern pine beetles (SPB) attack and kill stress-weakened trees, however, during years when populations reach epidemic proportions, even younger, healthy trees can be attacked, especially in overstocked loblolly stands.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 08

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)

**2007 Comp. Acreage:** 47.3

**Forest/Veg. Type:** Pine

**Age Range:** 17-90

**Avg. Growth Rate:** 5yr, 0.42 / 10yr, 0.95

**T/E Species:** None

**Disease/Insect Damage:** None

**Mechanical Damage:** rutting(minimal)

**Invasives:** Japanese stiltgrass(9%), Japanese honeysuckle(3%)

#### **Soils Data**

**Site Index Range (Soils):** 88-88

**Site Index Range (Curve):** 108-110

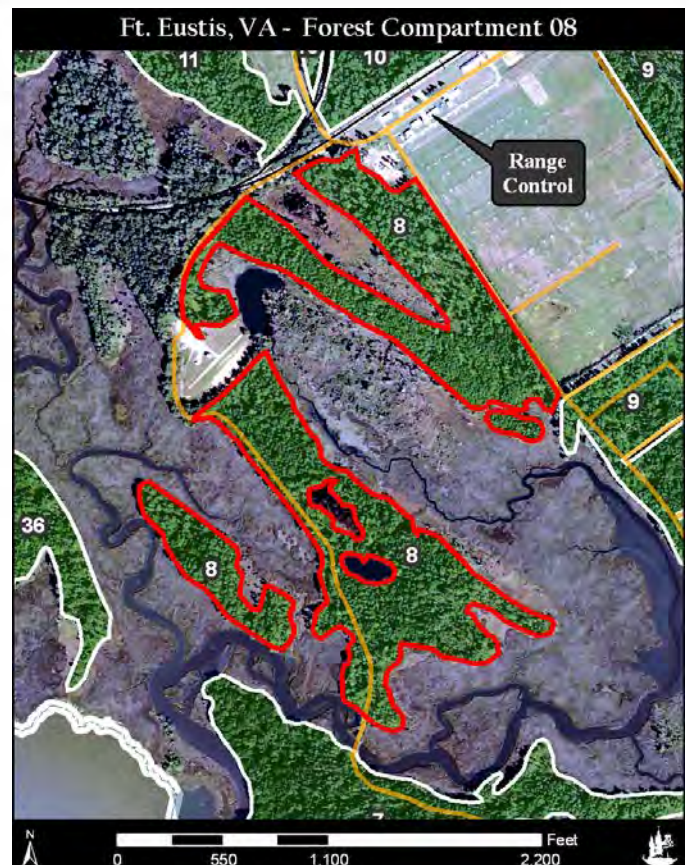
**Average Slope:** 0.00

**Soil Types:**

Bohicket-msc, Chickahominy-sl, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

Two distinct age classes are found within this forest compartment. West of Range 3 and east of a tidal wetland lies a pine/hardwood forest type established in 1917. The pine is over mature, possibly contaminated with metal (from the firing range), and has suffered extensive damage from southern pine beetle. Currently, this area is regenerating into more of a hardwood/pine forest type dominated by sweetgum, southern magnolia, swamp bay, and loblolly pine. The remaining forest (which also includes a small island) was established in 1989 and is located south of Range 2. It consists of a variably stocked pine/hardwood forest type found in mostly moist to wet areas with moderate soil rutting. Loblolly pine and sweetgum are dominant in the upper canopy, growing to heights of 58'.





**Timber & Vegetation Inventory****Forest Product Volume Summary****Sawtimber Product**

Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	4989.61	39	33	128.26	236008
H. Hardwood	0	0	0	0	0
S. Hardwood	2274.56	12	20	194.72	107587
Total:	7264.17	51	53		343595

**Pulpwood Product**

Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.
Pine	8.29	119	43	392
H. Hardwood	0	0	0	0
S. Hardwood	0	0	0	0
Total:	8.29	119	43	392

**Vegetative Class Dominance**

<b>Trees</b>	<b>% Canopy Closure:</b>	88.37
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	658.67
	<b>Dominant Species:</b>	swamp bay, sweetgum, southern magnolia, common persimmon, American hornbeam
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	624.00
	<b>Dominant Species:</b>	wax myrtle, devil's walkingstick, American beautyberry, Japanese honeysuckle, muscadine
<b>Groundcover</b>	<b>Overall Cover:</b>	0.52
	<b>Dominant Species:</b>	Japanese stilt grass, slender woodoats, American beautyberry, Christmas fern, New York fern

**Management Recommendations**

Conduct annual inspections for insect/disease. Two age classes are found within this fragmented compartment that is heavily impacted by range training areas. The upper canopy species east of range three is dominated by mature, pine/hardwood that is extremely valuable as a safety screen and likely contaminated with metal. The upper canopy is fairly open due to significant damage from previous SPB infestation(s). This area is currently regenerating into a heavily stocked hardwood/pine stand, consisting of sweetgum and loblolly. These relatively fast growing species will eventually fill voids left by the declining loblolly. Periodic assessments of afflicted trees along the range area should be made to determine if there is an imminent threat to troops or range personnel. These trees should be carefully removed with minimal damage to adjacent trees. The residual, younger pine/hardwood found south of range two and on a small island within the compartment is variably stocked and found on moist to wet soils. Due to the relatively small acreage, moist to wet soils, accessibility and proximity to range two, commercial thinning would be impractical. Consideration should be given to enhancing the road/firebreak system that currently exists.

## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 09

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)

**2007 Comp. Acreage:** 252.22

**Forest/Veg. Type:** Pine/Hardwood

**Age Range:** 23-83

**Avg. Growth Rate:** 5yr, 0.61 / 10yr, 1.43

**T/E Species:** None

**Disease/Insect Damage:**

**Mechanical Damage:** rutting(moderate)

**Invasives:** Japanese stiltgrass(48%), periwinkle(6%), Japanese honeysuckle(5%), tree-of-heaven(0.8%), English ivy(0.1%), multiflora rose(0.1%), autumn olive(0.1%), Chinese

#### **Soils Data**

**Site Index Range (Soils):** 85-90

**Site Index Range (Curve):** 68-110

**Average Slope:** 0.87

**Soil Types:**

Augusta-fsl, Bohicket-msc, Chickahominy-sl, Craven-Uchee-cx, Newflat-sl, State-s, Tetotum-sl, Udorthents-l

### **Compartment Description**

The compartment is variably aged with relatively small, more mature areas that were reserved from previous harvests for aesthetics, safety, or wetland protection. The majority of the compartment consists of adequate to heavily stocked loblolly pine (pulpwood/small piling) established in 1983-1984. The western portion of the compartment consists of a more mature hardwood component (established 1954), with upper canopy species primarily composed of pulpwood sized sweetgum, black cherry, and a few widely scattered oak species found on slightly drier soils. A variety of hydrologic communities, ranging between palustrine wetlands, mesic flatwoods, and dry, sandy ridges are present in the compartment. The flat to gently sloping topography permits seasonal surface water drainage, which allows a mixture of upland and hydrophytic vegetation to exist. The compartment contains a small southern longleaf pine plantation, which makes up 50% of a once open field/meadow. The remaining 50% has regenerated into loblolly pine (estimated to be approximately 550 saplings per acre), with a few invading scattered ailanthus saplings and autumn olive shrubs.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	2654.95	26	22	102.87	669633
H. Hardwood	60.06	1	1	109.14	15148
S. Hardwood	1458.08	7	12	215.51	367758
Total:	4173.1	33	35		1052538
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	6.07	79	32	1531	
H. Hardwood	0.68	8	4	172	
S. Hardwood	4.3	58	25	1085	
Total:	11.05	145	61	2788	

### Vegetative Class Dominance

<b>Trees</b>	<b>% Canopy Closure:</b>	94.64
	<b>Dominant Species:</b>	loblolly pine, sweetgum, cherrybark oak
<b>Saplings</b>	<b>Total Saplings/ Ac:</b>	443.53
	<b>Dominant Species:</b>	sweetgum, flowering dogwood, loblolly pine, tree of heaven, cherrybark oak
<b>Shrubs</b>	<b>Total Shrubs/ Ac:</b>	679.06
	<b>Dominant Species:</b>	swamp bay, Japanese honeysuckle, American beautyberry, muscadine, wax myrtle
<b>Groundcover</b>	<b>Overall Cover:</b>	0.76
	<b>Dominant Species:</b>	Japanese stilt grass, bigleaf periwinkle, slender woodoats, Christmas fern, yellow crownbeard

### Management Recommendations

Conduct annual inspections for insect/disease. For the purpose of forest health, consider a commercial thinning (south of range three) in 2008-2013. This commercial thinning should be conducted in conjunction with that of compartment three. Trees targeted for removal should be less desirable species such as sweetgum or red maple and weakened/suppressed loblolly pine. The objective of this silvicultural practice would be to create a healthy pine/hardwood stand dominated by loblolly pine (which makes up the majority of the stocking) and mast producing hardwood such as mixed oak species and blackgum with approximately 20' spacing between trees. The westward side of the compartment contains a heavily stocked, hardwood/pine forest type. Although the existing upper canopy is predominantly sweetgum (a less desirable species), a commercial thinning with similar spacing will increase diversity/density in the herbaceous layer which will enhance wildlife habitat and create additional revenue. A 100' wide "no-cut" buffer should be placed around range three where the proposed commercial thinning would be prohibited. Widening of existing firebreaks could also be accomplished congruently with heavy equipment used in the thinning process. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities.



## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 36

### **Compartment Details**

**Location:** Mulberry Island (Supports Training Area: 24)  
**2007 Comp. Acreage:** 29.72  
**Forest/Veg. Type:** Pine/Hardwood  
**Age Range:** 79-91  
**Avg. Growth Rate:** 5yr, 0.16 / 10yr, 0.33  
**T/E Species:** None  
**Disease/Insect Damage:** None  
**Mechanical Damage:** storm damage(8 trees)  
**Invasives:** Chinese privet(8%), Japanese stiltgrass(4%), Japanese honeysuckle(1%)

#### **Soils Data**

<b>Site Index Range (Soils):</b> 86-86	<b>Soil Types:</b>
<b>Site Index Range (Curve):</b> 101-101	Altavista-fsl, Bohicket-msc, State-s
<b>Average Slope:</b> 0.00	

### **Compartment Description**

The forest within this island compartment has suffered significant storm damage (estimated to be 67% of the entire island). The eastern portion of the island remains relatively intact with adequately stocked, mature, large saw timber sized loblolly pine (established in 1916). Midstory species that are common are sweetgum, swamp bay, and dogwood. The central portion of the island includes an area where an estimated 50% of what was once the upper canopy has suffered windthrow damage. Regenerating loblolly pine is present underneath large pine snags, where it appears a previous outbreak of southern pine beetle occurred. The western portion of the compartment has suffered what appears to be the most significant damage. The upper canopy in this area is currently dominated by black cherry and swamp bay growing to heights of 20-25'. Beautyberry, Chinese privet, and wax myrtle are frequently observed in the shrub/sapling layer with Japanese stilt grass and slender woodoats often found to be the dominant ground cover.



## Timber & Vegetation Inventory

<b>Forest Product Volume Summary</b>					
<b>Sawtimber Product</b>					
Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine	6572.62	15	33	445.07	195338
H. Hardwood	504.73	6	7	80.93	15001
S. Hardwood	0	0	0	0	0
Total:	7077.34	21	40		210339
<b>Pulpwood Product</b>					
Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.	
Pine	0.84	4	3	25	
H. Hardwood	1.25	12	7	37	
S. Hardwood	1.65	23	10	49	
Total:	3.73	40	20	111	

## Vegetative Class Dominance

<i>Trees</i>	<i>% Canopy Closure:</i>	88.11
	<i>Dominant Species:</i>	loblolly pine, sweetgum, black cherry
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	780.00
	<i>Dominant Species:</i>	swamp bay, loblolly pine
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	260.00
	<i>Dominant Species:</i>	muscadine, American beautyberry, wax myrtle, Chinese privet
<i>Groundcover</i>	<i>Overall Cover:</i>	0.29
	<i>Dominant Species:</i>	Japanese stilt grass, slender woodoats, swamp bay, American beautyberry, wax myrtle

## Management Recommendations

Due to access limitations, this forest compartment is considered as non-manageable.

## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 37

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)  
**2007 Comp. Acreage:** 12.61  
**Forest/Veg. Type:** NA  
**Age Range:** NA  
**Avg. Growth Rate:** 5yr, / 10yr,  
**T/E Species:** None  
**Disease/Insect Damage:** NA  
**Mechanical Damage:** NA  
**Invasives:** NA

#### **Soils Data**

<b>Site Index Range (Soils):</b> NA	<b>Soil Types:</b>
<b>Site Index Range (Curve):</b> NA	Bohicket-msc, Tetotum-sl
<b>Average Slope:</b>	

### **Compartment Description**

This compartment is composed of three small islands found along the southwestern coast of Mulberry Island, along the James River.





# **Timber & Vegetation Inventory**

## **Forest Product Volume Summary**

### **Sawtimber Product**

Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine					
H. Hardwood					
S. Hardwood					
Total:					

### **Pulpwood Product**

Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.
Pine				
H. Hardwood				
S. Hardwood				
Total:				

## **Vegetative Class Dominance**

<i>Trees</i>	<i>% Canopy Closure:</i>	
	<i>Dominant Species:</i>	NA
<i>Saplings</i>	<i>Total Saplings/ Ac:</i>	
	<i>Dominant Species:</i>	NA
<i>Shrubs</i>	<i>Total Shrubs/ Ac:</i>	
	<i>Dominant Species:</i>	NA
<i>Groundcover</i>	<i>Overall Cover:</i>	
	<i>Dominant Species:</i>	NA

## **Management Recommendations**

Due to access limitations, this forest compartment is considered as non-manageable.

## *Ft. Eustis Forest Compartment Analysis*

- Mulberry Island (South) -

Compartment # 38

### **Compartment Details**

**Location:** Mulberry Island (Supports Firing Range impact area)  
**2007 Comp. Acreage:** 4.64  
**Forest/Veg. Type:** NA  
**Age Range:** NA  
**Avg. Growth Rate:** 5yr, / 10yr.  
**T/E Species:** bald eagle  
**Disease/Insect Damage:** NA  
**Mechanical Damage:** NA  
**Invasives:** NA

#### **Soils Data**

<b>Site Index Range (Soils):</b> NA	<b>Soil Types:</b>
<b>Site Index Range (Curve):</b> NA	Bohicket-msc, Tetotum-sl
<b>Average Slope:</b>	

### **Compartment Description**

This island compartment is located near the southernmost tip of Mulberry Island.



## Timber & Vegetation Inventory

### Forest Product Volume Summary

#### Sawtimber Product

Sawtimber:	Vol/Acre	Trees/Acre	Basal Area/Ac.	Avg. Size	Total Comp. Vol.
Pine					
H. Hardwood					
S. Hardwood					
Total:					

#### Pulpwood Product

Pulpwood:	Cords/Acre	Trees/Acre	Basal Area/Ac.	Total Cords/Comp.
Pine				
H. Hardwood				
S. Hardwood				
Total:				

### Vegetative Class Dominance

Trees	% Canopy Closure:	
	Dominant Species:	NA
Saplings	Total Saplings/ Ac:	
	Dominant Species:	NA
Shrubs	Total Shrubs/ Ac:	
	Dominant Species:	NA
Groundcover	Overall Cover:	
	Dominant Species:	NA

### Management Recommendations

Due to access limitation, this forest compartment is considered as non-manageable, however, here a bald eagle nest exists. Although the bald eagle has been delisted, and no longer considered an endangered or threatened species, it is protected by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).



## **Mulberry Island (South) - Management Considerations:**

### **Training**

Training/Range Areas on Mulberry Island – South are supported on 12 forest compartments, labeled 1 through 9, and 36, and 37. Reference is made to Figure: 2.2C, titled Ft. Eustis, VA ~ Mulberry Island (South): Training Areas and Ranges. The Range Training Area is used for training at four primary sites: the 25-meter Range (R-2), Combat Positions Range (R-3), the known Distance Range (R-4), and the M203.-Law-Grenade Range (R-5). Although these firing range sites constitute less than 10% of the total acreage, their operations directly affect all of Mulberry –South, due to the necessity of down-range safety fans. Due to heightened military and police training requirements, access behind the range is very limited, due to the necessity of down-range safety fans. Primary vegetation impacts associated with the operation of these ranges would likely be confined to Compartments 8 and 9.

### **Metal Contamination of the Forest**

Mulberry Island has a long-history of supporting live fire training activities from both the air and ground. Mulberry Island was an artillery and bombing range in the 1940's. Large-scale gunnery and bombing practice ended by the 1950's. In the event timber is sold from Mulberry Island, all potential buyers should be informed of the possibility of metal contamination within the trees. All forest manufacturing facilities have metal detection sensors throughout the production line to identify contamination. However, additional metal sensors can be installed to further reduce risk of equipment damage. The risk of contamination can be somewhat evaluated by looking at the age of the timber. Since live fire gunnery and bombing practice ended approximately 40 years ago. Any timber that became established in 1960's or later likely is clear of metal contamination except within compartments 8 and 9, where on-going live fire training at the ranges could create additional risks.

## **6.6 - General Management Recommendations**

The recommendations as outlined for each compartment should be implemented within the time period specified whenever possible. However, training schedules, the need for cultural resource evaluations and other factors may delay implementation. Therefore, for planning purposes projects should be planned and coordinated on a five-year planning period. Reference is made to Table 6.6 for a summary of management recommendations for each compartment.

**Table 6.6, Forest Compartment Management Recommendations**

Comp. #	Management Recommendations
01	Conduct annual inspections for insect/disease/invasives. There is little commercial value found in the poor quality black walnuts and hackberry trees, and the relatively few loblolly pines that are of saw timber size are found in Chesapeake Bay Preservation Act Resource Protection Areas. The loblolly pines are, however, currently providing perching opportunities for raptors such as the bald eagle and may additionally provide future nesting opportunities. Tree-of-heaven saplings were found on occasion while traversing through the compartment. The invasive nature of this species combined with sparse competition and a relatively open upper canopy are cause for concern. It is recommended that consideration be given to installing control methods/techniques to limit its dispersion. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities.
02	Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2013. The loblolly pine within this compartment is mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus. Declining growth rates indicate loss of vigor which may increase the likelihood of future insect/disease problems. The goal of the selective harvest would be the removal of the loblolly pine and less desirable hardwoods such as red maple and sweetgum and the protection of species that have longer life spans such as white oak, cherrybark oak and black gum, which typically are good mast producers. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas. A selective harvest is mentioned as a management recommendation/consideration that would benefit the forests' current and/or foreseeable health, however, conditional constraints must also be considered such as limited access attributed to training and eagle management zones. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities
03	Conduct annual inspections for insect/disease and consider a commercial thinning within 2008-2013. The forest within this fragmented compartment consists primarily of heavily stocked, loblolly pine. The accessible, mainland areas (appx. 28 acres combined) could be greatly enhanced by a commercial thinning. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities.
04	Conduct annual inspections for insect/disease/invasives. This compartment is very similar in age and species composition to compartment one. Little commercial value is present except for an occasional saw timber-sized black walnut tree, however, wildlife use seems to be high especially from white-tailed deer. Tree-of-heaven saplings were found on occasion while traversing through the compartment. The invasive nature of this species combined with sparse competition and a relatively open upper canopy are cause for concern. It is recommended that consideration be given to installing control methods/techniques to limit its dispersion.
05	Due to access issues, the forest within this fragmented (three islands) compartment should be considered non-manageable. Currently, a bald eagle nest exists on the westward side of the large, middle island. Although the bald eagle has been delisted, and not currently considered an endangered or threatened species, it is protected by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).
06	Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2013. The loblolly pine within this compartment is mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus. Additionally, declining growth rates indicated loss of vigor which may increase the likelihood of future insect/disease problems. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas. Currently, an active bald eagle nest is found within this compartment. Training and proposed silvicultural practices should adhere to eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).

**Table 6.6, Forest Compartment Management Recommendations**

Comp. #	Management Recommendations
07	<p>Conduct annual inspections for insect/disease/bridge condition and reevaluate in 2018. Currently, there are two age classes found in this compartment as a result of a partial harvest that occurred in 1970. The more mature age class is showing some reduction in vigor, however, there is insufficient timber volume to warrant a commercial harvest at the present time. It is expected that in 2018, the younger pine component found within this compartment will become mature and large enough to commercially harvest as saw timber. Consideration should be given to include both age classes in a selective harvest. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within the Chesapeake Bay Preservation Act Resource Protection Areas. The mature pine, although a much smaller component of the compartment overall, does create a risk of a future southern pine beetle infestation that could possibly spread throughout the pine. Normally, southern pine beetles (SPB) attack and kill stress-weakened trees, however, during years when populations reach epidemic proportions, even younger, healthy trees can be attacked, especially in overstocked loblolly stands.</p>
08	<p>Conduct annual inspections for insect/disease. Two age classes are found within this fragmented compartment that is heavily impacted by range training areas. The upper canopy species east of range three is dominated by mature, pine/hardwood that is extremely valuable as a safety screen and likely contaminated with metal. The upper canopy is fairly open due to significant damage from previous SPB infestation(s). This area is currently regenerating into a heavily stocked hardwood/pine stand, consisting of sweetgum and loblolly. These relatively fast growing species will eventually fill voids left by the declining loblolly. Periodic assessments of afflicted trees along the range area should be made to determine if there is an imminent threat to troops or range personnel. These trees should be carefully removed with minimal damage to adjacent trees. The residual, younger pine/hardwood found south of range two and on a small island within the compartment is variably stocked and found on moist to wet soils. Due to the relatively small acreage, moist to wet soils, accessibility and proximity to range two, commercial thinning would be impractical. Consideration should be given to enhancing the road/firebreak system that currently exists.</p>
09	<p>Conduct annual inspections for insect/disease. For the purpose of forest health, consider a commercial thinning (south of range three) in 2008-2013. This commercial thinning should be conducted in conjunction with that of compartment three. Trees targeted for removal should be less desirable species such as sweetgum or red maple and weakened/suppressed loblolly pine. The objective of this silvicultural practice would be to create a healthy pine/hardwood stand dominated by loblolly pine (which makes up the majority of the stocking) and mast producing hardwood such as mixed oak species and blackgum with approximately 20' spacing between trees. The westward side of the compartment contains a heavily stocked, hardwood/pine forest type. Although the existing upper canopy is predominantly sweetgum (a less desirable species), a commercial thinning with similar spacing will increase diversity/density in the herbaceous layer which will enhance wildlife habitat and create additional revenue. A 100' wide "no-cut" buffer should be placed around range three where the proposed commercial thinning would be prohibited. Widening of existing firebreaks could also be accomplished congruently with heavy equipment used in the thinning process. Eagle management zones that are defined by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF) should guide all silvicultural and training activities.</p>
10	<p>Conduct annual inspections for insect/disease and reevaluate in 2018. Sampling within the compartment found a pine/hardwood plantation with establishment dates from 1967-1982 as well as a mature, pine hardwood stand established between 1923-1927. It is likely that in 2018, the younger component of pine/hardwood within this compartment will become commercially valuable as saw timber and could be managed with the mature pine/hardwood.</p>
11	<p>Conduct annual inspections for insect/disease and reevaluate in 2012 for a commercial thinning/partial harvest. The stocking within the core of this compartment is variable and an assessment will need to be made in 2012 to evaluate crown closure and crown class to determine if a commercial thinning is practical. If a commercial thinning becomes practical, also consider a selective harvest within the buffers that were left previously. The buffers are performing functions such as protecting water quality and aesthetic/safety screens as well as wildlife corridors, however a large percentage of the stocking is over mature loblolly pine. It would be necessary to carefully designate trees for removal so that the original objective(s) of the buffer(s) are minimally compromised and that Chesapeake Bay Resource Protection Area guidelines are followed.</p>



**Table 6.6, Forest Compartment Management Recommendations**

Comp. #	Management Recommendations
12	Conduct annual inspections for insect/disease and reevaluate in 2012 for a commercial thinning. This small compartment would be impractical to thin unless timed in conjunction with compartment 11.
13	Conduct annual inspections for insect/disease and consider a selective harvest in 2012 for the southern portion of this compartment. The southern portion contains pockets of large, merchantable pine saw timber along with some smaller mixed oaks and sweetgum and red maple. Consider placing 50'-75' aesthetic selective-cut buffers along Mulberry Road and the ammunition storage area. Trees targeted for removal should include the majority of the loblolly pine and suppressed, weakened, or damaged tree species that may become a hazard to roadways, powerlines, or buildings. Install 50'-75' riparian "no-cut" buffers along Chesapeake Bay Preservation Act Resource Protection Areas.
14	Conduct annual inspections for insect/disease and consider a commercial thinning within 2008-2013. Extensive rutting was noted during data collecting, most likely from previous harvesting operations. Consider timing the thinning when seasonal water tables are low to prevent further rutting and soil compaction. Protect water quality by limiting stream/ditch crossings and the installation of 50'-75' "no-cut" riparian buffers along Chesapeake Bay Preservation Act Resource Protection Areas.
15	Conduct annual inspections for insect/disease and consider a selective harvest in 2008-2012 within the central and southern portions of this compartment. The central portion contains a historic brickyard where restrictions protecting the integrity of the site exist. Existing parameters which limit/prohibit harvesting near this archaeological site must be considered in the harvest design and clearly stated in a timber sale contract. Implement 50'-75' riparian "no-cut" buffers along the compartment's interface with the Warwick River and other Chesapeake Bay Preservation Act Resource Protection Areas that may be applicable. The northern portion of this compartment is younger and growth rates are still fair. Consider managing this compartment area with the northern portion of compartment 24, which is similar in age and characteristics.
16	Due to access issues, this compartment is considered non-manageable.
17	Conduct annual inspections for insect/disease and consider a commercial thinning/selective harvest within 2008-2013. The compartment consists primarily of a young, adequate to heavily stocked hardwood/pine forest that could be greatly enhanced by a commercial thinning. This silvicultural practice, although typically performed earlier in the growing stages, would enhance forest health and wildlife foraging opportunities. Consider a selective harvest within the pocketed, more mature areas in conjunction with the thinning operation. Implement 50'-75' riparian "no-cut" buffers along tidal and non-tidal wetlands that fall within Chesapeake Bay Preservation Act Resource Protection Areas.
18	Conduct annual inspections for insect/disease and reevaluate growth rates in 2018. The central island (which is the only island accessible for management considerations) is variably aged and stocked and appears healthy.
19	Conduct annual inspections for insect/disease and consider a selective harvest in 2018. The mature loblolly pine is likely to experience a net reduction in volume from declining growth rates within the next 5 – 10 years. Reduced vigor will also likely increase the risk of insect/disease. Additionally, install 50'-75' riparian "no-cut" buffers in Chesapeake Bay Preservation Act Resource Protection Areas. Certain restrictions protecting the integrity of the Fort Crafford exist and must be further studied prior to harvest design. Existing parameters which limit/prohibit harvesting near this archaeological site must be followed in the harvest design and clearly defined in a timber sale contract.
20	Conduct annual inspections for insect/disease and consider a prescribed burn in 2008-2010 for the northern portion of the compartment and a selective harvest in 2018 for the southern portion (south of the cross roads intersection). The selective harvest should be conducted congruently with compartment 19. In the event of a planned prescribed burn, existing firebreaks must be improved and consideration should be given to adding additional firebreaks.
21	Conduct annual inspections for insect/disease and reevaluate growth rates in 2018. Although the pine component is merchantable, growth rates are fairly vigorous.

**Table 6.6, Forest Compartment Management Recommendations**

Comp. #	Management Recommendations
22	Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2013. The loblolly pine within this compartment is over mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus (although red heart fungus was not found in plot samples). The declining growth rates found in core samples (tree borings) indicate loss of vigor which may increase the likelihood of future insect/disease problems. Implement 50'-75' riparian "no-cut" buffers in Chesapeake Bay Protection Act Resource Protection Areas and 75' wide aesthetic "selective-cut" buffers along the rail road (parallel with Harrison Ave.) and Back River Road, in which trees targeted for removal should be clearly marked. Trees to be removed within the "selective-cut buffers" would be unhealthy loblolly pine and less desirable hardwoods such as red maple and sweetgum.
23	Conduct annual inspections for insect/disease and consider a selective harvest in 2008-2012 for the central and southern portions of this compartment. Growth rates were fairly vigorous in the northern portion of this compartment, found northeast of the DPW Bulk Storage. The loblolly pine within the central and southern portion of the compartment is over mature and showing some indications of decline. Pockets of prior southern pine beetle infestation(s) were observed while collecting data, along with an occasionally infected pine with red heart fungus. The declining growth rates found in core samples (tree borings) indicate loss of vigor which may increase the likelihood of future insect/disease problems. Implement 50'-75' riparian "no-cut" buffers in Chesapeake Bay Preservation Act Resource Protection Areas and 75' wide aesthetic "selective-cut" buffers along Mulberry Island and Back River Roads. Trees targeted for removal within the "selective-cut" buffer should include the majority of the loblolly pine and suppressed, weakened, or damaged tree species that may become a hazard to roadways, powerlines, or buildings. Additionally, install a "no-cut" buffer (prohibiting harvesting) around the permanently flooded area that's found near the middle of the southern portion of the compartment. Timing of timber harvesting within this compartment should occur when seasonal water tables are low.
24	Conduct annual inspections for insect/disease and consider a Commercial Thinning within 2008-2013 for the southern portion of this compartment which can generally be described as the compartment area located north of Mulberry road and south of a large wetland. Designate a riparian "no-cut" buffer prohibiting any thinning activity within 50'-75' of hydric soils found on the edge of the large wetland. Consider timing the commercial thinning with compartment 25. Reevaluate growth rates in 2018 for the northern portion of this compartment (pine forest type) and consider managing this area with the northern portion of compartment 15 (of similar age and characteristics).
25	Conduct annual inspections for insect/disease and consider a Commercial Thinning within 2008-2013. Consider timing a commercial thinning in conjunction with planned clearing or site enhancements in this vicinity. Logging equipment could be utilized to remove vegetation and substantially limit costs of additional site clearing equipment and debris disposal. Consider timing the commercial thinning with the southern portion of compartment 24.
26	This compartment is subdivided by natural drainage systems and steeply sloped ravines, which will make commercial logging impractical. The forest vegetation within this compartment is critical in preventing erosion and filtering excessive nutrients/contaminants from nearby roads, parking lots and administrative buildings. Additionally the compartment is used for training (confidence course) and recreation such as walking and trail running. Forest management activities should be limited to maintain the health and vigor of the residual trees. Conduct annual exams to identify hazardous trees in these primary use areas. Hazard trees should be carefully dropped and left on-site to limit soil disturbance and possible injury to neighboring trees/structures. In the event of future construction or site clearing within this compartment, consideration should be given to remove trees within the "footprint" of construction/clearing as well as over mature loblolly in the general vicinity.

**Table 6.6, Forest Compartment Management Recommendations**

Comp. #	Management Recommendations
27	<p>Conduct annual inspections for insect/disease and consider a selective harvest within 2008-2012 for the majority of this compartment. Two areas that should be excluded from the selective harvest are the area immediately west of the Natural Resources Office and another area found near the intersection of Taylor and Washington Avenue. Both of these areas should be reevaluated in 2018. The majority of the loblolly pine found within the compartment is over mature and showing some indications of decline. Red heart fungus was noted in 43% of sampled areas. Additionally, declining growth rates found in core samples (tree borings) indicate loss of vigor which may increase the likelihood of future insect/disease problems. Install 50'-75' riparian "no-cut" buffers along Chesapeake Bay Preservation Act Resource Protection Areas. Install 50'-75' aesthetic "selective-cut" buffers around the road system and administrative buildings. Attempts should be made to remove the majority of the pines and weakened, suppressed, or damaged species within the aesthetic "selective-cut" buffer, due to the likelihood they may become a hazard to roadways, power lines and administrative buildings. Trees targeted for removal should be clearly marked. Vegetation maintenance in forested areas by using tractor-like mowing devices can cause significant injury to trees by damaging tree stems (butts) and roots (compaction), similar to that which is found north of Taylor Avenue. The use of mulch and selective use of herbicide should be considered as an alternative management method.</p>
28	<p>Conduct annual inspections for insect/disease, hazard trees, and excessive erosion from storm water. This narrow compartment should be considered non-commercial due to its importance as a water quality buffer. The forest vegetation within this compartment is critical in preventing erosion and filtering excessive nutrients/contaminants from nearby roads, parking lots and administrative buildings.</p>
29	<p>Conduct annual inspections for insect/disease. The forest appears healthy and is providing ideal habitat for a variety of wildlife. The dense upper canopy along the interface between the tidal creek and fresh water streams provides cover for neotropical migratory songbirds, perching opportunities for wading birds including several species of herons and egrets, and also renders foraging opportunities for an array of small mammals and resident birds. Historically, the compartment area has been used for troop training, which was apparent by the considerable amount of low threshold ground disturbances, primarily pit &amp; mound (fox holes), which could possibly be used as breeding pools for the threatened salamander, Maybee's salamander. Maybee's salamander has been found in the Newport News area (Grafton area sinkhole pond complex) and is listed as a threatened salamander in Virginia. It is threatened by habitat fragmentation, aquatic and terrestrial habitat loss, road mortality, and alteration of hydrology mostly due to urbanization. Based on the Facility Master Plan, a portion of this compartment may be placed in a more intensive land use (TACT Equip Maint. Fac.). Pursuant to the environmental assessment associated with this potential project, a comprehensive evaluation of the status/population of the Maybee's salamander should occur. The compartment also serves as a valuable vegetation screen (buffer) abutting undeveloped private land that could possibly minimize potential conflict between military and private land uses. It is highly likely the adjacent, undeveloped private land will be placed in a more intensive land use, even further intensifying the importance of the vegetation screen which currently exists.</p>



**Table 6.6, Forest Compartment Management Recommendations**

Comp. #	Management Recommendations
30	Conduct annual inspections for insect/disease, hazard trees, and excessive erosion from storm water. The narrow forested area on the north side of Wilson Avenue should be considered non-commercial due to its importance as a vegetation buffer. The forest in this area abuts a large drain that flows underneath Wilson Avenue and eventually into the Warwick River. The forest vegetation is critical in preventing erosion and filtering nutrients/contaminants from nearby roads, parking lots, administrative buildings and base housing. The forested area on the south side of Wilson Avenue provides the same function, however, it is considerably larger. Based on the Facility Master Plan, some of this area may be placed in a more intensive land use (executive homes). Once development plans are finalized, a detailed vegetation management plan should be devised that incorporates recommended forest practices within or in close proximity to the proposed housing area. The current Facility Master Plan indicates proposed construction in the vicinity of an over mature pine/hardwood forest type. Once plans are finalized, a selective harvest is recommended. The selective harvest would target trees within the construction footprint, hazard/over mature trees in close proximity, and accessible, loblolly pine, tulip poplar, red maple, and sweetgum. The use of logging equipment and offsite removal of vegetation could significantly aid in site clearing and possibly produce some revenue. Install 50'-75' riparian "no-cut" buffers in Chesapeake Bay Protection Act Resource Protection Areas. Long-lived specimen trees such as white oaks should be protected during new construction where practical. The remaining forest within the compartment should be retained for aesthetics and environmental protection (water quality).
31	Conduct annual inspections for insect/disease and hazard trees. The forest within this compartment is variably aged, narrow, extremely fragmented, and vital in filtering nutrients/contaminants from the golf course. Hazard trees/branches should be removed in areas where they may jeopardize the safety of personnel using or maintaining the golf course.
33	Due to access limitations, this forest compartment is considered as non-manageable.
34	This compartment is noncommercial and can be found on an island where a bald eagle nest exists. Although the bald eagle has been delisted, and no longer considered an endangered or threatened species, it is protected by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).
35	Due to access limitations, this forest compartment is considered as non-manageable.
36	Due to access limitations, this forest compartment is considered as non-manageable.
37	Due to access limitations, this forest compartment is considered as non-manageable.
38	Due to access limitation, this forest compartment is considered as non-manageable, however, here a bald eagle nest exists. Although the bald eagle has been delisted, and no longer considered an endangered or threatened species, it is protected by the Bald Eagle Protection Guidelines for Virginia (USFWS/VDGIF).

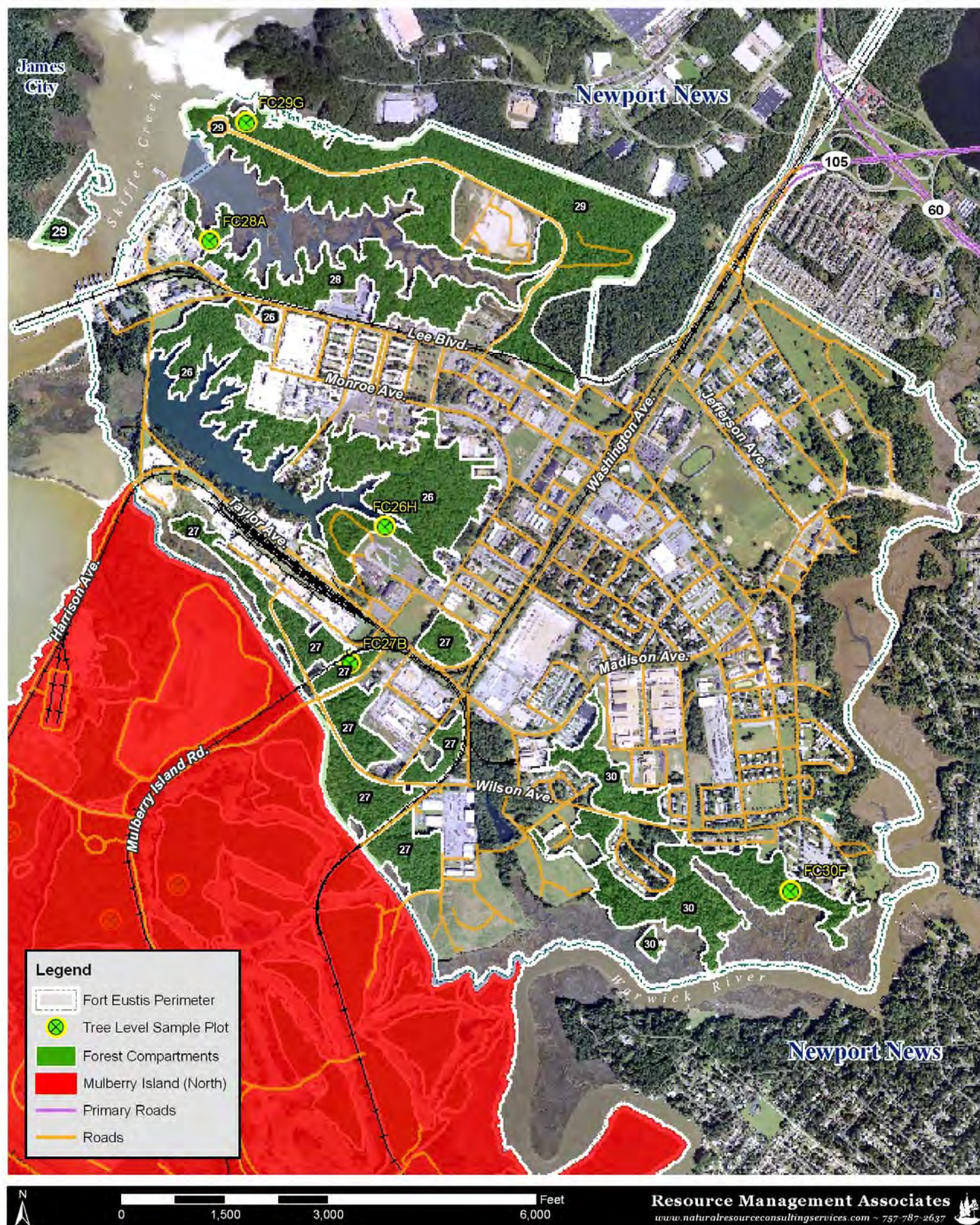
## **6.7 - Tree Level Data**

Tree level data was collected in order to document the species composition of select plots. One plot within each compartment was chosen arbitrarily from within the field. Plots were chosen arbitrarily for the purpose of covering a variety of forest types and ecological conditions. Refer to Figure: 6.7A, Fort Eustis, VA ~ Main Post: Tree Level Sample Plot Locations, Figure: 6.7B, Fort Eustis, VA ~ Mulberry Island (North): Tree Level Sample Plot Locations, and Figure: 6.7C, Fort Eustis, VA ~ Mulberry Island (South): Tree Level Sample Plot Locations for plot locations. The resulting data was analyzed for overall averages (numerical values) and frequency/percent for species and subclass values (text). Data summaries and raw data for each compartment follow each figure/map.

### **6.71 - Main Post Tree Level Data: Compartments 26-30**



# Ft. Eustis, VA - Main Post: Tree Level Sample Plot Locations





## Forest Compartment 26, Sample Plot H: Tree-Level Data Summary (8 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	American beech	~	1	12.5
	loblolly pine	~	1	12.5
	tulip poplar	~	4	50.0
	white oak	~	2	25.0
DIAMETER		17.00	~	~
HEIGHT		75.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	6	75.0
	Intermediate	~	2	25.0
LIVE CROWN		40.00	~	~
CROWN DIAMETER		29.00	~	~
5YR GR		0.10	~	~
10YR GR		0.20	~	~
TREE CONDITION	Good	~	6	75.0
	Fair	~	2	25.0
TREE QUALITY	Acceptable Growing Stock	~	7	87.5
	Unacceptable Growing Stock	~	1	12.5
FOREST PRODUCT	Pulpwood	~	2	25.0
	Sawtimber	~	6	75.0

## Forest Compartment 26, Sample Plot H: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC26H	1	loblolly pine	18	78	3	Co-dominant	28	22	0.1	0.19	Good	Acceptable Growing Stock	Sawtimber	None
	2	white oak	18	66	2	Intermediate	50	37	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	white oak	28	78	1.5	Co-dominant	45	35	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	American beech	16	78	1.5	Co-dominant	33	24	~	~	Fair	Unacceptable Growing Stock	Pulpwood	Broken branch @ 30' / erosion @ roots
	5	tulip poplar	10	60	2	Intermediate	30	25	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	6	tulip poplar	16	76	2.5	Co-dominant	55	33	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	tulip poplar	16	80	2.5	Co-dominant	38	32	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	tulip poplar	14	80	2	Co-dominant	40	22	~	~	Fair	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 27, Sample Plot B: Tree-Level Data Summary (9 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	9	100.0
DIAMETER		11.00	~	~
HEIGHT		69.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	8	88.9
	Intermediate	~	1	11.1
LIVE CROWN		17.00	~	~
CROWN DIAMETER		18.00	~	~
5YR GR		0.60	~	~
10YR GR		1.30	~	~
TREE CONDITION	Good	~	9	100.0
TREE QUALITY	Acceptable Growing Stock	~	9	100.0
FOREST PRODUCT	Pulpwood	~	1	11.1
	Sawtimber	~	8	88.9

## Forest Compartment 27, Sample Plot B: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC27B	1	loblolly pine	14	70	2.5	Co-dominant	18	24	0.55	1.25	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	10	70	1	Co-dominant	18	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	14	70	2.5	Co-dominant	18	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	8	65	1.5	Intermediate	12	13	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	loblolly pine	12	70	2	Co-dominant	16	16	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	10	70	1.5	Co-dominant	18	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	12	70	2	Co-dominant	18	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	loblolly pine	10	70	2.5	Co-dominant	15	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	loblolly pine	10	70	1	Co-dominant	18	15	~	~	Good	Acceptable Growing Stock	Sawtimber	None



## Forest Compartment 28, Sample Plot A: Tree-Level Data Summary (12 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	2	16.7
	white oak	~	10	83.3
DIAMETER		16.00	~	~
HEIGHT		84.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	8	66.7
	Intermediate	~	4	33.3
LIVE CROWN		53.00	~	~
CROWN DIAMETER		32.00	~	~
5YR GR		0.30	~	~
10YR GR		0.40	~	~
TREE CONDITION	Good	~	11	91.7
	Poor	~	1	8.3
TREE QUALITY	Acceptable Growing Stock	~	11	91.7
	Cull	~	1	8.3
FOREST PRODUCT	None	~	1	8.3
	Pulpwood	~	4	33.3
	Sawtimber	~	7	58.3

## Forest Compartment 28, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC28A	1	loblolly pine	16	89	2.5	Co-dominant	20	30	0.28	0.43	Good	Acceptable Growing Stock	Sawtimber	None
	2	white oak	16	89	1.5	Co-dominant	65	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	white oak	12	85	2	Intermediate	70	18	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4	white oak	14	68	1.5	Intermediate	53	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	white oak	12	85	1.5	Intermediate	55	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	6	white oak	16	85	1	Co-dominant	70	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	18	92	0	Co-dominant	25	30	~	~	Poor	Cull	None	Red heart present
	8	white oak	14	56	1.5	Intermediate	30	28	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	white oak	16	85	1.5	Co-dominant	75	42	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	10	white oak	18	89	2	Co-dominant	70	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	11	white oak	16	95	2.5	Co-dominant	50	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	12	white oak	18	85	1.5	Co-dominant	55	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 29, Sample Plot G: Tree-Level Data Summary (14 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	American beech	~	2	14.3
	cherrybark oak	~	1	7.1
	loblolly pine	~	1	7.1
	swamp chestnut oak	~	1	7.1
	sweetgum	~	3	21.4
	tulip poplar	~	2	14.3
	white oak	~	3	21.4
	willow oak	~	1	7.1
DIAMETER		15.00	~	~
HEIGHT		86.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	6	42.9
	Dominant		1	7.1
	Intermediate	~	4	28.6
	Overtopped	~	3	21.4
LIVE CROWN		49.00	~	~
CROWN DIAMETER		24.00	~	~
5YR GR		0.30	~	~
10YR GR		0.70	~	~
TREE CONDITION	Good	~	12	85.7
	Poor	~	2	14.3
TREE QUALITY		Acceptable Growing Stock	14	100.0
FOREST PRODUCT	Pulpwood	~	7	50.0
	Sawtimber	~	7	50.0

## Forest Compartment 29, Sample Plot G: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC29G	1	cherrybark oak	16	105	2	Co-dominant	65	24	0.3	0.7	Good	Acceptable Growing Stock	Sawtimber	None
	2	sweetgum	16	105	2	Co-dominant	65	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	willow oak	20	105	2	Co-dominant	65	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	tulip poplar	18	105	2.5	Co-dominant	40	22	~	~	Poor	Acceptable Growing Stock	Pulpwood	Hollow
	5	white oak	24	105	2	Dominant	70	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	American beech	8	30	1	Overtopped	20	24	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	7	American beech	6	30	1	Overtopped	16	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	8	loblolly pine	10	90	1.5	Intermediate	24	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	white oak	8	60	1	Overtopped	40	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	10	sweetgum	10	90	1.5	Intermediate	58	18	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	11	swamp chestnut oak	16	90	1.5	Co-dominant	70	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	12	white oak	16	85	1	Intermediate	50	35	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	13	tulip poplar	20	105	2	Intermediate	40	26	~	~	Poor	Acceptable Growing Stock	Pulpwood	Hollow
	14	sweetgum	18	95	2	Co-dominant	65	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 30, Sample Plot F: Tree-Level Data Summary (13 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	American holly	~	1	7.7
	cherrybark oak	~	1	7.7
	loblolly pine	~	6	46.2
	sweetgum	~	4	30.8
	white oak	~	1	7.7
DIAMETER		19.00	~	~
HEIGHT		96.00	~	~
MERCH HEIGHT		3.00	~	~
CROWN CLASS	Co-dominant	~	7	53.8
	Intermediate	~	2	15.4
	Overtopped	~	4	30.8
LIVE CROWN		46.00	~	~
CROWN DIAMETER		29.00	~	~
5YR GR		0.20	~	~
10YR GR		0.30	~	~
TREE CONDITION	Good	~	11	84.6
	Poor	~	2	15.4
TREE QUALITY	Acceptable Growing Stock	~	12	92.3
	Cull	~	1	7.7
FOREST PRODUCT	None	~	1	7.7
	Pulpwood	~	2	15.4
	Sawtimber	~	10	76.9

## Forest Compartment 30, Sample Plot F: Raw Tree-Level Data

PLOT#		TREE #		SPECIES			DIAMETER		HEIGHT	MERCH HEIGHT		CROWN CLASS			LIVE CROWN	CROWN DIAMETER		5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY		FOREST PRODUCT		TREE DAMAGE	
FC30F	1	loblolly pine		18	123	4.5	Co-dominant		60	28	0.15	0.29	Good	Acceptable Growing Stock		Sawtimber	None									
	2	loblolly pine		28	123	4	Co-dominant		50	35	~	~	Good	Acceptable Growing Stock		Sawtimber	None									
	3	American holly		6	28	0	Overtopped		20	14	~	~	Good	Cull		None	None									
	4	sweetgum		14	100	1.5	Intermediate		85	20	~	~	Good	Acceptable Growing Stock		Sawtimber	None									
	5	white oak		22	100	1.5	Intermediate		60	36	~	~	Good	Acceptable Growing Stock		Sawtimber	None									
	6	cherrybark oak		40	123	3	Co-dominant		55	42	~	~	Good	Acceptable Growing Stock		Sawtimber	None									
	7	sweetgum		14	52	1.5	Overtopped		32	22	~	~	Good	Acceptable Growing Stock		Sawtimber	None									
	8	sweetgum		14	52	2	Overtopped		20	20	~	~	Good	Acceptable Growing Stock		Pulpwood	None									
	9	loblolly pine		26	123	3.5	Co-dominant		48	42	~	~	Poor	Acceptable Growing Stock		Sawtimber	Wound @ 10' / possible red heart									
	10	loblolly pine		16	123	4.5	Co-dominant		46	30	~	~	Good	Acceptable Growing Stock		Sawtimber	None									
	11	loblolly pine		18	123	4	Co-dominant		50	36	~	~	Good	Acceptable Growing Stock		Sawtimber	None									
	12	loblolly pine		14	123	2	Co-dominant		45	24	~	~	Poor	Acceptable Growing Stock		Sawtimber	Red heart @ 9' - 25'									
	13	sweetgum		12	55	1.5	Overtopped		25	30	~	~	Good	Acceptable Growing Stock		Pulpwood	None									



**6.72 - Mulberry Island (North) Tree Level Data: Compartments 10-25, 31, & 33-35**

# Ft. Eustis, VA ~ Mulberry Is. (North): Tree Level Sample Plot Locations





## Forest Compartment 10, Sample Plot A: Tree-Level Data Summary (7 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	7	100.0
DIAMETER		12.00	~	~
HEIGHT		60.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	4	57.1
	Dominant	~	1	14.3
	Intermediate	~	1	14.3
	Overtopped	~	1	14.3
LIVE CROWN		23.00	~	~
CROWN DIAMETER		21.00	~	~
5YR GR		0.80	~	~
10YR GR		0.20	~	~
TREE CONDITION	Fair	~	1	14.3
	Good	~	6	85.7
TREE QUALITY	Acceptable Growing Stock	~	6	85.7
	Cull	~	1	14.3
FOREST PRODUCT	None	~	1	14.3
	Pulpwood	~	1	14.3
	Sawtimber	~	5	71.4

## Forest Compartment 10, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC10A	1	loblolly pine	16	65	2.5	Dominant	30	32	0.75	0.2	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	8	32	0	Overtopped	5	16	~	~	Good	Cull	None	Damaged top / sever leaning
	3	loblolly pine	12	65	2.5	Co-dominant	25	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	14	65	2	Co-dominant	25	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	loblolly pine	12	65	2	Co-dominant	25	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	14	65	2.5	Co-dominant	25	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	10	65	1.5	Intermediate	25	18	~	~	Fair	Acceptable Growing Stock	Pulpwood	None



## Forest Compartment II, Sample Plot B: Tree-Level Data Summary (12 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	cherrybark oak	~	1	8.3
	loblolly pine	~	4	33.3
	sweetgum	~	7	58.3
DIAMETER		14.00	~	~
HEIGHT		71.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	4	33.3
	Dominant	~	1	8.3
	Intermediate	~	3	25.0
	Overtopped	~	4	33.3
LIVE CROWN		33.00	~	~
CROWN DIAMETER		24.00	~	~
5YR GR		0.50	~	~
10YR GR		0.90	~	~
TREE CONDITION	Fair	~	4	33.3
	Good	~	8	66.7
TREE QUALITY	Acceptable Growing Stock	~	4	33.3
	Cull	~	1	8.3
	Unacceptable Growing Stock	~	7	58.3
FOREST PRODUCT	None	~	1	8.3
	Pulpwood	~	6	50.0
	Sawtimber	~	5	41.7

## Forest Compartment II, Sample Plot B: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FCIIB	1	loblolly pine	24	95	3.5	Dominant	40	30	0.5	0.9	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	20	85	3	Co-dominant	25	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	16	70	1	Co-dominant	30	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	20	95	2.5	Co-dominant	40	25	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	sweetgum	10	60	2	Overtopped	45	30	~	~	Fair	Unacceptable Growing Stock	Pulpwood	None
	6	sweetgum	12	60	1	Overtopped	25	15	~	~	Fair	Unacceptable Growing Stock	Pulpwood	None
	7	sweetgum	12	60	1	Overtopped	30	15	~	~	Fair	Unacceptable Growing Stock	Pulpwood	None
	8	sweetgum	8	70	1.5	Intermediate	30	24	~	~	Good	Unacceptable Growing Stock	Pulpwood	None
	9	sweetgum	10	70	2	Intermediate	30	26	~	~	Good	Unacceptable Growing Stock	Pulpwood	None
	10	sweetgum	12	75	2	Intermediate	40	40	~	~	Good	Unacceptable Growing Stock	Pulpwood	None
	11	cherrybark oak	16	85	1.5	Co-dominant	40	15	~	~	Good	Unacceptable Growing Stock	Sawtimber	None
	12	sweetgum	6	32	0	Overtopped	20	11	~	~	Fair	Cull	None	None

## Forest Compartment 12, Sample Plot B: Tree-Level Data Summary (6 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	6	100.0
DIAMETER		8.00	~	~
HEIGHT		40.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	4	66.7
	Dominant	~	1	16.7
	Intermediate	~	1	16.7
LIVE CROWN		16.00	~	~
CROWN DIAMETER		13.00	~	~
5YR GR		0.70	~	~
10YR GR		1.80	~	~
TREE CONDITION	Fair	~	1	16.7
	Good	~	5	83.3
TREE QUALITY	Acceptable Growing Stock	~	6	100.0
FOREST PRODUCT	Pulpwood	~	6	100.0

## Forest Compartment 12, Sample Plot B: Raw Tree-Level Data

	PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC12B	1		loblolly pine	10	40	1.5	Dominant	20	18	0.65	1.75	Good	Acceptable Growing Stock	Pulpwood	None
	2		loblolly pine	10	40	1	Co-dominant	20	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3		loblolly pine	8	40	1	Co-dominant	20	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4		loblolly pine	8	40	1	Co-dominant	15	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5		loblolly pine	8	40	1.5	Co-dominant	12	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	6		loblolly pine	6	40	1	Intermediate	10	9	~	~	Fair	Acceptable Growing Stock	Pulpwood	None

## Forest Compartment 13, Sample Plot F: Tree-Level Data Summary (12 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	1	8.3
	sweetgum	~	11	91.7
DIAMETER		12.00	~	~
HEIGHT		77.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	3	25.0
	Dominant	~	1	8.3
	Intermediate	~	3	25.0
	Overtopped	~	5	41.7
LIVE CROWN		36.00	~	~
CROWN DIAMETER		19.00	~	~
5YR GR		0.60	~	~
10YR GR		1.10	~	~
TREE CONDITION	Fair	~	5	41.7
	Good	~	7	58.3
TREE QUALITY	Acceptable Growing Stock	~	12	100.0
FOREST PRODUCT	Pulpwood	~	8	66.7
	Sawtimber	~	4	33.3

## Forest Compartment 13, Sample Plot F: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC13F	1	loblolly pine	20	95	4	Dominant	35	38	0.6	1.1	Good	Acceptable Growing Stock	Sawtimber	None
	2	sweetgum	12	85	2.5	Intermediate	60	10	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	sweetgum	8	75	1.5	Overtopped	65	8	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	4	sweetgum	6	70	1	Overtopped	30	8	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	5	sweetgum	8	55	1	Overtopped	35	8	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	6	sweetgum	12	85	2.5	Intermediate	30	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	7	sweetgum	14	75	1.5	Co-dominant	30	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	sweetgum	10	65	1.5	Overtopped	20	18	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	9	sweetgum	12	75	2	Intermediate	25	15	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	10	sweetgum	16	90	1.5	Co-dominant	30	16	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	11	sweetgum	10	66	1	Overtopped	35	18	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	12	sweetgum	16	88	2	Co-dominant	35	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None



## Forest Compartment 14, Sample Plot B: Tree-Level Data Summary (7 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	black cherry	~	1	14.3
	loblolly pine	~	4	57.1
	sweetgum	~	2	28.6
DIAMETER		7.00	~	~
HEIGHT		61.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	5	71.4
	Dominant	~	1	14.3
	Intermediate	~	1	14.3
LIVE CROWN		22.00	~	~
CROWN DIAMETER		16.00	~	~
5YR GR		1.50	~	~
10YR GR		2.80	~	~
TREE CONDITION	Good	~	7	100.0
TREE QUALITY	Acceptable Growing Stock	~	6	85.7
	Cull	~	1	14.3
FOREST PRODUCT	None	~	1	14.3
	Pulpwood	~	5	71.4
	Sawtimber	~	1	14.3

## Forest Compartment 14, Sample Plot B: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC14B	1	loblolly pine	10	60	1.5	Dominant	30	24	1.5	2.8	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	6	56	1.5	Intermediate	12	14	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	loblolly pine	8	60	2	Co-dominant	20	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4	sweetgum	6	62	1	Co-dominant	25	14	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	sweetgum	6	62	1	Co-dominant	25	14	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	6	loblolly pine	8	62	1.5	Co-dominant	20	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	7	blackgumk cherry	8	62	0	Co-dominant	20	16	~	~	Good	Cull	None	None

## Forest Compartment 15, Sample Plot A: Tree-Level Data Summary (13 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	black cherry	~	1	7.7
	loblolly pine	~	5	38.5
	muckernut hickory	~	1	7.7
	sweetgum	~	2	15.4
	white oak	~	4	30.8
DIAMETER		20.00	~	~
HEIGHT		82.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	6	46.2
	Dominant	~	1	7.7
	Intermediate	~	2	15.4
	Overtopped	~	4	30.8
LIVE CROWN		35.00	~	~
CROWN DIAMETER		38.00	~	~
5YR GR		0.20	~	~
10YR GR		0.40	~	~
TREE CONDITION	Good	~	12	92.3
	Poor	~	1	7.7
TREE QUALITY	Acceptable Growing Stock	~	13	100.0
FOREST PRODUCT	Pulpwood	~	2	15.4
	Sawtimber	~	11	84.6

## Forest Compartment 15, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC15A	1	loblolly pine	26	98	4	Dominant	25	60	0.2	0.4	Good	Acceptable Growing Stock	Sawtimber	None
	2	white oak	22	90	1.5	Intermediate	40	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	22	98	3.5	Co-dominant	25	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	14	96	2	Co-dominant	25	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	white oak	26	90	2	Intermediate	60	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	sweetgum	16	60	1.5	Overtopped	25	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	sweetgum	20	90	1.5	Co-dominant	40	40	~	~	Good	Acceptable Growing Stock	Sawtimber	Partially hollow
	8	blackgumk cherry	8	35	1	Overtopped	15	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	white oak	28	94	1.5	Co-dominant	60	35	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	10	muckernut hickory	6	45	1	Overtopped	50	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	11	loblolly pine	26	98	3.5	Co-dominant	30	40	~	~	Poor	Acceptable Growing Stock	Sawtimber	Red heart present
	12	white oak	24	75	1.5	Overtopped	30	55	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	13	loblolly pine	26	98	4	Co-dominant	30	52	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 16, Sample Plot C: Tree-Level Data Summary (13 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	black cherry	~	1	7.7
	cherrybark oak	~	1	7.7
	loblolly pine	~	3	23.1
	sweetgum	~	8	61.5
DIAMETER		10.00	~	~
HEIGHT		64.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	2	15.4
	Dominant	~	1	7.7
	Intermediate	~	5	38.5
	Overtopped	~	5	38.5
LIVE CROWN		26.00	~	~
CROWN DIAMETER		18.00	~	~
5YR GR		0.30	~	~
10YR GR		0.70	~	~
TREE CONDITION	Fair	~	5	38.5
	Good	~	8	61.5
TREE QUALITY	Acceptable Growing Stock	~	13	100.0
FOREST PRODUCT	Pulpwood	~	10	76.9
	Sawtimber	~	3	23.1

## Forest Compartment 16, Sample Plot C: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC16C	1	loblolly pine	12	72	3	Dominant	22	24	0.25	0.7	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	10	65	2.5	Intermediate	18	18	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	loblolly pine	12	72	2.5	Co-dominant	22	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	sweetgum	12	65	2	Intermediate	25	18	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	sweetgum	10	65	2	Intermediate	25	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	6	sweetgum	10	50	1.5	Overtopped	20	12	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	7	blackgumk cherry	12	65	1.5	Overtopped	27	20	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	8	sweetgum	8	65	1.5	Intermediate	20	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	sweetgum	8	70	1.5	Overtopped	30	12	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	10	sweetgum	8	60	1	Overtopped	30	15	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	11	sweetgum	8	60	1	Overtopped	40	18	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	12	cherrybark oak	14	60	1	Intermediate	40	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	13	sweetgum	10	60	1.5	Co-dominant	25	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None



## Forest Compartment 17, Sample Plot D: Tree-Level Data Summary (14 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	14	100.0
DIAMETER		9.00	~	~
HEIGHT		63.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	7	50.0
	Intermediate	~	6	42.9
	Overtopped	~	1	7.1
LIVE CROWN		16.00	~	~
CROWN DIAMETER		14.00	~	~
5YR GR		0.70	~	~
10YR GR		1.40	~	~
TREE CONDITION	Fair	~	3	21.4
	Good	~	9	64.3
	Poor	~	2	14.3
TREE QUALITY	Acceptable Growing Stock	~	12	85.7
	Cull	~	2	14.3
FOREST PRODUCT	Pulpwood	~	9	64.3
	Sawtimber	~	3	21.4

## Forest Compartment 17, Sample Plot D: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC17D	1	loblolly pine	6	55	1	Intermediate	15	8	0.65	1.4	Good	Acceptable Growing Stock	Pulpwood	None
	2	loblolly pine	8	66	2	Co-dominant	18	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	loblolly pine	10	66	1	Intermediate	12	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4	loblolly pine	6	66	1	Intermediate	12	8	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	loblolly pine	14	66	1.5	Co-dominant	22	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	10	55	0	Overtopped	12	10	~	~	Fair	Cull	None	Butt damage
	7	loblolly pine	12	66	0	Co-dominant	10	15	~	~	Fair	Cull	None	8 metal spikes
	8	loblolly pine	10	66	2	Co-dominant	18	15	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	loblolly pine	12	45	1.5	Intermediate	6	15	~	~	Fair	Acceptable Growing Stock	Sawtimber	None
	10	loblolly pine	8	66	1.5	Co-dominant	22	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	11	loblolly pine	8	66	1.5	Co-dominant	20	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	12	loblolly pine	8	66	1	Intermediate	12	16	~	~	Poor	Acceptable Growing Stock	Pulpwood	None
	13	loblolly pine	10	66	1.5	Co-dominant	18	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	14	loblolly pine	8	66	1	Intermediate	20	9	~	~	Poor	Acceptable Growing Stock	Pulpwood	None

## Forest Compartment 18, Sample Plot A: Tree-Level Data Summary (10 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	blackgum	~	1	10.0
	cherrybark oak	~	3	30.0
	loblolly pine	~	1	10.0
	southern red oak	~	2	20.0
	white oak	~	2	20.0
	willow oak	~	1	10.0
DIAMETER		11.00	~	~
HEIGHT		58.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	7	70.0
	Intermediate	~	1	10.0
	Overtopped	~	2	20.0
LIVE CROWN		32.00	~	~
CROWN DIAMETER		23.00	~	~
5YR GR		0.20	~	~
10YR GR		0.40	~	~
TREE CONDITION	Fair	~	4	40.0
	Good	~	6	60.0
TREE QUALITY	Acceptable Growing Stock	~	10	100.0
FOREST PRODUCT	Pulpwood	~	7	70.0
	Sawtimber	~	3	30.0

## Forest Compartment 18, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC18A	1	loblolly pine	10	65	1.5	Co-dominant	18	18	0.24	0.35	Good	Acceptable Growing Stock	Sawtimber	None
	2	southern red oak	10	50	1.5	Intermediate	35	22	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	3	cherrybark oak	14	65	1.5	Co-dominant	35	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	southern red oak	12	65	1	Co-dominant	40	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	blackgumkgum	10	38	1	Overtopped	21	34	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	6	white oak	6	40	1.5	Overtopped	22	12	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	7	cherrybark oak	12	65	1	Co-dominant	40	24	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	8	white oak	10	65	1.5	Co-dominant	25	28	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	cherrybark oak	16	65	1.5	Co-dominant	40	28	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	10	willow oak	12	65	1.5	Co-dominant	40	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None

## Forest Compartment 19, Sample Plot D: Tree-Level Data Summary (5 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	cherrybark oak	~	2	40.0
	loblolly pine	~	3	60.0
DIAMETER		25.00	~	~
HEIGHT		95.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	3	60.0
	Dominant	~	1	20.0
	Intermediate	~	1	20.0
LIVE CROWN		37.00	~	~
CROWN DIAMETER		28.00	~	~
5YR GR		0.30	~	~
10YR GR		0.60	~	~
TREE CONDITION	Fair	~	1	20.0
	Good	~	4	80.0
TREE QUALITY	Acceptable Growing Stock	~	4	80.0
	Cull	~	1	20.0
FOREST PRODUCT	None	~	1	20.0
	Sawtimber	~	4	80.0

## Forest Compartment 19, Sample Plot D: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC19D	1	loblolly pine	18	105	3.5	Dominant	28	30	0.3	0.6	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	18	105	3	Co-dominant	32	26	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	24	105	2.5	Co-dominant	45	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	cherrybark oak	34	65	0	Intermediate	40	22	~	~	Fair	Cull	None	Large nails present
	5	cherrybark oak	32	95	1	Co-dominant	40	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None



## Forest Compartment 20, Sample Plot B: Tree-Level Data Summary (7 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	3	42.9
	sweetgum	~	2	28.6
	tree-of-heaven	~	2	28.6
DIAMETER		14.00	~	~
HEIGHT		58.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	3	42.9
	Dominant	~	1	14.3
	Intermediate	~	2	28.6
	Overtopped	~	1	14.3
LIVE CROWN		30.00	~	~
CROWN DIAMETER		24.00	~	~
5YR GR		0.40	~	~
10YR GR		0.80	~	~
TREE CONDITION	Good	~	6	85.7
	Poor	~	1	14.3
TREE QUALITY	Acceptable Growing Stock	~	5	71.4
	Cull	~	2	28.6
FOREST PRODUCT	None	~	2	28.6
	Pulpwood	~	4	57.1
	Sawtimber	~	1	14.3

## Forest Compartment 20, Sample Plot B: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC20B	1	loblolly pine	22	68	1.5	Dominant	30	32	0.4	0.8	Poor	Acceptable Growing Stock	Pulpwood	Minor butt damage
	2	sweetgum	10	68	1.5	Co-dominant	30	14	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	sweetgum	10	68	1	Co-dominant	30	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4	loblolly pine	8	30	1	Overtopped	12	10	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	tree-of-heaven	6	45	0	Intermediate	30	35	~	~	Good	Cull	None	None
	6	tree-of-heaven	24	60	0	Intermediate	48	30	~	~	Good	Cull	None	None
	7	loblolly pine	16	67	1	Co-dominant	30	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 21, Sample Plot A: Tree-Level Data Summary (5 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	cherrybark oak	~	2	40.0
	loblolly pine	~	1	20.0
	sweetgum	~	1	20.0
	willow oak	~	1	20.0
DIAMETER		10.00	~	~
HEIGHT		57.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	4	80.0
	Intermediate	~	1	20.0
LIVE CROWN		22.00	~	~
CROWN DIAMETER		21.00	~	~
5YR GR		0.30	~	~
10YR GR		1.00	~	~
TREE CONDITION	Good	~	5	100.0
TREE QUALITY	Acceptable Growing Stock	~	5	100.0
FOREST PRODUCT	Pulpwood	~	5	100.0

## Forest Compartment 21, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC21A	1	loblolly pine	12	61	1	Co-dominant	18	12	0.3	1	Good	Acceptable Growing Stock	Pulpwood	None
	2	sweetgum	8	58	1	Co-dominant	18	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	cherrybark oak	14	58	1	Co-dominant	30	30	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4	willow oak	6	50	1	Intermediate	21	24	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	cherrybark oak	10	58	1	Co-dominant	25	28	~	~	Good	Acceptable Growing Stock	Pulpwood	None

## Forest Compartment 22, Sample Plot C: Tree-Level Data Summary (6 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	3	50.0
	sweetgum	~	3	50.0
DIAMETER		20.00	~	~
HEIGHT		95.00	~	~
MERCH HEIGHT		3.00	~	~
CROWN CLASS	Co-dominant	~	6	100.0
LIVE CROWN		25.00	~	~
CROWN DIAMETER		23.00	~	~
5YR GR		0.30	~	~
10YR GR		0.60	~	~
TREE CONDITION	Good	~	6	100.0
TREE QUALITY	Acceptable Growing Stock	~	6	100.0
FOREST PRODUCT	Sawtimber	~	6	100.0

## Forest Compartment 22, Sample Plot C: Raw Tree-Level Data

PLOT#		TREE #	SPECIES		DIAMETER		HEIGHT	MERCH HEIGHT		CROWN CLASS		LIVE CROWN	CROWN DIAMETER		5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC22C	1	loblolly pine	24	105	3	Co-dominant	25	25	0.25	0.55	Good	Acceptable Growing Stock	Sawtimber	None						
	2	loblolly pine	20	90	3	Co-dominant	20	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None						
	3	loblolly pine	28	105	3	Co-dominant	35	34	~	~	Good	Acceptable Growing Stock	Sawtimber	None						
	4	sweetgum	18	90	2.5	Co-dominant	22	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None						
	5	sweetgum	18	90	2	Co-dominant	28	20	~	~	Good	Acceptable Growing Stock	Sawtimber	Tree leaning						
	6	sweetgum	14	90	1.5	Co-dominant	22	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None						



## Forest Compartment 23, Sample Plot A: Tree-Level Data Summary (12 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	7	58.3
	sweetgum	~	3	25.0
	willow oak	~	2	16.7
DIAMETER		20.00	~	~
HEIGHT		77.00	~	~
MERCH HEIGHT		3.00	~	~
CROWN CLASS	Co-dominant	~	6	50.0
	Dominant	~	1	8.3
	Intermediate	~	2	16.7
	Overtopped	~	3	25.0
LIVE CROWN		42.00	~	~
CROWN DIAMETER		31.00	~	~
5YR GR		0.20	~	~
10YR GR		0.20	~	~
TREE CONDITION	Good	~	10	83.3
	Poor	~	2	16.7
TREE QUALITY	Acceptable Growing Stock	~	12	100.0
FOREST PRODUCT	Pulpwood	~	5	41.7
	Sawtimber	~	7	58.3

## Forest Compartment 23, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC23A	1	loblolly pine	16	80	2.5	Intermediate	40	24	0.18	0.24	Poor	Acceptable Growing Stock	Sawtimber	Red heart conk @ 40'
	2	loblolly pine	26	115	3	Co-dominant	42	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	26	115	4	Co-dominant	54	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	22	115	4	Co-dominant	45	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	willow oak	18	40	1.5	Overtopped	28	22	~	~	Poor	Acceptable Growing Stock	Pulpwood	None
	6	loblolly pine	26	115	3.5	Co-dominant	50	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	24	115	3.5	Co-dominant	58	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	sweetgum	14	68	1.5	Intermediate	46	25	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	sweetgum	8	40	1	Overtopped	32	14	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	10	willow oak	18	68	1.5	Co-dominant	52	28	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	11	sweetgum	8	38	1.5	Overtopped	13	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	12	loblolly pine	28	10	3.5	Dominant	49	45	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 24, Sample Plot A: Tree-Level Data Summary (17 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	17	100.0
DIAMETER		11.00	~	~
HEIGHT		81.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	7	41.2
	Dominant	~	1	5.9
	Intermediate	~	7	41.2
	Overtopped	~	2	11.8
LIVE CROWN		20.00	~	~
CROWN DIAMETER		18.00	~	~
5YR GR		0.70	~	~
10YR GR		1.50	~	~
TREE CONDITION	Fair	~	1	5.9
	Good	~	16	94.1
TREE QUALITY	Acceptable Growing Stock	~	16	94.1
	Unacceptable Growing Stock	~	1	5.9
FOREST PRODUCT	Pulpwood	~	8	47.1
	Sawtimber	~	9	52.9

## Forest Compartment 24, Sample Plot A: Raw Tree-Level Data

<div>PLOT#</div> <div>TREE #</div> <div>SPECIES</div> <div>DIAMETER</div> <div>HEIGHT</div> <div>MERCH HEIGHT</div> <div>CROWN CLASS</div> <div>LIVE CROWN</div> <div>CROWN DIAMETER</div> <div>5YR GROWTH RATE</div> <div>10YR GROWTH RATE</div> <div>TREE CONDITION</div> <div>TREE QUALITY</div> <div>FOREST PRODUCT</div> <div>TREE DAMAGE</div>														
FC24A	1	loblolly pine	16	83	3	Dominant	26	34	0.65	1.5	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	14	83	3	Co-dominant	28	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	8	72	1.5	Overtopped	8	20	~	~	Good	Unacceptable Growing Stock	Pulpwood	None
	4	loblolly pine	8	83	2.5	Intermediate	20	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	loblolly pine	10	83	2	Intermediate	20	14	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	6	loblolly pine	10	83	1.5	Intermediate	20	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	7	loblolly pine	6	80	1.5	Intermediate	20	16	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	8	loblolly pine	8	78	2	Intermediate	20	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	loblolly pine	12	76	2.5	Co-dominant	28	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	10	loblolly pine	8	83	1.5	Intermediate	15	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	11	loblolly pine	14	83	1	Co-dominant	20	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	12	loblolly pine	12	75	2.5	Co-dominant	22	16	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	13	loblolly pine	12	83	2	Overtopped	10	12	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	14	loblolly pine	10	83	2	Intermediate	20	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	15	loblolly pine	14	83	2	Co-dominant	20	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	16	loblolly pine	12	83	2	Co-dominant	20	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	17	loblolly pine	12	83	2	Co-dominant	25	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 25, Sample Plot A: Tree-Level Data Summary (8 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	2	25.0
	sweetgum	~	6	75.0
DIAMETER		8.00	~	~
HEIGHT		48.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	5	62.5
	Dominant	~	1	12.5
	Intermediate	~	2	25.0
LIVE CROWN		19.00	~	~
CROWN DIAMETER		17.00	~	~
5YR GR		1.20	~	~
10YR GR		2.80	~	~
TREE CONDITION	Good	~	8	100.0
TREE QUALITY	Acceptable Growing Stock	~	8	100.0
FOREST PRODUCT	Pulpwood	~	8	100.0

## Forest Compartment 25, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC25A	1	loblolly pine	10	50	2	Dominant	22	20	1.2	2.75	Good	Acceptable Growing Stock	Pulpwood	None
	2	sweetgum	8	50	1.5	Co-dominant	22	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	sweetgum	8	50	1	Co-dominant	20	15	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4	sweetgum	10	52	1.5	Co-dominant	22	24	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5	loblolly pine	6	40	1	Intermediate	10	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	6	sweetgum	8	50	1.5	Co-dominant	20	15	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	7	sweetgum	6	40	1	Intermediate	15	15	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	8	sweetgum	8	52	1	Co-dominant	22	18	~	~	Good	Acceptable Growing Stock	Pulpwood	None



## Forest Compartment 26, Sample Plot H: Tree-Level Data Summary (8 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	American beech	~	1	12.5
	loblolly pine	~	1	12.5
	tulip poplar	~	4	50.0
	white oak	~	2	25.0
DIAMETER		17.00	~	~
HEIGHT		75.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	6	75.0
	Intermediate	~	2	25.0
LIVE CROWN		40.00	~	~
CROWN DIAMETER		29.00	~	~
5YR GR		0.10	~	~
10YR GR		0.20	~	~
TREE CONDITION	Good	~	6	75.0
	Fair	~	2	25.0
TREE QUALITY	Acceptable Growing Stock	~	7	87.5
	Unacceptable Growing Stock	~	1	12.5
FOREST PRODUCT	Pulpwood	~	2	25.0
	Sawtimber	~	6	75.0

## Forest Compartment 31, Sample Plot J: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC31J	1	loblolly pine	14	77	3	Co-dominant	26	24	0.33	0.6	Good	Acceptable Growing Stock	Sawtimber	None
	2	Virginia pine	10	60	2	Overtopped	20	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	white oak	18	77	2	Intermediate	50	28	~	~	Poor	Acceptable Growing Stock	Pulpwood	Hollow @ base
	4	white oak	14	70	1.5	Intermediate	35	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	southern red oak	20	77	2.6	Intermediate	38	35	~	~	Poor	Acceptable Growing Stock	Pulpwood	Hollow
	6	loblolly pine	14	77	2.5	Co-dominant	28	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	18	77	2	Co-dominant	28	26	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	loblolly pine	14	80	2.5	Co-dominant	28	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	9	loblolly pine	18	80	1.5	Co-dominant	20	24	~	~	Fair	Acceptable Growing Stock	Sawtimber	Red heart @ 35'
	10	loblolly pine	20	80	3	Co-dominant	50	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	11	red maple	10	60	0	Overtopped	40	45	~	~	Fair	Cull	None	Metal contamination

## Forest Compartment 33, Sample Plot A: Tree-Level Data Summary (3 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	2	66.7
	sweetgum	~	1	33.3
DIAMETER		13.00	~	~
HEIGHT		55.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	2	66.7
	Intermediate	~	1	33.3
LIVE CROWN		32.00	~	~
CROWN DIAMETER		24.00	~	~
5YR GR		0.90	~	~
10YR GR		1.50	~	~
TREE CONDITION	Good	~	3	100.0
TREE QUALITY	Acceptable Growing Stock	~	3	100.0
FOREST PRODUCT	Pulpwood	~	2	66.7
	Sawtimber	~	1	33.3

## Forest Compartment 33, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC33A	1	loblolly pine	14	57.3	2	Co-dominant	27.3	28	0.85	1.5	Good	Acceptable Growing Stock	Sawtimber	None
	2	sweetgum	14	70	1.5	Co-dominant	54	25	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	loblolly pine	10	39	1.5	Intermediate	14	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None

## Forest Compartment 34, Sample Plot A: Tree-Level Data Summary (6 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	blackgum	~	1	16.7
	cherrybark oak	~	1	16.7
	loblolly pine	~	2	33.3
	sweetgum	~	1	16.7
	willow oak	~	1	16.7
DIAMETER		19.00	~	~
HEIGHT		71.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	3	50.0
	Intermediate	~	2	33.3
	Overtopped	~	1	16.7
LIVE CROWN		36.00	~	~
CROWN DIAMETER		26.00	~	~
5YR GR		0.20	~	~
10YR GR		0.40	~	~
TREE CONDITION	Good	~	5	83.3
	Poor	~	1	16.7
TREE QUALITY	Acceptable Growing Stock	~	4	66.7
	Cull	~	2	33.3
FOREST PRODUCT	None	~	2	33.3
	Sawtimber	~	4	66.7

## Forest Compartment 34, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC34A	1	loblolly pine	26	85	3	Co-dominant	30	28	0.18	0.4	Good	Acceptable Growing Stock	Sawtimber	None
	2	cherrybark oak	24	70	1.5	Co-dominant	30	15	~	~	Poor	Acceptable Growing Stock	Sawtimber	None
	3	blackgumkgum	6	25	0	Overtopped	20	12	~	~	Good	Cull	None	None
	4	loblolly pine	22	114	2	Co-dominant	60	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	sweetgum	14	66	2	Intermediate	28	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	willow oak	20	64	0	Intermediate	50	40	~	~	Good	Cull	None	Broken branches @ 30'



## Forest Compartment 35, Sample Plot A: Tree-Level Data Summary (10 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	9	90.0
	sweetgum	~	1	10.0
DIAMETER		20.00	~	~
HEIGHT		87.00	~	~
MERCH HEIGHT		3.00	~	~
CROWN CLASS	Co-dominant	~	9	90.0
	Dominant	~	1	10.0
LIVE CROWN		34.00	~	~
CROWN DIAMETER		29.00	~	~
5YR GR		0.40	~	~
10YR GR		0.70	~	~
TREE CONDITION	Good	~	10	100.0
TREE QUALITY	Acceptable Growing Stock	~	10	100.0
FOREST PRODUCT	Sawtimber	~	10	100.0

## Forest Compartment 35, Sample Plot A: Raw Tree-Level Data

Plot#	Tree #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC35A	1	loblolly pine	20	95	4	Dominant	35	45	0.36	0.65	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	24	75	2.5	Co-dominant	35	28	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	22	90	3	Co-dominant	35	35	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	22	90	3	Co-dominant	30	30	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	loblolly pine	18	95	3	Co-dominant	30	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	16	70	2.5	Co-dominant	25	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	22	90	3	Co-dominant	25	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	loblolly pine	22	90	3	Co-dominant	35	35	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	9	loblolly pine	20	90	3.5	Co-dominant	30	28	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	10	sweetgum	18	80	1.5	Co-dominant	60	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None

**6.73 - Mulberry Island (South) Tree Level Data: Compartments 1-9 & 36-38**

# Ft. Eustis, VA ~ Mulberry Is. (South): Tree Level Sample Plot Locations





Forest Compartment 1, Sample Plot A: Tree-Level Data Summary (7 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	black walnut	~	3	42.9
	loblolly pine	~	1	14.3
	sweetgum	~	3	42.9
DIAMETER		16.86	~	~
HEIGHT		63.71	~	~
MERCH HEIGHT		0.93	~	~
CROWN CLASS	Co-dominant	~	3	42.9
	Intermediate	~	1	14.3
	Open grown	~	2	28.6
	Overtopped	~	1	14.3
LIVE CROWN		42.00	~	~
CROWN DIAMETER		25.86	~	~
5YR GR		0.40	~	~
10YR GR		1.00	~	~
TREE CONDITION	Fair	~	1	14.3
	Good	~	5	71.4
	Poor	~	1	14.3
TREE QUALITY	Acceptable Growing Stock	~	5	71.4
	Cull	~	2	28.6
FOREST PRODUCT	None	~	2	28.6
	Sawtimber	~	5	71.4

Forest Compartment 1, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC01A	1	loblolly pine	30	77	1	Open grown	55	42	0.4	1	Good	Acceptable Growing Stock	Sawtimber	None
	2	black walnut	10	55	0	Intermediate	43	10	~	~	Poor	Cull	None	Broken branch @ 12'
	3	black walnut	16	68	1	Co-dominant	30	32	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	black walnut	14	73	1	Co-dominant	50	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	sweetgum	16	73	2	Co-dominant	40	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	sweetgum	6	23	0	Overtopped	15	10	~	~	Fair	Cull	None	None
	7	sweetgum	26	77	1.5	Open grown	61	45	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 2, Sample Plot A: Tree-Level Data Summary (6 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	3	50.0
	sweetgum	~	3	50.0
DIAMETER		17.67	~	~
HEIGHT		74.17	~	~
MERCH HEIGHT		1.83	~	~
CROWN CLASS	Co-dominant	~	4	66.7
	Intermediate	~	2	33.3
LIVE CROWN		36.00	~	~
CROWN DIAMETER		26.67	~	~
5YR GR		0.40	~	~
10YR GR		0.80	~	~
TREE CONDITION	Fair	~	1	16.7
	Good	~	4	66.7
	Poor	~	1	16.7
TREE QUALITY	Acceptable Growing Stock	~	5	83.3
	Cull	~	1	16.7
FOREST PRODUCT	None	~	1	16.7
	Pulpwood	~	2	33.3
	Sawtimber	~	3	50.0

## Forest Compartment 2, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC02A	1	loblolly pine	18	95	2.5	Co-dominant	30	32	0.35	0.75	Good	Acceptable Growing Stock	Sawtimber	None
	2	sweetgum	8	52	1.5	Intermediate	31	17	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	sweetgum	24	80	0	Co-dominant	58	38	~	~	Fair	Cull	None	Bolts present / poor condition @ 6'
	4	sweetgum	10	30	1.5	Intermediate	10	3	~	~	Poor	Acceptable Growing Stock	Pulpwood	None
	5	loblolly pine	26	95	2.5	Co-dominant	45	42	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	20	93	3	Co-dominant	42	28	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 3, Sample Plot A: Tree-Level Data Summary (16 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	16	100.0
DIAMETER		9.00	~	~
HEIGHT		64.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	10	62.5
	Intermediate	~	5	31.3
	Overtopped	~	1	6.3
LIVE CROWN		14.00	~	~
CROWN DIAMETER		12.00	~	~
5YR GR		0.40	~	~
10YR GR		1.30	~	~
TREE CONDITION	Fair	~	2	12.5
	Good	~	12	75.0
	Poor	~	2	12.5
TREE QUALITY	Acceptable Growing Stock	~	12	75.0
	Cull	~	1	6.3
	Unacceptable Growing Stock	~	3	18.8
FOREST PRODUCT	None	~	1	6.3
	Pulpwood	~	11	18.8
	Sawtimber	~	4	25.0

## Forest Compartment 3, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC03A	1	loblolly pine	10	65	1.5	Co-dominant	15	12	0.35	1.25	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	8	65	1.5	Co-dominant	15	10	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	loblolly pine	8	65	1.5	Co-dominant	12	9	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4	loblolly pine	6	65	1	Intermediate	15	8	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	5	loblolly pine	10	65	1.5	Co-dominant	20	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	10	63	1.5	Co-dominant	18	18	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	8	65	1	Co-dominant	18	10	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	8	loblolly pine	8	60	1	Intermediate	6	7	~	~	Fair	Unacceptable Growing Stock	Pulpwood	None
	9	loblolly pine	12	65	2	Co-dominant	12	13	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	10	loblolly pine	8	65	1	Co-dominant	12	10	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	11	loblolly pine	8	60	1	Intermediate	8	8	~	~	Poor	Acceptable Growing Stock	Pulpwood	None
	12	loblolly pine	10	65	1	Intermediate	20	17	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	13	loblolly pine	8	65	1	Intermediate	14	8	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	14	loblolly pine	10	65	1	Co-dominant	15	15	~	~	Good	Unacceptable Growing Stock	Pulpwood	None
	15	loblolly pine	10	65	1.5	Co-dominant	15	14	~	~	Good	Unacceptable Growing Stock	Sawtimber	None
	16	loblolly pine	6	60	0	Overtopped	10	9	~	~	Poor	Cull	None	None



## Forest Compartment 4, Sample Plot A: Tree-Level Data Summary (6 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	black walnut	~	5	83.3
	hackberry	~	1	16.7
DIAMETER		17.00	~	~
HEIGHT		73.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	4	66.7
	Overtopped	~	2	33.3
LIVE CROWN		42.00	~	~
CROWN DIAMETER		35.00	~	~
5YR GR		0.80	~	~
10YR GR		1.40	~	~
TREE CONDITION	Fair	~	4	66.7
	Good	~	2	33.3
TREE QUALITY	Acceptable Growing Stock	~	4	66.7
	Cull	~	2	33.3
FOREST PRODUCT	None	~	2	33.3
	Sawtimber	~	4	66.7

## Forest Compartment 4, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC04A	1	black walnut	20	80	1.5	Co-dominant	45	40	0.8	1.4	Good	Acceptable Growing Stock	Sawtimber	None
	2	black walnut	22	80	1	Co-dominant	40	45	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	black walnut	20	80	1	Co-dominant	50	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	black walnut	18	80	1	Co-dominant	55	35	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	black walnut	12	65	0	Overtopped	23	20	~	~	Poor	Cull	None	Broken branch @ 18'
	6	hackberry	8	55	0	Overtopped	40	33	~	~	Poor	Cull	None	Feeble @ 3.5'

## Forest Compartment 5, Sample Plot A: Tree-Level Data Summary (10 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	cherrybark oak	~	2	20.0
	loblolly pine	~	4	40.0
	post oak	~	1	10.0
	southern red oak	~	1	10.0
	white oak	~	2	20.0
DIAMETER		18.00	~	~
HEIGHT		79.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	4	40.0
	Dominant	~	2	20.0
	Intermediate	~	2	20.0
	Overtopped	~	2	20.0
LIVE CROWN		44.00	~	~
CROWN DIAMETER		35.00	~	~
5YR GR		0.10	~	~
10YR GR		0.20	~	~
TREE CONDITION	Fair	~	1	10.0
	Good	~	9	90.0
TREE QUALITY	Acceptable Growing Stock	~	10	100.0
FOREST PRODUCT	Pulpwood	~	3	30.0
	Sawtimber	~	7	70.0

## Forest Compartment 5, Sample Plot A: Raw Tree-Level Data

	PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC05A	1		loblolly pine	16	95	3.5	Dominant	45	33	0.12	0.2	Good	Acceptable Growing Stock	Sawtimber	None
	2		post oak	12	60	1.5	Intermediate	50	24	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3		southern red oak	10	33	1	Overtopped	23	20	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	4		white oak	10	55	1	Overtopped	35	18	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	5		loblolly pine	26	95	2.5	Co-dominant	45	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6		cherrybark oak	26	95	2.5	Co-dominant	45	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7		white oak	20	95	1	Co-dominant	60	43	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8		cherrybark oak	20	70	1	Intermediate	50	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	9		loblolly pine	24	95	3	Dominant	45	56	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	10		loblolly pine	20	95	3	Co-dominant	40	38	~	~	Fair	Acceptable Growing Stock	Sawtimber	Large knot @ 6'

## Forest Compartment 6, Sample Plot B: Tree-Level Data Summary (10 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	cherrybark oak	~	3	30.0
	red maple	~	2	20.0
	swamp chestnut oak	~	3	30.0
	sweetgum	~	1	10.0
	white oak	~	1	10.0
DIAMETER		21.00	~	~
HEIGHT		84.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	5	50.0
	Intermediate	~	2	20.0
	Overtopped	~	3	30.0
LIVE CROWN		57.00	~	~
CROWN DIAMETER		32.00	~	~
5YR GR		0.30	~	~
10YR GR		0.60	~	~
TREE CONDITION	Fair	~	4	40.0
	Good	~	5	50.0
	Poor	~	1	10.0
TREE QUALITY	Acceptable Growing Stock	~	9	90.0
	Cull	~	1	10.0
FOREST PRODUCT	None	~	1	10.0
	Pulpwood		3	30.0
	Sawtimber	~	6	60.0

## Forest Compartment 6, Sample Plot B: Raw Tree-Level Data

	<div>PLOT#</div> <div>TREE #</div>	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC06B	1	cherrybark oak	22	97	1.5	Co-dominant	55	30	0.3	0.6	Good	Acceptable Growing Stock	Sawtimber	None
	2	cherrybark oak	26	100	1.5	Co-dominant	70	40	~	~	Fair	Acceptable Growing Stock	Sawtimber	Broken branch @ 20'
	3	swamp chestnut oak	36	97	1	Co-dominant	75	43	~	~	Good	Acceptable Growing Stock	Sawtimber	1 dead branch
	4	swamp chestnut oak	12	66	1	Overtopped	46	24	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	5	sweetgum	20	97	2.5	Intermediate	40	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	cherrybark oak	28	100	2.5	Co-dominant	80	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	swamp chestnut oak	14	75	1	Overtopped	60	30	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	8	red maple	14	32	1	Overtopped	28	18	~	~	Poor	Acceptable Growing Stock	Pulpwood	Broken top @ 20'
	9	red maple	12	75	0	Intermediate	60	30	~	~	Fair	Cull	None	None
	10	white oak	24	100	1	Co-dominant	60	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None



## Forest Compartment 7, Sample Plot C: Tree-Level Data Summary (9 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	9	100.0
DIAMETER		12.00	~	~
HEIGHT		66.00	~	~
MERCH HEIGHT		2.00	~	~
CROWN CLASS	Co-dominant	~	6	66.7
	Intermediate	~	3	33.3
LIVE CROWN		25.00	~	~
CROWN DIAMETER		16.00	~	~
5YR GR		0.30	~	~
10YR GR		0.80	~	~
TREE CONDITION	Fair	~	1	11.1
	Good	~	8	88.9
TREE QUALITY	Acceptable Growing Stock	~	9	100.0
FOREST PRODUCT	Pulpwood	~	4	44.4
	Sawtimber	~	5	55.6

## Forest Compartment 7, Sample Plot C: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC07C	1	loblolly pine	12	68	2	Co-dominant	35	18	0.3	0.75	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	10	68	2	Co-dominant	25	12	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	3	loblolly pine	8	55	1	Intermediate	20	16	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	4	loblolly pine	14	68	2.5	Co-dominant	30	16	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	loblolly pine	14	68	1.5	Co-dominant	30	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	16	68	2.5	Co-dominant	30	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	14	68	2	Co-dominant	28	16	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	loblolly pine	10	65	1.5	Intermediate	15	10	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	9	loblolly pine	10	65	1.5	Intermediate	15	18	~	~	Good	Acceptable Growing Stock	Pulpwood	None

## Forest Compartment 8, Sample Plot A: Tree-Level Data Summary (7 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	loblolly pine	~	4	57.1
	sweetgum	~	3	42.9
DIAMETER		22.00	~	~
HEIGHT		97.00	~	~
MERCH HEIGHT		3.00	~	~
CROWN CLASS	Co-dominant	~	1	14.3
	Dominant	~	3	42.9
	Intermediate	~	2	28.6
	Overtopped	~	1	14.3
LIVE CROWN		46.00	~	~
CROWN DIAMETER		31.00	~	~
5YR GR		0.20	~	~
10YR GR		0.30	~	~
TREE CONDITION	Fair	~	1	14.3
	Good	~	6	85.7
TREE QUALITY	Acceptable Growing Stock	~	7	100.0
FOREST PRODUCT	Sawtimber	~	7	100.0

## Forest Compartment 8, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC08A	1	loblolly pine	20	115	4.5	Dominant	35	26	0.15	0.25	Good	Acceptable Growing Stock	Sawtimber	None
	2	sweetgum	22	80	2	Intermediate	65	20	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	sweetgum	22	80	2.5	Intermediate	60	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	24	120	4.5	Dominant	40	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	sweetgum	14	50	1	Overtopped	30	24	~	~	Fair	Acceptable Growing Stock	Sawtimber	None
	6	loblolly pine	26	118	3.5	Dominant	35	38	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	26	115	4	Co-dominant	55	42	~	~	Good	Acceptable Growing Stock	Sawtimber	None

## Forest Compartment 9, Sample Plot A: Tree-Level Data Summary (7 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT
SPECIES	blackgum	~	2	28.6
	dogwood	~	1	14.3
	sweetgum	~	4	57.1
DIAMETER		15.00	~	~
HEIGHT		83.00	~	~
MERCH HEIGHT		1.00	~	~
CROWN CLASS	Co-dominant	~	2	28.6
	Dominant	~	3	42.9
	Intermediate	~	1	14.3
	Overtopped	~	1	14.3
LIVE CROWN		44.00	~	~
CROWN DIAMETER		26.00	~	~
5YR GR		0.70	~	~
10YR GR		1.50	~	~
TREE CONDITION	Good	~	7	100.0
TREE QUALITY	Acceptable Growing Stock	~	6	85.7
	Cull	~	1	14.3
FOREST PRODUCT	Pulpwood	~	2	28.6
	Sawtimber	~	4	57.1

## Forest Compartment 9, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC09A	1	sweetgum	18	100	2	Dominant	55	38	0.65	1.5	Good	Acceptable Growing Stock	Sawtimber	None
	2	sweetgum	14	85	1.5	Co-dominant	40	22	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	dogwood	8	55	0	Overtopped	18	12	~	~	Good	Cull	None	None
	4	sweetgum	20	100	1	Dominant	50	34	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	sweetgum	20	100	1	Dominant	60	36	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	6	blackgum	12	70	1.5	Intermediate	35	26	~	~	Good	Acceptable Growing Stock	Pulpwood	None
	7	blackgum	12	70	2	Co-dominant	50	15	~	~	Good	Acceptable Growing Stock	Pulpwood	None



## Forest Compartment 36, Sample Plot A: Tree-Level Data Summary (10 Trees)

CLASS / SUBCLASS		AVERAGE	FREQUENCY	PERCENT	
SPECIES	loblolly pine	~	7	70.0	
	sweetgum	~	3	30.0	
DIAMETER		17.00	~	~	
HEIGHT		91.00	~	~	
MERCH HEIGHT		3.00	~	~	
CROWN CLASS	Co-dominant	~	6	60.0	
	Overtopped	~	4	40.0	
LIVE CROWN		38.00	~	~	
CROWN DIAMETER		26.00	~	~	
5YR GR		0.10	~	~	
10YR GR		0.20	~	~	
TREE CONDITION	Good	~	6	60.0	
	Fair	~	4	40.0	
TREE QUALITY		Acceptable Growing Stock	~	10	100.0
FOREST PRODUCT	Pulpwood	~	4	40.0	
	Sawtimber	~	6	60.0	

## Forest Compartment 36, Sample Plot A: Raw Tree-Level Data

PLOT#	TREE #	SPECIES	DIAMETER	HEIGHT	MERCH HEIGHT	CROWN CLASS	LIVE CROWN	CROWN DIAMETER	5YR GROWTH RATE	10YR GROWTH RATE	TREE CONDITION	TREE QUALITY	FOREST PRODUCT	TREE DAMAGE
FC36A	1	loblolly pine	20	115	3.5	Co-dominant	42	36	0.1	0.18	Good	Acceptable Growing Stock	Sawtimber	None
	2	loblolly pine	20	115	4	Co-dominant	52	28	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	3	loblolly pine	18	115	4	Co-dominant	52	24	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	4	loblolly pine	26	120	3.5	Co-dominant	50	40	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	5	sweetgum	12	60	1.5	Overtopped	50	22	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	6	loblolly pine	24	115	2.5	Co-dominant	40	26	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	7	loblolly pine	22	120	4	Co-dominant	42	28	~	~	Good	Acceptable Growing Stock	Sawtimber	None
	8	sweetgum	8	40	1	Overtopped	20	18	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	9	sweetgum	8	28	1	Overtopped	18	16	~	~	Fair	Acceptable Growing Stock	Pulpwood	None
	10	loblolly pine	12	80	2	Overtopped	15	20	~	~	Fair	Acceptable Growing Stock	Pulpwood	None







## **Appendix**

A.1 Fort Eustis Timber Volume Summary

A.2 Fort Eustis Canopy Species

A.3 Fort Eustis Groundcover Species

A.4 Fort Eustis Sapling Species

A.5 Fort Eustis Shrub Species

A.6 Fort Eustis Dominant Species by Compartment

*Table A.1, Ft. Eustis Forest Compartment Timber Volumes*

Compartment:		Sawtimber Volumes (Int. 1/4 log scale, Bd.ft.):				Pulpwood Cords:			
#	Acres	Pine	Hard HW	Soft HW	Total	Pine	Hard HW	Soft HW	Total
01	10.18	2857	15970	11199	30026	4	35	0	39
02	110.07	1021948	45923	208399	1276270	0	27	396	423
03	59.13	213710	0	0	213710	1054	0	0	1054
04	28.53	0	50375	0	50375	0	41	46	87
05	24.5	141880	14240	26883	183003	53	24	91	168
06	101.55	505112	138787	548089	1191988	0	21	318	339
07	104.05	407573	167942	187426	762937	112	119	223	455
08	47.3	236008	0	107587	343595	392	0	0	392
09	252.22	669633	15148	367758	1052538	1531	172	1085	2788
10	53.49	225256	0	37614	262870	51	0	426	477
11	78.21	434981	59778	19988	514747	50	29	388	467
12	12.04	0	4346	0	4346	78	5	29	113
13	177.13	1217401	176396	599424	1993222	111	311	1478	1900
14	35.35	23959	0	0	23959	202	0	246	448
15	143.7	1436529	181369	151897	1769795	231	154	299	684
16	81.78	518873	57603	197198	773673	43	86	609	738
17	106.06	410302	104825	337218	852345	299	108	535	942
18	80.15	236531	85923	50654	373107	326	258	441	1025
19	75.45	425060	29918	134535	589514	0	45	124	169
20	69.48	538427	82894	34822	656143	67	91	414	572
21	46.61	435261	69328	15741	520330	79	110	154	343
22	51.29	694913	26238	99947	821098	0	147	0	147
23	83.79	1101479	80965	23998	1206441	33	284	190	507
24	74.39	322962	65697	0	388659	552	48	180	780
25	18.96	5728	0	0	5728	105	12	106	224
26	133.05	1010203	575700	439236	2025138	0	229	250	479
27	110.09	872763	167336	448673	1488772	72	156	247	475
28	61.95	219714	358432	126959	705106	80	126	84	290

*Table A.1, Ft. Eustis Forest Compartment Timber Volumes*

Compartment:		Sawtimber Volumes (Int. 1/4 log scale, Bd.ft.):				Pulpwood Cords:			
#	Acres	Pine	Hard HW	Soft HW	Total	Pine	Hard HW	Soft HW	Total
29	183.31	492686	575028	1012073	2079786	580	367	622	1569
30	95.77	780938	230103	471398	1482439	100	79	390	570
31	222.45	2326809	471908	230471	3029187	297	321	765	1383
33	4.1	9279	3840	0	13119	3	2	2	7
34	23.38	174927	33205	94774	302905	0	36	45	81
35	8.76	70526	5631	13278	89435	0	10	28	38
36	29.72	195338	15001	0	210339	25	37	49	111
37	12.61								
38	4.64								
<b>Total:</b>		17379566	3909849	5997239	27286645	6530	3490	10260	20284
<b>Total Value Est:</b>		\$3,475,913	\$234,590	\$329,848	\$4,040,351	\$52,240	\$10,420	\$30,780	\$93,490

**Grand Total Value Estimate, Effective 09/2007: \$4,133,841.00**



## A.2, Fort Eustis Canopy Species

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- |   |   |
|---|---|
| 1, <i>Acer rubrum</i><br>red maple                        | 17, <i>Populus deltoides</i><br>eastern cottonwood  |
| 2, <i>Carya glabra</i><br>pignut hickory                  | 18, <i>Prunus serotina</i><br>American/black cherry |
| 3, <i>Carya tomentosa</i><br>mockernut hickory            | 19, <i>Quercus alba</i><br>white oak                |
| 4, <i>Fagus grandifolia</i><br>American beech             | 20, <i>Quercus bicolor</i><br>swamp white oak       |
| 5, <i>Fraxinus americanus</i><br>white ash                | 21, <i>Quercus coccinea</i><br>scarlet oak          |
| 6, <i>Fraxinus pennsylvanica</i><br>green ash             | 22, <i>Quercus falcata</i><br>southern red oak      |
| 7, <i>Ilex opaca</i><br>American holly                    | 23, <i>Quercus michauxii</i><br>swamp chestnut oak  |
| 8, <i>Juglans nigra</i><br>black walnut                   | 24, <i>Quercus nigra</i><br>water oak               |
| 9, <i>Liquidambar styraciflua</i><br>sweetgum             | 25, <i>Quercus phellos</i><br>willow oak            |
| 10, <i>Liriodendron tulipifera</i><br>yellow/tulip poplar | 26, <i>Quercus prinus</i><br>chestnut oak           |
| 11, <i>Nysa biflora</i><br>swamp tupelo                   | 27, <i>Quercus rubra</i><br>red oak                 |
| 12, <i>Nyssa sylvatica</i><br>blackgum                    | 28, <i>Quercus stellata</i><br>post oak             |
| 13, <i>Pinus echinata</i><br>shortleaf pine               | 29, <i>Quercus velutina</i><br>black oak            |
| 14, <i>Pinus taeda</i><br>loblolly pine                   | 30, <i>Ulmus americana</i><br>American elm          |
| 15, <i>Pinus virginiana</i><br>Virginia pine              |   |
| 16, <i>Platanus occidentalis</i><br>American sycamore     |   |

### A.3, Fort Eustis Groundcover Species

---

- 1, *Acalypha rhomboidea* Raf.  
Virginia threeseed mercury
- 2, *Acer rubrum* L.  
red maple
- 3, *Ageratina altissima* (L.) King & H.E. Robins. var. *altissima*  
white snakeroot
- 4, *Ailanthus altissima* (P. Mill.) Swingle  
tree of heaven
- 5, *Ajuga reptans* L.  
common bugle
- 6, *Allium canadense* L.  
meadow garlic
- 7, *Ambrosia artemisiifolia* L.  
annual ragweed
- 8, *Amelanchier arborea* (Michx. f.) Fern.  
common serviceberry
- 9, *Amphicarpaea bracteata* (L.) Fern.  
American hogpeanut
- 10, *Andropogon virginicus* L.  
broomsedge bluestem
- 11, *Antennaria howellii* Greene ssp. *neodioica* (Greene) Bayer  
Howell's pussytoes
- 12, *Aralia spinosa* L.  
devil's walkingstick
- 13, *Arisaema triphyllum* (L.) Schott  
Jack in the pulpit
- 14, *Arundinaria gigantea* (Walt.) Muhl.  
giant cane
- 15, *Asclepias syriaca* L.  
common milkweed
- 16, *Asplenium platyneuron* (L.) B.S.P.  
ebony spleenwort
- 17, *Aster* L.  
aster
- 18, *Athyrium filix-femina* (L.) Roth  
common ladyfern
- 19, *Bidens frondosa* L.  
devil's beggartick
- 20, *Boehmeria cylindrica* (L.) Sw.  
smallspike false nettle
- 21, *Campsis radicans* (L.) Seem. ex Bureau  
trumpet creeper
- 22, *Cardamine parviflora* L.  
sand bittercress
- 23, *Carex comosa* Boott  
longhair sedge
- 24, *Carex crinita* Lam.  
fringed sedge
- 25, *Carex debilis* Michx.  
white edge sedge
- 26, *Carex flaccosperma* Dewey  
thinfruit sedge
- 27, *Carex folliculata* L.  
northern long sedge
- 28, *Carex frankii* Kunth  
Frank's sedge
- 29, *Carex intumescens* Rudge  
greater bladder sedge
- 30, *Carex joorii* Bailey  
cypress swamp sedge
- 31, *Carex* L.  
sedge
- 32, *Carex lupuliformis* Sartwell ex Dewey  
false hop sedge
- 33, *Carex lurida* Wahlenb.  
shallow sedge
- 34, *Carex rosea* Schkuhr ex Willd.  
rosy sedge
- 35, *Carex scoparia* Schkuhr ex Willd.  
broom sedge
- 36, *Carex seorsa* Howe  
weak stellate sedge
- 37, *Carex stipata* Muhl. ex Willd.  
owlfruit sedge
- 38, *Carex swanii* (Fern.) Mackenzie  
Swan's sedge
- 39, *Carpinus caroliniana* Walt.  
American hornbeam

### A.3, Fort Eustis Groundcover Species

---

- 40, *Carya alba* (L.) Nutt. ex Ell.  
mockernut hickory
- 41, *Carya glabra* (P. Mill.) Sweet  
pignut hickory
- 42, *Chasmanthium laxum* (L.) Yates  
slender woodoats
- 43, *Chelone glabra* L.  
white turtlehead
- 44, *Chimaphila maculata* (L.) Pursh  
striped prince's pine
- 45, *Chionanthus virginicus* L.  
white fringetree
- 46, *Cinna arundinacea* L.  
sweet woodreed
- 47, *Clethra alnifolia* L.  
coastal sweetpepperbush
- 48, *Commelina communis* L.  
Asiatic dayflower
- 49, *Conyza canadensis* (L.) Cronq.  
Canadian horseweed
- 50, *Cornus florida* L.  
flowering dogwood
- 51, *Cypripedium acaule* Ait.  
moccasin flower
- 52, *Dactylis glomerata* L.  
orchardgrass
- 53, *Danthonia spicata* (L.) Beauv. ex Roemer & J.A. Schultes  
poverty oatgrass
- 54, *Desmodium laevigatum* (Nutt.) DC.  
smooth ticktrefoil
- 55, *Desmodium nudiflorum* (L.) DC.  
nakedflower ticktrefoil
- 56, *Desmodium paniculatum* (L.) DC.  
panicledleaf ticktrefoil
- 57, *Dichanthelium* (A.S. Hitchc. & Chase) Gould  
rosette grass
- 58, *Dichanthelium boscii* (Poir.) Gould & C.A. Clark  
Bosc's panicgrass
- 59, *Dichanthelium clandestinum* (L.) Gould  
deertongue
- 60, *Dichanthelium dichotomum* (L.) Gould  
cypress panicgrass
- 61, *Dichanthelium scoparium* (Lam.) Gould  
velvet panicum
- 62, *Dioscorea villosa* L.  
wild yam
- 63, *Diospyros virginiana* L.  
common persimmon
- 64, *Duchesnea indica* (Andr.) Focke  
Indian strawberry
- 65, *Erechtites hieraciifolia* (L.) Raf. ex DC.  
American burnweed
- 66, *Euonymus americana* L.  
strawberry bush
- 67, *Eupatorium capillifolium* (Lam.) Small  
dogfennel
- 68, *Eupatorium* L.  
thoroughwort
- 69, *Eupatorium serotinum* Michx.  
lateflowering thoroughwort
- 70, *Fragaria virginiana* Duchesne  
Virginia strawberry
- 71, *Fraxinus pennsylvanica* Marsh.  
green ash
- 72, *Galium aparine* L.  
stickywilly
- 73, *Galium circaezans* Michx.  
licorice bedstraw
- 74, *Gaultheria procumbens* L.  
eastern teaberry
- 75, *Gaylussacia baccata* (Wangenh.) K. Koch  
black huckleberry
- 76, *Gaylussacia dumosa* (Andr.) Torr. & Gray  
dwarf huckleberry
- 77, *Gaylussacia frondosa* (L.) Torr. & Gray ex Torr.  
blue huckleberry
- 78, *Geum canadense* Jacq.  
white avens
- 79, *Glechoma hederacea* L.  
ground ivy



### A.3, Fort Eustis Groundcover Species

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- |   |  |
|---|--|
| 80, <i>Glyceria striata</i> (Lam.) A.S. Hitchc.<br>fowl mannagrass      | 100, <i>Liquidambar styraciflua</i> L.<br>sweetgum   |
| 81, <i>Gnaphalium uliginosum</i> L.<br>marsh cudweed                    | 101, <i>Liriodendron tulipifera</i> L.<br>tuliptree  |
| 82, <i>Grass spp.</i><br>unidentifiable grass                           | 102, <i>Lonicera japonica</i> Thunb.<br>Japanese honeysuckle   |
| 83, <i>Hypericum hypericoides</i> (L.) Crantz<br>St. Andrew's cross     | 103, <i>Lycopodium digitatum</i> Dill. ex A. Braun<br>fan clubmoss                                     |
| 84, <i>Hypericum mutilum</i> L.<br>dwarf St. Johnswort                  | 104, <i>Lycopodium obscurum</i> L.<br>rare clubmoss  |
| 85, <i>Hypericum prolificum</i> L.<br>shrubby St. Johnswort             | 105, <i>Lycopus virginicus</i> L.<br>Virginia water horehound  |
| 86, <i>Ilex opaca</i> Ait.<br>American holly                            | 106, <i>Lysimachia ciliata</i> L.<br>fringed loosestrife   |
| 87, <i>Ilex verticillata</i> (L.) Gray<br>common winterberry            | 107, <i>Magnolia virginiana</i> L.<br>sweetbay   |
| 88, <i>Impatiens capensis</i> Meerb.<br>jewelweed                       | 108, <i>Maianthemum racemosum</i> (L.) Link ssp. <i>racemosum</i><br>feathery false lily of the valley |
| 89, <i>Iris virginica</i> L.<br>Virginia iris                           | 109, <i>Malaxis unifolia</i> Michx.<br>green adder's-mouth orchid                                      |
| 90, <i>Juncus effusus</i> L.<br>common rush                             | 110, <i>Medeola virginiana</i> L.<br>Indian cucumber   |
| 91, <i>Juncus repens</i> Michx.<br>lesser creeping rush                 | 111, <i>Microstegium vimineum</i> (Trin.) A. Camus<br>Nepalese browntop                                |
| 92, <i>Juncus tenuis</i> Willd.<br>poverty rush                         | 112, <i>Mimulus ringens</i> L.<br>Allegheny monkeyflower   |
| 93, <i>Juncus validus</i> Coville var. <i>validus</i><br>roundhead rush | 113, <i>Mitchella repens</i> L.<br>partridgeberry  |
| 94, <i>Juniperus virginiana</i> L.<br>eastern redcedar                  | 114, <i>Murdannia keisak</i> (Hassk.) Hand.-Maz.<br>wartremoving herb                                  |
| 95, <i>Leersia virginica</i> Willd.<br>whitegrass                       | 115, <i>Nyssa biflora</i> Walt.<br>swamp tupelo  |
| 96, <i>Lespedeza procumbens</i> Michx.<br>trailing lespedeza            | 116, <i>Nyssa sylvatica</i> Marsh.<br>blackgum   |
| 97, <i>Leucothoe racemosa</i> (L.) Gray<br>swamp doghobble              | 117, <i>Onoclea sensibilis</i> L.<br>sensitive fern  |
| 98, <i>Ligustrum sinense</i> Lour.<br>Chinese privet                    | 118, <i>Osmunda cinnamomea</i> L.<br>cinnamon fern   |
| 99, <i>Lindera benzoin</i> (L.) Blume<br>northern spicebush             | 119, <i>Osmunda regalis</i> L.<br>royal fern   |

### A.3, Fort Eustis Groundcover Species

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- |  |  |
|--|--|
| 120, <i>Ostrya virginiana</i> (P. Mill.) K. Koch<br>hophornbeam          | 140, <i>Potentilla canadensis</i> L.<br>dwarf cinquefoil   |
| 121, <i>Oxalis dillenii</i> Jacq.<br>wood sorrel                         | 141, <i>Potentilla simplex</i> Michx.<br>common cinquefoil   |
| 122, <i>Oxalis stricta</i> L.<br>common yellow oxalis                    | 142, <i>Proserpinaca palustris</i> L.<br>marsh mermaidweed   |
| 123, <i>Oxydendrum arboreum</i> (L.) DC.<br>sourwood                     | 143, <i>Prunus serotina</i> Ehrh.<br>black cherry  |
| 124, <i>Panicum</i> L.<br>panicgrass                                     | 144, <i>Pteridium aquilinum</i> (L.) Kuhn<br>western brackenfern   |
| 125, <i>Panicum verrucosum</i> Muhl.<br>warty panicgrass                 | 145, <i>Quercus alba</i> L.<br>white oak   |
| 126, <i>Parthenocissus quinquefolia</i> (L.) Planch.<br>Virginia creeper | 146, <i>Quercus coccinea</i> Muenchh.<br>scarlet oak   |
| 127, <i>Peltandra virginica</i> (L.) Schott<br>green arrow arum          | 147, <i>Quercus falcata</i> Michx.<br>southern red oak   |
| 128, <i>Phytolacca americana</i> L.<br>American pokeweed                 | 148, <i>Quercus michauxii</i> Nutt.<br>swamp chestnut oak  |
| 129, <i>Pinus taeda</i> L.<br>loblolly pine                              | 149, <i>Quercus nigra</i> L.<br>water oak  |
| 130, <i>Pinus virginiana</i> P. Mill.<br>Virginia pine                   | 150, <i>Quercus palustris</i> Muenchh.<br>pin oak  |
| 131, <i>Poa pratensis</i> L.<br>Kentucky bluegrass                       | 151, <i>Quercus phellos</i> L.<br>willow oak   |
| 132, <i>Poa trivialis</i> L.<br>rough bluegrass                          | 152, <i>Quercus rubra</i> L.<br>northern red oak   |
| 133, <i>Polygonatum biflorum</i> (Walt.) Ell.<br>smooth Solomon's seal   | 153, <i>Quercus stellata</i> Wangenh.<br>post oak  |
| 134, <i>Polygonum caespitosum</i> Blume<br>oriental ladythumb            | 154, <i>Quercus velutina</i> Lam.<br>black oak   |
| 135, <i>Polygonum</i> L.<br>knotweed                                     | 155, <i>Rhexia mariana</i> L. var. <i>ventricosa</i> (Fern. & Grise.)<br>Kral & Bostick<br>Maryland meadowbeauty |
| 136, <i>Polygonum persicaria</i> L.<br>spotted ladythumb                 | 156, <i>Rhododendron periclymenoides</i> (Michx.) Shinners<br>pink azalea  |
| 137, <i>Polygonum sagittatum</i> L.<br>arrowleaf tearthumb               | 157, <i>Rhus copallinum</i> L.<br>flameleaf sumac  |
| 138, <i>Polygonum virginianum</i> L.<br>jumpseed                         | 158, <i>Rhynchospora corniculata</i> (Lam.) Gray<br>shortbristle horned beaksedge                                |
| 139, <i>Polystichum acrostichoides</i> (Michx.) Schott<br>Christmas fern | 159, <i>Rubus argutus</i> Link<br>sawtooth blackberry  |

### A.3, Fort Eustis Groundcover Species

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- |   |  |
|---|--|
| 160, <i>Rubus flagellaris</i> Willd.<br>northern dewberry                     | 180, <i>Vaccinium pallidum</i> Ait.<br>Blue Ridge blueberry        |
| 161, <i>Sassafras albidum</i> (Nutt.) Nees<br>sassafras                       | 181, <i>Vaccinium stamineum</i> L.<br>deerberry                    |
| 162, <i>Saururus cernuus</i> L.<br>lizard's tail                              | 182, <i>Verbascum thapsus</i> L.<br>common mullein                 |
| 163, <i>Schedonorus phoenix</i> (Scop.) Holub<br>tall fescue                  | 183, <i>Verbesina occidentalis</i> (L.) Walt.<br>yellow crownbeard |
| 164, <i>Scirpus cyperinus</i> (L.) Kunth<br>woolgrass                         | 184, <i>Viburnum dentatum</i> L.<br>southern arrowwood             |
| 165, <i>Sisyrinchium angustifolium</i> P. Mill.<br>narrowleaf blue-eyed grass | 185, <i>Viburnum nudum</i> L.<br>possumhaw                         |
| 166, <i>Smilax bona-nox</i> L.<br>saw greenbrier                              | 186, <i>Vinca minor</i> L.<br>common periwinkle                    |
| 167, <i>Smilax glauca</i> Walt.<br>cat greenbrier                             | 187, <i>Viola</i> × <i>primulifolia</i> L. (pro sp.)<br>0          |
| 168, <i>Smilax rotundifolia</i> L.<br>roundleaf greenbrier                    | 188, <i>Viola pedata</i> L.<br>birdfoot violet                     |
| 169, <i>Smilax walteri</i> Pursh<br>coral greenbrier                          | 189, <i>Viola sororia</i> Willd.<br>common blue violet             |
| 170, <i>Solanum carolinense</i> L.<br>Carolina horsenettle                    | 190, <i>Vitis rotundifolia</i> Michx.<br>muscadine                 |
| 171, <i>Solidago canadensis</i> L.<br>Canada goldenrod                        | 191, <i>Woodwardia areolata</i> (L.) T. Moore<br>netted chainfern  |
| 172, <i>Solidago</i> L.<br>goldenrod  |  |
| 173, <i>Stellaria media</i> (L.) Vill.<br>common chickweed                    |  |
| 174, <i>Taraxacum officinale</i> G.H. Weber ex Wiggers<br>common dandelion    |  |
| 175, <i>Toxicodendron radicans</i> (L.) Kuntze<br>eastern poison ivy          |  |
| 176, <i>Ulmus alata</i> Michx.<br>winged elm                                  |  |
| 177, <i>Ulmus americana</i> L.<br>American elm                                |  |
| 178, <i>Vaccinium formosum</i> Andr.<br>southern blueberry                    |  |
| 179, <i>Vaccinium fuscatum</i> Ait.<br>black highbush blueberry               |  |



#### A.4, Fort Eustis Sapling Species

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- 1, *Acer negundo* L.  
boxelder
- 2, *Acer rubrum* L.  
red maple
- 3, *Ailanthus altissima* (P. Mill.) Swingle  
tree of heaven
- 4, *Carpinus caroliniana* Walt.  
American hornbeam
- 5, *Carya alba* (L.) Nutt. ex Ell.  
mockernut hickory
- 6, *Celtis occidentalis* L.  
common hackberry
- 7, *Cornus florida* L.  
flowering dogwood
- 8, *Diospyros virginiana* L.  
common persimmon
- 9, *Fagus grandifolia* Ehrh.  
American beech
- 10, *Fraxinus pennsylvanica* Marsh.  
green ash
- 11, *Ilex opaca* Ait.  
American holly
- 12, *Juglans nigra* L.  
black walnut
- 13, *Juniperus virginiana* L.  
eastern redcedar
- 14, *Liquidambar styraciflua* L.  
sweetgum
- 15, *Liriodendron tulipifera* L.  
tuliptree
- 16, *Magnolia grandiflora* L.  
southern magnolia
- 17, *Malus angustifolia* (Ait.) Michx.  
southern crabapple
- 18, *Nyssa biflora* Walt.  
swamp tupelo
- 19, *Nyssa sylvatica* Marsh.  
blackgum
- 20, *Oxydendrum arboreum* (L.) DC.  
sourwood
- 21, *Paulownia tomentosa* (Thunb.) Sieb. & Zucc. ex Steud.  
princesstree
- 22, *Persea palustris* (Raf.) Sarg.  
swamp bay
- 23, *Pinus taeda* L.  
loblolly pine
- 24, *Platanus occidentalis* L.  
American sycamore
- 25, *Prunus serotina* Ehrh.  
black cherry
- 26, *Quercus alba* L.  
white oak
- 27, *Quercus falcata* Michx.  
southern red oak
- 28, *Quercus michauxii* Nutt.  
swamp chestnut oak
- 29, *Quercus pagoda* Raf.  
cherrybark oak
- 30, *Quercus prinus* L.  
chestnut oak
- 31, *Quercus rubra* L.  
northern red oak
- 32, *Quercus velutina* Lam.  
black oak
- 33, *Robinia pseudoacacia* L.  
black locust
- 34, *Sassafras albidum* (Nutt.) Nees  
sassafras
- 35, *Ulmus americana* L.  
American elm

## A.5, Fort Eustis Shrub Species

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- 1, *Ailanthus altissima* (P. Mill.) Swingle  
tree of heaven
- 2, *Aralia spinosa* L.  
devil's walkingstick
- 3, *Asimina triloba* (L.) Dunal  
pawpaw
- 4, *Baccharis halimifolia* L.  
eastern baccharis
- 5, *Callicarpa americana* L.  
American beautyberry
- 6, *Campsis radicans* (L.) Seem. ex Bureau  
trumpet creeper
- 7, *Cornus florida* L.  
flowering dogwood
- 8, *Elaeagnus umbellata* Thunb.  
autumn olive
- 9, *Gaylussacia frondosa* (L.) Torr. & Gray ex Torr.  
blue huckleberry
- 10, *Ilex opaca* Ait.  
American holly
- 11, *Iva frutescens* L.  
Jesuit's bark
- 12, *Juniperus virginiana* L.  
eastern redcedar
- 13, *Ligustrum sinense* Lour.  
Chinese privet
- 14, *Lindera benzoin* (L.) Blume  
northern spicebush
- 15, *Lonicera japonica* Thunb.  
Japanese honeysuckle
- 16, *Matelea gonocarpus* (Walt.) Shinnars  
angularfruit milkvine
- 17, *Melia azedarach* L.  
Chinaberrytree
- 18, *Morella cerifera* (L.) Small  
wax myrtle
- 19, *Parthenocissus quinquefolia* (L.) Planch.  
Virginia creeper
- 20, *Persea palustris* (Raf.) Sarg.  
swamp bay
- 21, *Rosa multiflora* Thunb. ex Murr.  
multiflora rose
- 22, *Smilax bona-nox* L.  
saw greenbrier
- 23, *Smilax rotundifolia* L.  
roundleaf greenbrier
- 24, *Symplocos tinctoria* (L.) L'Hér.  
common sweetleaf
- 25, *Toxicodendron radicans* (L.) Kuntze  
eastern poison ivy
- 26, *Vaccinium fuscatum* Ait.  
black highbush blueberry
- 27, *Vitis rotundifolia* Michx.  
muscadine
- 28, *Vitis vulpina* L.  
frost grape

## A.6, Dominant Species by Compartment

Comp. #	Vegetative Class	Dominant Species
01	Canopy	black walnut, hackberry, loblolly pine
	Shrubs	muscadine, American beautyberry, roundleaf greenbrier, saw greenbrier
	Saplings	sweetgum, common hackberry, black walnut
	Groundcover	Virginia wildrye, yellow crownbeard, Japanese stilt grass, Japanese honeysuckle, switchgrass
02	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	American beautyberry, muscadine, swamp bay, wax myrtle, eastern poison ivy
	Saplings	sweetgum, swamp bay, cherrybark oak, common persimmon, red maple
	Groundcover	Japanese stilt grass, smallspike false nettle, yellow crownbeard, Christmas fern, Japanese honeysuckle
03	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	swamp bay, American beautyberry, Japanese honeysuckle, muscadine, devil's walkingstick
	Saplings	sweetgum
	Groundcover	Japanese stilt grass, Japanese honeysuckle, swamp bay, slender woodoats, American beautyberry
04	Canopy	black walnut, sweetgum, black cherry
	Shrubs	muscadine, roundleaf greenbrier, wax myrtle, Japanese honeysuckle, saw greenbrier
	Saplings	sweetgum, black walnut, swamp bay
	Groundcover	Japanese stilt grass, yellow crownbeard, Virginia wildrye, smallspike false nettle, ebony spleenwort
05	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	American beautyberry, swamp bay, wax myrtle
	Saplings	sweetgum, northern red oak, white oak
	Groundcover	American beautyberry, muscadine, dogfennel, Japanese stilt grass, roundleaf greenbrier
06	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	swamp bay, muscadine, wax myrtle, American beautyberry, Japanese honeysuckle
	Saplings	loblolly pine, sweetgum, common persimmon, flowering dogwood
	Groundcover	Japanese stilt grass, slender woodoats, sweet woodreed, yellow crownbeard, swamp bay
07	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	American beautyberry, roundleaf greenbrier, muscadine, saw greenbrier, wax myrtle
	Saplings	swamp bay, sweetgum, common persimmon, loblolly pine, cherrybark oak
	Groundcover	slender woodoats, Japanese stilt grass, Christmas fern, roundleaf greenbrier, saw greenbrier
08	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	wax myrtle, devil's walkingstick, American beautyberry, Japanese honeysuckle, muscadine
	Saplings	swamp bay, sweetgum, southern magnolia, common persimmon, American hornbeam
	Groundcover	Japanese stilt grass, slender woodoats, American beautyberry, Christmas fern, New York fern
09	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	swamp bay, Japanese honeysuckle, American beautyberry, muscadine, wax myrtle
	Saplings	sweetgum, flowering dogwood, loblolly pine, tree of heaven, cherrybark oak
	Groundcover	Japanese stilt grass, bigleaf periwinkle, slender woodoats, Christmas fern, yellow crownbeard



## A.6, Dominant Species by Compartment

Comp. #	Vegetative Class	Dominant Species
10	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	Japanese honeysuckle, devil's walkingstick, American beautyberry, muscadine, eastern redcedar
	Saplings	common persimmon, sweetgum, northern red oak, loblolly pine, black oak
	Groundcover	Japanese stilt grass, Japanese honeysuckle, common ladyfern, Virginia creeper, Christmas fern
11	Canopy	loblolly pine, sweetgum, red maple
	Shrubs	wax myrtle, American beautyberry, roundleaf greenbrier, devil's walkingstick, muscadine
	Saplings	sweetgum, loblolly pine, southern red oak, cherrybark oak, red maple
	Groundcover	Japanese stilt grass, slender woodoats, common reed, sawtooth blackberry, Japanese honeysuckle
12	Canopy	loblolly pine, sweetgum
	Shrubs	American beautyberry
	Saplings	sweetgum, common persimmon, loblolly pine, black locust, cherrybark oak
	Groundcover	Japanese stilt grass, ground ivy, Japanese honeysuckle, Pennsylvania smartweed, common reed
13	Canopy	sweetgum, loblolly pine, black cherry
	Shrubs	wax myrtle, Japanese honeysuckle, muscadine, eastern poison ivy, saw greenbrier
	Saplings	sweetgum, cherrybark oak, flowering dogwood, loblolly pine, black cherry
	Groundcover	Japanese stilt grass, Japanese honeysuckle, slender woodoats, Virginia creeper, Christmas fern
14	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	devil's walkingstick, wax myrtle, American beautyberry, muscadine, Japanese honeysuckle
	Saplings	sweetgum, northern red oak, loblolly pine, common persimmon
	Groundcover	Japanese stilt grass, Japanese honeysuckle, Jack in the pulpit, sweetgum, smallspike false nettle
15	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	wax myrtle, common sweetleaf, Japanese honeysuckle, American beautyberry, muscadine
	Saplings	common persimmon, sweetgum, blackgum, loblolly pine, flowering dogwood
	Groundcover	Japanese stilt grass, slender woodoats, Christmas fern, whitegrass, New York fern
16	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	Chinaberrytree, American beautyberry, saw greenbrier, wax myrtle, muscadine
	Saplings	tree of heaven, sweetgum, blackgum, black cherry
	Groundcover	Japanese stilt grass, tree of heaven, slender woodoats, American beautyberry, smallspike false nettle
17	Canopy	sweetgum, loblolly pine, tulip poplar, swamp chestnut oak
	Shrubs	American beautyberry, muscadine, Japanese honeysuckle, wax myrtle, flowering dogwood
	Saplings	sweetgum, flowering dogwood, cherrybark oak, sourwood
	Groundcover	Japanese stilt grass, Christmas fern, New York fern, broad beechfern, Japanese honeysuckle

## A.6, Dominant Species by Compartment

Comp. #	Vegetative Class	Dominant Species
18	Canopy	sweetgum, loblolly pine, tulip poplar, cherrybark oak
	Shrubs	roundleaf greenbrier, wax myrtle, American beautyberry, Japanese honeysuckle, Virginia creeper
	Saplings	loblolly pine, sweetgum, black oak
	Groundcover	Japanese stilt grass, yellow crownbeard, slender woodoats, roundleaf greenbrier, black cherry
19	Canopy	loblolly pine, cherrybark oak, sweetgum, blackgum
	Shrubs	wax myrtle, muscadine, roundleaf greenbrier, American beautyberry, devil's walkingstick
	Saplings	sweetgum, common persimmon,
	Groundcover	Japanese stilt grass, common selfheal, Japanese honeysuckle, muscadine, whitegrass
20	Canopy	loblolly pine, cherrybark oak, sweetgum, white oak
	Shrubs	wax myrtle, eastern baccharis, muscadine, Japanese honeysuckle, American beautyberry
	Saplings	loblolly pine, sweetgum, tree of heaven, black oak, southern crabapple
	Groundcover	Japanese stilt grass, saltmeadow cordgrass, eastern poison ivy, smallspike false nettle, Japanese honeysuckle
21	Canopy	loblolly pine, sweetgum, cherrybark oak
	Shrubs	Japanese honeysuckle, wax myrtle, roundleaf greenbrier, muscadine, American beautyberry
	Saplings	sweetgum, common persimmon, cherrybark oak, black cherry, blackgum
	Groundcover	Japanese stilt grass, Japanese honeysuckle, smallspike false nettle, Virginia creeper, sawtooth blackberry
22	Canopy	loblolly pine, sweetgum
	Shrubs	roundleaf greenbrier, trumpet creeper, eastern poison ivy
	Saplings	loblolly pine, sweetgum, cherrybark oak, swamp chestnut oak
	Groundcover	common rush, roundleaf greenbrier, slender woodoats, woolgrass, sweetgum
23	Canopy	loblolly pine, cherrybark oak, southern red oak
	Shrubs	wax myrtle, roundleaf greenbrier, black highbush blueberry
	Saplings	sweetgum, swamp chestnut oak, cherrybark oak, red maple, blackgum
	Groundcover	blue huckleberry, slender woodoats, switchgrass, common reed, rice cutgrass
24	Canopy	loblolly pine, sweetgum
	Shrubs	Japanese honeysuckle, muscadine, Virginia creeper, wax myrtle, American beautyberry
	Saplings	sweetgum, cherrybark oak, common persimmon, yellow poplar, mockernut hickory
	Groundcover	Japanese stilt grass, slender woodoats, Japanese honeysuckle, common rush, eastern poison ivy
25	Canopy	loblolly pine, sweetgum
	Shrubs	American beautyberry, Japanese honeysuckle
	Saplings	sweetgum, loblolly pine, cherrybark oak, common persimmon
	Groundcover	Japanese stilt grass, Japanese honeysuckle, New York fern, sweet woodreed, yellow crownbeard

## A.6, Dominant Species by Compartment

Comp. #	Vegetative Class	Dominant Species
26	Canopy	tulip poplar, cherrybark oak, American beech, sweetgum, loblolly pine
	Shrubs	American holly, black highbush blueberry, flowering dogwood
	Saplings	sweetgum, yellow poplar, red maple, American beech, loblolly pine
	Groundcover	slender woodoats, muscadine, sweetgum, sensitive fern, broad beechfern
27	Canopy	loblolly pine, white oak, southern red oak, willow oak
	Shrubs	wax myrtle, swamp bay, black highbush blueberry
	Saplings	sweetgum, red maple, loblolly pine, American holly, cherrybark oak
	Groundcover	muscadine, cinnamon fern, blue huckleberry, slender woodoats, black huckleberry
28	Canopy	American beech, white oak, tulip poplar, loblolly pine
	Shrubs	blue huckleberry, American holly, pawpaw
	Saplings	sweetgum, American beech, common persimmon, red maple, flowering dogwood
	Groundcover	blue huckleberry, muscadine, pawpaw, white oak, sweetgum
29	Canopy	tulip poplar, American beech, sweetgum, cherrybark oak, loblolly pine
	Shrubs	pawpaw, American holly, wax myrtle, northern spicebush, muscadine
	Saplings	sweetgum, American hornbeam, American beech, flowering dogwood, American holly
	Groundcover	pawpaw, muscadine, rare clubmoss, partridgeberry, Christmas fern
30	Canopy	tulip poplar, sweetgum, cherrybark oak, loblolly pine
	Shrubs	pawpaw, eastern poison ivy, northern spicebush, Japanese honeysuckle, roundleaf greenbrier
	Saplings	yellow poplar, sweetgum, American hornbeam, flowering dogwood, black cherry
	Groundcover	Japanese stilt grass, yellow poplar, pawpaw, Christmas fern, eastern poison ivy
31	Canopy	sweetgum, loblolly pine, red maple, tulip poplar
	Shrubs	wax myrtle
	Saplings	sweetgum, loblolly pine, red maple, cherrybark oak, southern red oak
	Groundcover	Japanese stilt grass, slender woodoats, New York fern, whitegrass, blue huckleberry
33	Canopy	sweetgum, southern red oak, loblolly pine
	Shrubs	American beautyberry, saw greenbrier, muscadine, Jesuit's bark
	Saplings	swamp bay tree of heaven
	Groundcover	slender woodoats, Virginia wildrye, saw greenbrier, saltmeadow cordgrass, American beautyberry
34	Canopy	cherrybark oak, loblolly pine, sweetgum
	Shrubs	American beautyberry, roundleaf greenbrier, wax myrtle, swamp bay, flowering dogwood
	Saplings	loblolly pine, sweetgum, blackgum
	Groundcover	slender woodoats, American beautyberry, common reed, tall oatgrass, swamp bay
35	Canopy	loblolly pine, sweetgum, cherrybark oak, black cherry, hackberry
	Shrubs	American beautyberry, wax myrtle, saw greenbrier, Chinese privet, Japanese honeysuckle
	Saplings	sweetgum
	Groundcover	Japanese stilt grass, Japanese honeysuckle, slender woodoats, American beautyberry, yellow crownbeard



### *A.6, Dominant Species by Compartment*

Comp. #	Vegetative Class	Dominant Species
36	Canopy	loblolly pine, sweetgum, black cherry
	Shrubs	muscadine, American beautyberry, wax myrtle, Chinese privet
	Saplings	swamp bay, loblolly pine
	Groundcover	Japanese stilt grass, slender woodoats, swamp bay, American beautyberry, wax myrtle
37	Canopy	NA
	Shrubs	NA
	Saplings	NA
	Groundcover	NA
38	Canopy	NA
	Shrubs	NA
	Saplings	NA
	Groundcover	NA