TE-16 Attachment

# FINAL
# FOREST CONSERVATION PLAN

for

**Proposed Calvert Cliffs Nuclear Power Plant Unit 3 Project Area**
**Calvert Cliffs Nuclear Power Plant Site**
**Calvert County, Maryland**

**Prepared by:**

**Tetra Tech NUS**
**20251 Century Blvd., Suite 200**
**Germantown, Maryland 20874**
**Principal Investigator: J. Peyton Doub, PWS, CEP**

**May 2008**

# TABLE OF CONTENTS

**EXECUTIVE SUMMARY** ..... 1
**INTRODUCTION** ..... 2
**SUMMARY OF FOREST STAND IMPACTS** ..... 3
**FOREST RETENTION, REFORESTATION, AND AFFORESTATION CALCULATIONS** ..... 5
**FOREST RETENTION** ..... 8
**REFORESTATION AND AFFORESTATION** ..... 9
**REFERENCES** ..... 9

## LIST OF TABLES

Table 1 Summary of Proposed Impacts to Forest Stands ..... 11

## LIST OF FIGURES

Figure 1 FSD Summary ..... 12
Figure 2 Proposed Forest Stand Impacts and Proposed Forest Retention Areas May 2008 ..... 13
Figure 3 Forest Conservation Worksheet ..... 14

# EXECUTIVE SUMMARY

This report presents a Forest Conservation Plan (FCP) for that portion of the Calvert Cliffs Nuclear Power Plant (CCNPP) Site in Lusby, Maryland, where UniStar Nuclear Energy (UNE) proposes to construct a third nuclear power reactor (CCNPP Unit 3). An FCP outlines mitigation requirements under the Maryland Forest Conservation Act for land development projects. The FCP draws upon baseline forest characterization data developed for the reactor project in a Forest Stand Delineation (FSD) report prepared previously. Mitigation can take one (or a combination) of three forms:

1. **Forest Retention**, which consists of designating areas of existing forest cover on a development site for permanent preservation;

2. **Reforestation**, which consists of planting forest cover in non-forested areas to offset the loss of forest cover during construction of a development project; and

3. **Afforestation**, which consists of planting forest cover in non-forested areas to offset the absence of existing forest cover on a development site.

The FCP presents a sequence of calculations performed by UNE to quantify how much of each type of mitigation must be performed to comply with the Maryland Forest Conservation Act. UNE proposes enough Forest Retention (preservation) on the CCNPP Site that additional mitigation in the form of Reforestation or Afforestation is not necessary to achieve compliance with the Act. When possible, preserving existing forest cover (i.e., Forest Retention) is superior to attempting to plant new forest cover (i.e., Reforestation or Afforestation) because it avoids the delay and uncertainties associated with nurturing planted seedlings into mature forest cover. The areas proposed for Forest Retention include approximately 102 acres immediately surrounding the reactor construction site plus 58 acres of mature forest cover in a "Northwestern Tract" in the northwestern quadrant of the CCNPP Site. The FCP also outlines how UNE has designed the reactor to minimize the loss of forest cover and outlines specific measures for protecting the designated Forest Retention Areas.

# INTRODUCTION

This report presents a Forest Conservation Plan (FCP) for that portion of the Calvert Cliffs Nuclear Power Plant (CCNPP) Site in Lusby, Maryland, where UniStar Nuclear Energy (UNE) proposes to construct a third nuclear power reactor (CCNPP Unit 3). The area addressed by the FCP is henceforth referred to as the "Project Site". The FCP follows procedures outlined in Chapter 3 of the *State Forest Conservation Technical Manual*, Third Edition (Maryland DNR, 1997) (henceforth referred to as the "Technical Manual"). The requirements for a FCP are established in the Maryland *Forest Conservation Act* (FCA). The FCP includes text, calculations, plans, and specifications. The calculations, plans, and specifications are provided on attachments that may be removed for use independently from the text.

**Forest Stand Delineation:** The FCP draws upon quantitative baseline forest condition data presented in a Forest Stand Delineation (FSD) prepared for the Project Site under separate cover. The FSD is incorporated by reference into the FCP. The FSD followed procedures for a "Full FSD" outlined in Section 2.2.3 of the Technical Manual. The FSD expanded upon vegetation data presented previously in a *Final Flora Survey Report* (Tetra Tech, 2007a), which mapped and qualitatively characterized vegetation on the entire CCNPP Site, including, but not limited to, the Project Site. The FSD also used data and information from the *Final Wetland Delineation Report* (Tetra Tech NUS, 2007b), which mapped the locations of wetlands and other waters of the United States, as defined by the Federal Clean Water Act in 33 CFR 328 and delineated using the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), on the Project Site.

Figure 1 depicts the spatial extent of each forest stand, as characterized in the FSD report. The FSD report also included an Environmental Features Map depicting wetlands, wetland and stream buffers, floodplains, and steep slopes; a Soils Map; and a map of Specimen Trees. Specimen Trees are defined under the Maryland Forest Conservation Act as trees measuring 30 inches in diameter at breast height (DBH) or more, or having 75 percent or more of the diameter of the current State champion tree of that species.

**Determination of Priority Forest Areas for Retention:** The forest stands characterized by the FSD are of varying priority for avoidance of impacts (i.e., retention during site preparation). The order of priority for retention are, from highest to lowest:

- Sycamore – Sweetgum – American Elm Forest stands;
- Chestnut Oak Forest stands;
- Sweetgum – Tulip Poplar Forest stands; and
- Virginia Pine – Oak Forest stands; Black Locust Forest stands; and Virginia Pine Forest stands.

The Sycamore – Sweetgum – American Elm Forest comprises forested wetlands and riparian uplands in the bottoms of stream valleys and hence constitutes the highest priority forest for avoidance of impacts (i.e., retention during site preparation). The Chestnut Oak Forest comprises mature, late successional deciduous forest cover on sloping uplands and is the next to highest priority forest for avoidance (retention). It does not include wetlands, but wetland and stream buffers extend into Chestnut Oak Forest on the low parts of slopes adjoining wetlands and stream valleys. Many of the dominant and codominant species are Specimen Trees (shown on Figure 1) or exceed 20 inches DBH and are of slow-growing species such as chestnut oak, white oak, and black oak. Many such trees are estimated to be over 100 years in age, and regeneration of similar forest cover could require 75 or more years.

Like the Chestnut Oak Forest, the Sweetgum – Tulip Poplar Forest includes many stream and wetland buffers as well as large, mature trees and many Specimen Trees (shown on Figure 1). But because sweetgum and tulip poplar are faster-growing species than most oak species, Sweetgum – Tulip Poplar Forest is of lower priority for retention than Chestnut Oak Forest. Furthermore, Sweetgum – Tulip Poplar Forest tends to occupy flatter areas of richer soil rather than the steeper and drier settings occupied by Chestnut Oak.

The Virginia Pine – Oak Forest, Black Locust Forest, and Virginia Pine Forest stands are of the lowest priority for retention. All are dominated by saplings and young trees of relatively fast growing species such as Virginia pine, loblolly pine, and black locust. None contain any Specimen Trees. The Virginia Pine – Oak Forest stands constitute regeneration on areas of former Chestnut Oak Forest that were logged in the 1980s. The Black Locust Forest stands are early successional forest stands that have become established on areas of dredged spoils or graded areas originating from construction of CCNPP Units 1 and 2 in the 1970s. The Virginia Pine Forest stand occupies an area of graded soil adjacent to the Camp Conoy Fishing Pond.

## SUMMARY OF FOREST STAND IMPACTS

The total area of forest that must be cleared to construct the proposed project (Figure 2) is approximately 238 acres. UNE has minimized the need for forest clearing by taking maximum advantage of existing unforested areas on the CCNPP Site, especially the grassy lawns of a former recreational facility termed Camp Conoy and an area of old field vegetation on dredge spoils termed the Lake Davies Dredged Material Disposal Area. By positioning much of the power block and adjoining permanent laydown area in what is now Camp Conoy, UNE has minimized the extent of forest clearing necessary in the Chesapeake Bay Critical Area (CBCA) to the east and on forested slopes in the headwaters of Johns Creek to the west. In its Applicant's Environmental Report submitted to the U.S. Nuclear Regulatory

Commission (NRC) in July 2007, UNE reported that approximately 252 acres of forest cover would be cleared. The subsequent reduction of impacts to only 238 acres reflects an ongoing effort by UNE to avoid and minimize forest clearing.

Some specific changes to the footprint that have reduced forest clearing include:

- Moving the proposed location for a concrete batch plant from a forested area in the western part of the CCNPP Site to a proposed permanent construction laydown area just southeast of the proposed power block;

- Reducing the width of clearing to accommodate a construction entrance road traversing forested areas in the western part of the CCNPP Site;

- Moving some proposed temporary construction staging areas from forested areas to old field areas in the western part of the CCNPP Site; and

- Redesigning the stormwater management facilities for the project to eliminate the need for a stormwater detention basin in a forested area northwest of the proposed power block and for basins in certain forested wetlands in the western part of the CCNPP Site.

Of the approximately 238 acres of forest clearing proposed at this time, just over 21 acres are in the CBCA, where forest clearing is regulated under the Maryland Chesapeake Bay Critical Areas Act rather than the Maryland Forest Conservation Act. UNE has prepared separate documentation for submittal to the Chesapeake Bay Critical Area Commission describing forest impacts in the CBCA and outlining mitigation measures. The FCP therefore focuses only on approximately 217 acres of forest clearing necessary outside of the CBCA, under jurisdiction of the Maryland Forest Conservation Act. The Technical Manual refers to an entire development property, including any lands in the CBCA, as the "Total Tract" and that part of a development property outside the CBCA (and hence under jurisdiction of the Maryland Forest Conservation Act) as the "Net Tract".

Table 1 quantifies proposed forest clearing in each stand characterized in the FSD. Separate columns provide forest clearing acreage in each stand for the "Total Tract" (which includes the CBCA) and the "Net Tract", which is the focus of the FCP. The approximately 217 acres of proposed forest clearing in the "Net Tract", and hence the subject of the FCP includes:

- Approximately 125.5 acres of Chestnut Oak Forest;
- Approximately 39.9 acres of Virginia Pine – Oak Forest;

- Approximately 35.6 acres of Sweetgum – Tulip Poplar Forest;
- Approximately 8.9 acres of Sycamore – Sweetgum – American Elm Forest;
- Approximately 6.1 acres of Black Locust Forest; and
- Approximately 0.7 acres of Virginia Pine Forest.

As noted above, the Sycamore – Sweetgum – American Elm Forest constitutes the highest priority for avoidance of impacts (i.e., retention during site preparation). UNE is able to site the proposed facilities in a manner avoiding the need for clearing or grading in a broad, mature stand of Sycamore – Sweetgum – American Elm Forest (Stand 4-14) on bottomlands directly adjoining John's Creek. However, it is not possible to avoid Sycamore – Sweetgum – American Elm Forest associated with certain seeps and unnamed headwater tributaries flowing toward John's Creek (Stands 4-3, 4-11, and 4-12) or the Chesapeake Bay (Stands 2-6, 2-10 through 2-12, and 9-4 and 9-5). The need for establishing broad, uniformly graded surfaces to accommodate the power block, switchyard, cooling tower, and other industrial facilities prevents UNE from building around wetlands, seeps, and other localized environmental features.

UNE's design also minimizes encroachment into Chestnut Oak Forest, the next highest priority for retention. The unavoidably large extent of Chestnut Oak Forest impact reflects its spatial predominance over much of the CCNPP Site. However, UNE is still able to avoid much of the steepest Chestnut Oak Forest on slopes adjoining Johns Creek, especially in Stands 4-9 and 4-15. The alignment chosen by UNE for the Construction Access Road avoids most of the steep Chestnut Oak Forest in Stands 7-7 and 7-8.

## FOREST RETENTION, REFORESTATION, AND AFFORESTATION CALCULATIONS

There are three categories of compensatory mitigation for forest loss impacts under the Maryland Forest Conservation Act:

1. **Forest Retention** consists of designating areas of existing forest cover on a development site for permanent preservation;

2. **Reforestation** consists of planting forest cover in non-forested areas to offset the loss of forest cover during construction of a development project; and

3. **Afforestation** consists of planting forest cover in non-forested areas to offset the absence of existing forest cover on a development site.

**Calculation of Mitigation Requirements:** The Technical Manual prescribes detailed calculations to determine the area of Forest Retention, Reforestation, and Afforestation required to achieve compliance with the Maryland Forest Conservation Act. The calculations involve quantifying the areas of existing forest cover and projected losses, followed by comparing them against two benchmark levels of forest cover termed the Conservation Threshold and Afforestation Threshold. The benchmarks are calculated by multiplying a project site's area by specific percentages based on the tract's zoning (the percentages are higher for low density zoning categories and lower for high density and commercial and industrial zoning categories). **Reforestation** requirements are calculated by multiplying forest losses by specific factors based on whether the losses cause forest cover to decrease below the Conservation Threshold. Forest cover losses that do not bring overall forest cover below the Conservation Threshold may be offset by a Reforestation ratio of 0.25: 1 (i.e., 0.25 acre of Reforestation per acre lost). Additional forest cover losses must be offset by a Reforestation ratio of 2:1 (i.e., 2 acres of reforestation per acre lost). The total reforestation requirement may be offset by **Forest Retention** on an acre for acre (1:1) basis.

**Afforestation** is an additional mitigation requirement under the Maryland Forest Conservation Act for development tracts that lack substantial areas of existing forest cover. The requirement is met by planting forest cover to bring the resulting forest cover up to the Afforestation Threshold. Because of the extensive existing forest cover on the Project Site, no Afforestation is required.

**Calculation Worksheet:** Because of the abundance of mature existing forest cover on the CCNPP Site and the ability to designate large areas of that forest cover for permanent preservation, UNE seeks to meet its mitigation requirements under the Maryland Forest Conservation Act entirely via Forest Retention. Forest Retention is superior to Reforestation or Afforestation because it avoids the delays and uncertainties associated with raising planted fields of tree seedlings into mature forest cover. For example, chestnut oak, the dominant tree in Chestnut Oak Forest, is a slow growing tree species that reportedly attains only 20 feet over 20 years (a rate of 1 foot per year) and requires 200 to 300 years to reach maturity (Hightshoe, 1988). Mountain laurel, the dominant shrub in the understory of Chestnut Oak Forest, is also slow-growing, reportedly attaining only 4 to 8 feet over 10 years (roughly 0.5 foot per year) (Hightshoe, 1988). Even though a planted cluster of chestnut oak and mountain laurel seedlings might achieve the appearance of mature Chestnut Oak Forest in 50 to 100 years, it is uncertain whether the new forest would match the natural diversity and spatial stratification inherent in existing naturally generated Chestnut Oak Forest. The ability of chestnut oak and mountain laurel to attain dominance in the climax forest of today reflects environmental conditions over the past couple of centuries, and changes in climate and other environmental factors may prevent future duplication of many nuances in the present vegetation. Furthermore, the planted seedlings would have to withstand exposure to pests, disease, herbivory by wildlife, and other adverse stresses. Attempts to replant forest types dominated by

faster growing species, such as Sweetgum – Tulip Poplar Forest, would be subject to the same uncertainties even if less time would be necessary for attainment of mature canopy height.

Figure 3 is a worksheet from the Technical Manual presenting the mitigation requirements calculations for the Project Site. To allow for meeting the mitigation requirements entirely enough Forest Retention, UNE expanded the Project Site to include an area of existing forest cover in the northwestern part of the CCNPP Site that will not be cleared during construction of the proposed CCNPP Unit 3. This Northwestern Tract consists of approximately 59 acres between the existing 500-kilovolt (kV) electric transmission line right-of-way (ROW) and Maryland Route 2-4. A 200-foot wide strip of forest cover directly adjacent to the ROW is excluded from the Northwestern Tract to allow for possible future expansion of the ROW. By adding this land area to the Project Site, UNE agrees to permanently dedicate the land to Forest Retention. The Total Tract Area (A) is therefore expanded from the approximately 599 acres addressed in the FSD to a total of approximately 658 acres (the original Total Tract Area of 599 acres plus the Northwestern Tract of 59 acres). That portion of the original 599 acres in the CBCA (B), approximately 98 acres, was then deducted, leaving a Net Tract Area (C) of approximately 560 acres.

The CCNPP Site is an industrial property. Hence, the Land Use Type used for the calculations is "Commercial and Industrial Use Area". According to the Technical Manual, the Afforestation Threshold and Conservation Threshold for a "Commercial and Industrial Use Area" must be 15 percent of the Net Tract Area. Hence, the Afforestation Threshold (D) and Conservation Threshold (E) used in the calculations are approximately 84 acres (15 percent of 560 acres).

The total existing forest cover on the Net Tract (F) is approximately 377 acres, which includes approximately 319 acres in the original forest stands (excluding the CBCA) plus approximately 58 acres of forest cover in the Northwestern Tract. Subtracting the Conservation Threshold (E) (84 acres) from the total existing forest cover (F) (377 acres) leaves an area (G) of approximately 293 acres of forest cover over the Conservation Threshold. Under the Maryland Forest Conservation Act, retaining a minimum of 0.2 times the area of forest cover over the Conservation Threshold (0.2 X G) plus the Conservation Threshold (E) allows an applicant to meet the full mitigation requirement without the need for supplemental planting (Reforestation and/or Afforestation). This Forest Retention target is termed the "Breakeven Point" (H), which calculates at approximately 143 acres for the Project Site. For the Project Site, the Act permits clearing a maximum (I) of approximately 234 acres of forest cover without the need for supplemental planting.

UNE proposes to clear approximately 217 acres (J) of forest cover, thereby leaving approximately 160 acres (K) of existing forest for Forest Retention. Because the 160 acres of Forest Retention (K) exceeds

the Breakeven Point (H), the Maryland Forest Conservation Act allows the mitigation requirement to be met exclusively via Forest Retention, without any supplemental planting.

## FOREST RETENTION

Figure 2 depicts areas proposed for Forest Retention. The proposed Forest Retention Areas encompass approximately 160 acres, including approximately 102 acres of the forest stands characterized by the FSD plus approximately 58 acres of forest in the Northwestern Tract. The Forest Retention Areas specifically include:

- Approximately 46.5 acres of Chestnut Oak Forest;
- Approximately 15.0 acres of Sweetgum – Tulip Poplar Forest;
- Approximately 22.8 acres of Virginia Pine – Oak Forest;
- Approximately 11.8 acres of Sycamore – Sweetgum – American Elm Forest;
- Approximately 6.4 acres of Black Locust Forest; and
- Approximately 58 acres of forest cover in the Northwestern Tract.

Most of the designated Forest Retention Areas (other than the Northwestern Tract) are at the outer edge of the proposed construction footprint. Constructing the power block, switchyard, cooling tower, and permanent laydown areas requires establishing a smooth grade over broad land areas; hence, preservation of individual trees and small patches of trees is not practicable over most of the Project Site. However, the designated Forest Retention Areas include several small patches and slivers of forest cover between the new construction area and the existing Independent Spent Nuclear Fuel Storage Facility and the Lake Davies Dredged Materials Disposal Area.

The Northwestern Tract was not addressed in the FSD. However, according to the flora survey map completed in 2007, the 58 acres of Forest Retention in the Northwestern Tract includes approximately 50 acres of Mixed Deciduous Forest (which generally corresponds to Sweetgum – Tulip Poplar Forest or Chestnut Oak Forest) and approximately 8 acres of Bottomland Deciduous Forest (which generally corresponds to Sycamore – Sweetgum – American Elm Forest). The Northwestern Tract includes approximately 8 acres of forested wetlands plus approximately 10 acres of land within 50 feet of wetland (wetland buffer). Several localized slope areas exceed 25 percent in grade.

The limits of each Forest Retention Area will be marked using silt fence (or super silt fence where designated by the Soil Erosion and Sediment Control Plan) prior to initiation of clearing activities on the Project Site. The silt fence will serve both as a barrier preventing inadvertent entry into the Forest Retention Areas by personnel or equipment and as a barrier to sedimentation. Signs will be posted

prohibiting physical disturbance of the Forest Retention Areas. Storage of materials and parking of equipment will be limited to designated construction laydown areas and prohibited in Forest Retention Areas.

Each Forest Retention Area will be visually inspected by a Qualified Professional following completion of construction activities and after one year. Any non-native invasive plants, as listed in Appendix F of the Technical Manual, will be killed or removed. Trees on the new forest edge will be pruned, in accordance with professional practice, as necessary to remove dead or damaged limbs and protect overall tree health. Dead trees within 50 feet of the forest edge (and farther, if necessary for human safety) will be removed. Any edge trees displaying more than a 10 percent lean will be removed. Trees over 12 inches DBH that have experienced soil disturbance deeper than 6 inches within 30 percent or more of their critical root zone, as defined in the Technical Manual, will be fertilized in accordance with professional practice using a low nitrogen, slow release fertilizer. Any resulting canopy gaps greater than 1,000 square feet will be filled by supplemental planting at a density of at least 2 seedlings per 100 square feet. The seedlings will be of species identified as dominant or codominant for the corresponding stand in the FSD. Any other actions deemed necessary by the professional to protect the overall forest integrity, such as disease or insect control actions, will be performed.

## REFORESTATION AND AFFORESTATION

Because UNE proposes an area of Forest Retention exceeding the "Breakeven Point" defined by the Maryland Forest Conservation Act, no Reforestation or Afforestation is proposed for purposes of complying with the Act.

## REFERENCES

Environmental Laboratory, 1987. *Corps of Engineers Wetlands Delineation Manual.* Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Hightshoe, G. L., 1988. *Native Trees, Shrubs, and Vines for Urban and Rural America – A Planting Design Manual for Environmental Designers.* Van Nostrand Reinhold, New York, New York.

Maryland DNR (Department of Natural Resources), 1997. *State Forest Conservation Technical Manual.* Third Edition, Ginger Page Howell and Todd Ericson, Editors.

Tetra Tech, 2007a. *Final Flora Survey Report for Proposed UniStar Nuclear Project Area, Calvert Cliffs Nuclear Power Plant Site, Calvert County, Maryland*, May 2007.

Tetra Tech, 2007b. *Final Wetland Delineation Report for Proposed UniStar Nuclear Project Area, Calvert Cliffs Nuclear Power Plant Site, Calvert County, Maryland*, May 2007.

**Table 1**
**Summary of Proposed Impacts to Forest Stands**
**Proposed Calvert Cliffs Nuclear Power Plant Unit 3 Project Site**
**Calvert Cliffs Nuclear Power Plant Site, Lusby, Maryland**
**Page 1 of 2**

| Stand | Forest Stand Description | Total Tract | Net Tract (Excludes CBCA) | | |
|---|---|---|---|---|---|
| | | Existing Forest | Existing Forest | Cleared Forest | Retained Forest |
| 1-1 | Sweetgum – Tulip Poplar Forest | 13.5 | 12.6 | 12.5 | 0.1 |
| 1-2 | Sweetgum – Tulip Poplar Forest | 14.1 | 14.0 | 14.0 | 0.0 |
| 1-3 | Sweetgum – Tulip Poplar Forest | 12.6 | 0.7 | 0.1 | 0.6 |
| 1-4 | Sweetgum – Tulip Poplar Forest | 11.3 | 1.2 | 0.8 | 0.4 |
| 1-5 | Sweetgum – Tulip Poplar Forest | 8.8 | 0.0 | N/A | N/A |
| 2-1 | Chestnut Oak Forest | 4.6 | 4.6 | 4.6 | 0.0 |
| 2-2 | Chestnut Oak Forest | 6.9 | 6.7 | 6.7 | 0.0 |
| 2-3 | Sweetgum – Tulip Poplar Forest | 6.1 | 0.0 | N/A | N/A |
| 2-4 | Chestnut Oak Forest | 5.4 | 0.0 | N/A | N/A |
| 2-5 | Sweetgum – Tulip Poplar Forest | 6.5 | 1.4 | 1.4 | 0.0 |
| 2-6 | Sycamore – Sweetgum – American Elm Forest | 0.9 | 0.5 | 0.3 | 0.2 |
| 2-7 | Chestnut Oak Forest | 17.0 | 0.0 | N/A | N/A |
| 2-8 | Chestnut Oak Forest | 10.4 | 5.6 | 2.7 | 2.9 |
| 2-9 | Chestnut Oak Forest | 7.7 | 7.7 | 7.5 | 0.2 |
| 2-10 | Sycamore – Sweetgum – American Elm Forest | 0.3 | 0.3 | 0.2 | 0.1 |
| 2-11 | Sycamore – Sweetgum – American Elm Forest | 0.4 | 0.4 | 0.4 | 0.0 |
| 2-12 | Sycamore – Sweetgum – American Elm Forest | 0.2 | 0.2 | 0.2 | 0.0 |
| 2-13 | Virginia Pine Forest | 0.7 | 0.7 | 0.7 | 0.0 |
| 4-1 | Virginia Pine – Oak Forest | 28.9 | 28.9 | 15.7 | 13.2 |
| 4-2 | Chestnut Oak Forest | 8.2 | 8.2 | 8.0 | 0.2 |
| 4-3 | Sycamore – Sweetgum – American Elm Forest | 4.2 | 4.2 | 3.6 | 0.6 |
| 4-4 | Chestnut Oak Forest | 9.3 | 9.3 | 9.3 | 0.0 |
| 4-5 | Virginia Pine – Oak Forest | 4.5 | 4.5 | 4.5 | 0.0 |
| 4-6 | Chestnut Oak Forest | 7.2 | 7.2 | 7.2 | 0.0 |
| 4-7 | Chestnut Oak Forest | 21.6 | 21.6 | 18.1 | 3.5 |
| 4-8 | Virginia Pine – Oak Forest | 3.2 | 3.2 | 3.2 | 0.0 |
| 4-9 | Chestnut Oak Forest | 30.7 | 30.7 | 25.0 | 5.7 |
| 4-10 | Virginia Pine – Oak Forest | 9.1 | 9.1 | 9.1 | 0.0 |
| 4-11 | Sycamore – Sweetgum – American Elm Forest | 0.9 | 0.9 | 0.9 | 0.0 |
| 4-12 | Sycamore – Sweetgum – American Elm Forest | 1.6 | 1.6 | 1.3 | 0.3 |
| 4-13 | Chestnut Oak Forest | 20.5 | 20.5 | 18.5 | 2.0 |
| 4-14 | Sycamore – Sweetgum – American Elm Forest | 5.3 | 5.3 | 0.0 | 5.3 |
| 4-15 | Chestnut Oak Forest | 13.3 | 13.3 | 2.4 | 10.9 |
| 4-16 | Chestnut Oak Forest | 2.0 | 2.0 | 0.8 | 1.2 |
| 6-1 | Black Locust Forest | 8.8 | 8.8 | 5.4 | 3.4 |
| 6-2 | Chestnut Oak Forest | 3.0 | 3.0 | 1.5 | 1.5 |
| 7-1 | Sweetgum – Tulip Poplar Forest | 3.7 | 3.7 | 0.6 | 3.1 |
| 7-2 | Sweetgum – Tulip Poplar Forest | 17.0 | 17.0 | 6.2 | 10.8 |
| 7-3 | Virginia Pine – Oak Forest | 1.6 | 1.6 | 0.1 | 1.5 |
| 7-4 | Sycamore – Sweetgum – American Elm Forest | 2.3 | 2.3 | 0.9 | 1.4 |
| 7-5 | Black Locust Forest | 1.5 | 1.5 | 0.6 | 0.9 |
| 7-6 | Sycamore – Sweetgum – American Elm Forest | 0.4 | 0.4 | 0.1 | 0.3 |
| 7-7 | Chestnut Oak Forest | 8.5 | 8.5 | 1.3 | 7.2 |
| 7-8 | Chestnut Oak Forest | 13.5 | 13.5 | 2.6 | 10.9 |

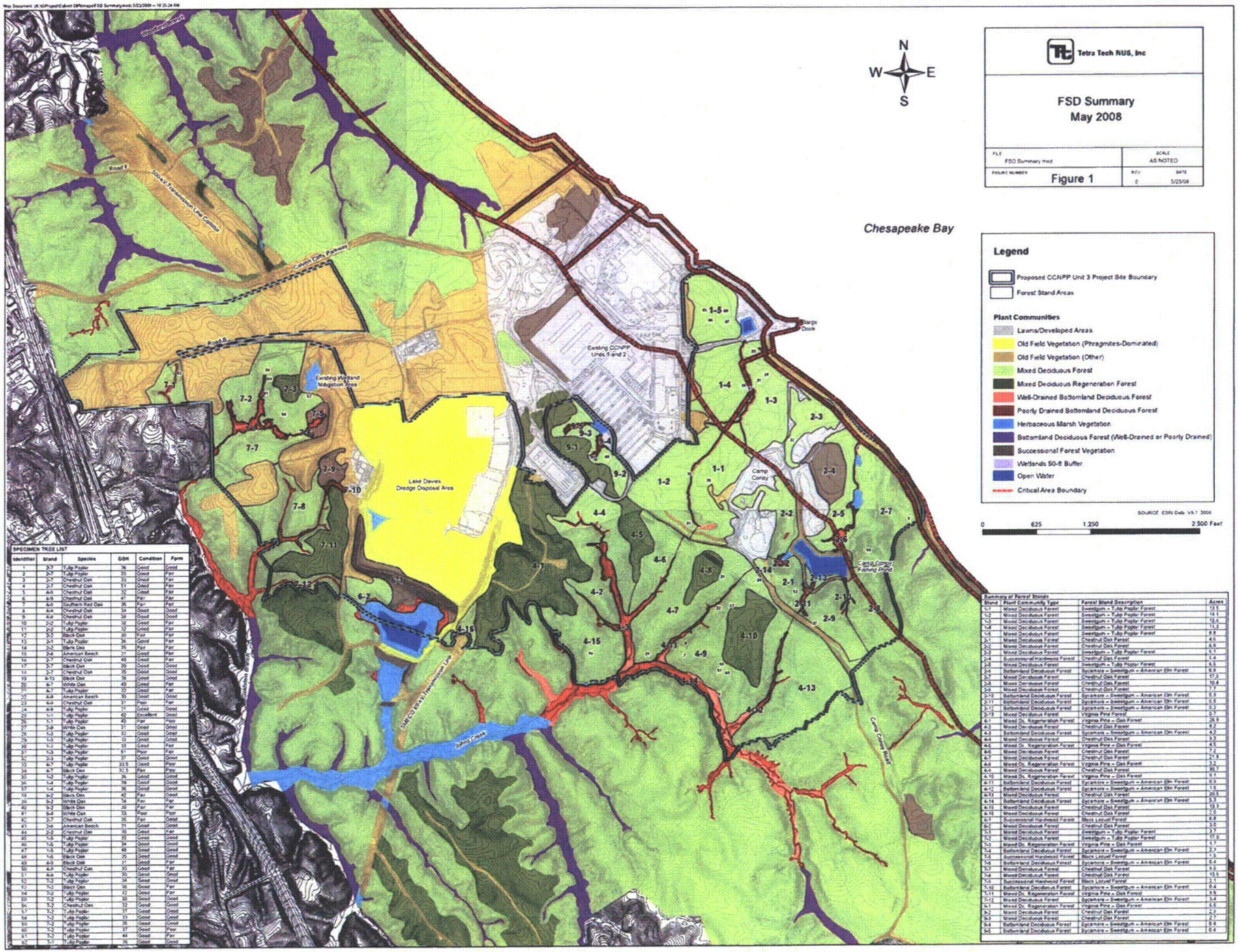
**Table 1**
**Summary of Proposed Impacts to Forest Stands**
**Proposed Calvert Cliffs Nuclear Power Plant Unit 3 Project Site**
**Calvert Cliffs Nuclear Power Plant Site, Lusby, Maryland**
**Page 2 of 2**

| Stand | Forest Stand Description | Total Tract | Net Tract (Excludes CBCA) | | |
|---|---|---|---|---|---|
| | | Existing Forest | Existing Forest | Cleared Forest | Retained Forest |
| 7-9 | Black Locust Forest | 2.1 | 2.1 | 0.2 | 1.9 |
| 7-10 | Sycamore – Sweetgum – American Elm Forest | 0.4 | 0.4 | 0.1 | 0.3 |
| 7-11 | Virginia Pine – Oak Forest | 8.9 | 8.9 | 2.5 | 6.4 |
| 7-12 | Sycamore – Sweetgum – American Elm Forest | 3.4 | 3.4 | 0.0 | 3.4 |
| 9-1 | Virginia Pine – Oak Forest | 6.5 | 6.5 | 4.9 | 1.6 |
| 9-2 | Chestnut Oak Forest | 2.3 | 2.3 | 2.3 | 0.0 |
| 9-3 | Chestnut Oak Forest | 2.7 | 2.7 | 2.7 | 0.0 |
| 9-4 | Sycamore – Sweetgum – American Elm Forest | 0.4 | 0.4 | 0.4 | 0.0 |
| 9-5 | Sycamore – Sweetgum – American Elm Forest | 0.4 | 0.4 | 0.4 | 0.0 |
| Additional Areas of Chestnut Oak Forest | | 4.6 | 4.6 | 4.6 | 0.0 |
| Totals | | 389.9 | 319.1 | 217.2 | 101.9 |

Tetra Tech NUS, Inc

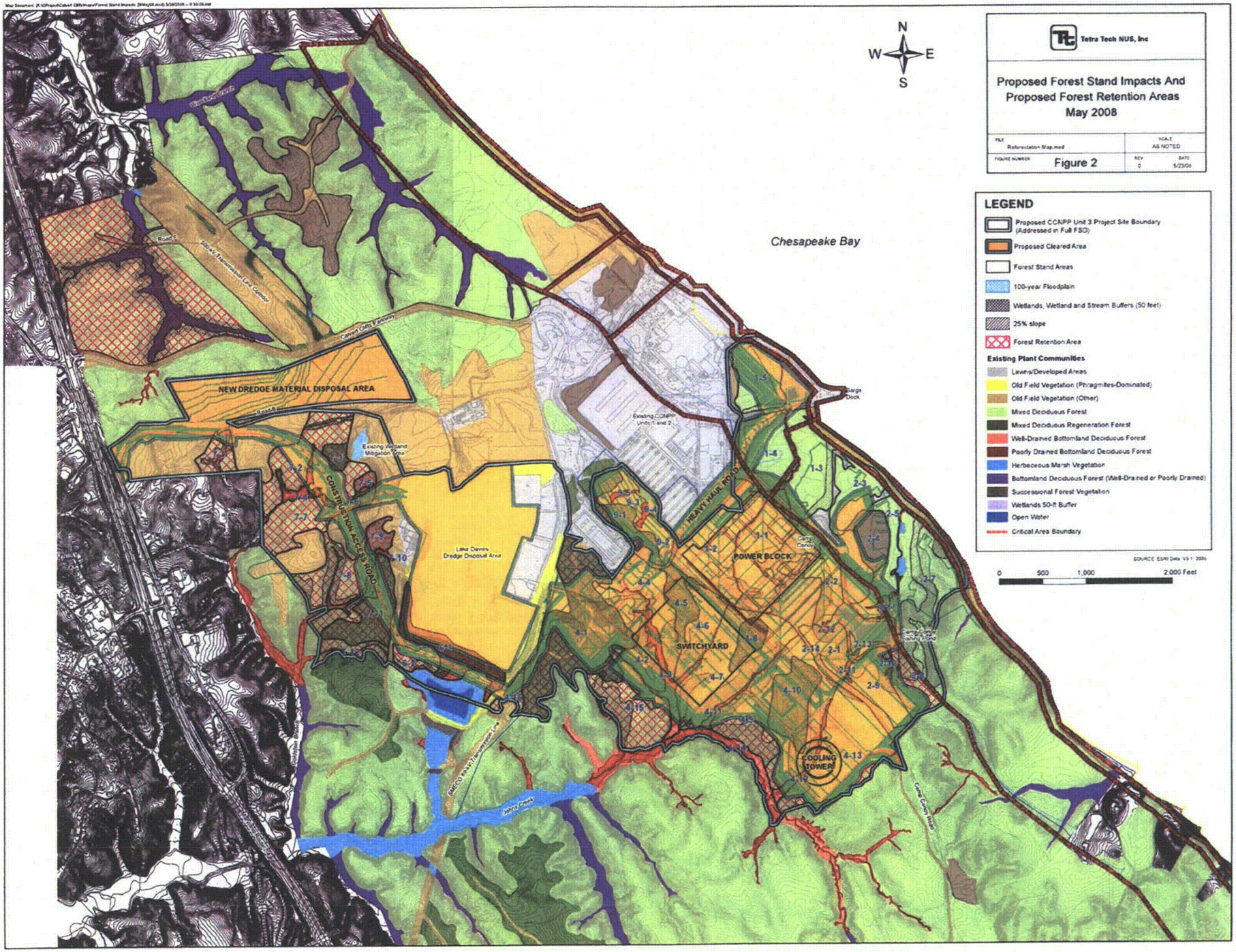
# FSD Summary
May 2008

| FILE | SCALE |
|---|---|
| FSD Summary.mxd | AS NOTED |
| FIGURE NUMBER: Figure 1 | REV: 0 / DATE: 5/23/08 |




| SPECIMEN TREE LIST | | | | | |
|---|---|---|---|---|---|
| Identifier | Stand | Species | DBH | Condition | Form |
| 1 | 2-7 | Tulip Poplar | 36 | Good | Good |
| 2 | 2-7 | Tulip Poplar | 35 | Good | Fair |
| 3 | 2-7 | Chestnut Oak | 33 | Good | Fair |
| 4 | 2-7 | Chestnut Oak | 51 | Good | Fair |
| 5 | 4-9 | Chestnut Oak | 32 | Good | Fair |
| 6 | 4-9 | Chestnut Oak | 41 | Fair | Fair |
| 7 | 4-9 | Southern Red Oak | 36 | Fair | Poor |
| 8 | 4-9 | Chestnut Oak | 34 | Good | Good |
| 9 | 4-9 | Chestnut Oak | 38 | Good | Good |
| 10 | 2-2 | Tulip Poplar | 32 | Good | Fair |
| 11 | 2-2 | Tulip Poplar | 32 | Good | Fair |
| 12 | 2-2 | Black Oak | 30 | Fair | Fair |
| 13 | 2-1 | Tulip Poplar | 36 | Good | Fair |
| 14 | 2-2 | Black Oak | 35 | Fair | Fair |
| 15 | 2-8 | American Beech | 31 | Good | Fair |
| 16 | 2-7 | Chestnut Oak | 48 | Good | Fair |
| 17 | 2-7 | Black Oak | 35 | Good | Good |
| 18 | 2-7 | Chestnut Oak | 35 | Good | Good |
| 19 | 4-13 | Black Oak | 38 | Good | Good |
| 20 | 4-7 | White Oak | 40 | Good | Fair |
| 21 | 4-7 | Tulip Poplar | 32 | Good | Fair |
| 22 | 4-9 | American Beech | 30 | Good | Good |
| 23 | 4-9 | Chestnut Oak | 31 | Poor | Fair |
| 24 | 4-9 | Tulip Poplar | 31 | Good | Good |
| 25 | 1-1 | Tulip Poplar | 42 | Excellent | Good |
| 26 | 1-1 | Tulip Poplar | 40 | Fair | Poor |
| 27 | 3-8 | White Oak | 31 | Good | Good |
| 28 | 1-3 | Tulip Poplar | 32 | Good | Good |
| 29 | 1-3 | Tulip Poplar | 33 | Good | Good |
| 30 | 1-3 | Tulip Poplar | 33 | Good | Fair |
| 31 | 1-3 | Tulip Poplar | 61 | Poor | Fair |
| 32 | 2-3 | Tulip Poplar | 37 | Good | Good |
| 33 | 4-7 | Tulip Poplar | 33.5 | Good | Poor |
| 34 | 4-7 | Black Oak | 32.5 | Fair | Poor |
| 35 | 1-2 | Tulip Poplar | 35 | Good | Good |
| 36 | 1-4 | Tulip Poplar | 39 | Good | Good |
| 37 | 1-4 | Tulip Poplar | 36 | Good | Good |
| 38 | 9-2 | Black Oak | 42 | Fair | Good |
| 39 | 9-2 | White Oak | 34 | Fair | Fair |
| 40 | 9-2 | Black Oak | 30 | Fair | Fair |
| 41 | 9-4 | White Oak | 33 | Poor | Poor |
| 42 | 2-7 | Chestnut Oak | 35 | Fair | Good |
| 43 | 2-8 | American Beech | 31 | Good | Good |
| 44 | 2-2 | Chestnut Oak | 30 | Good | Fair |
| 45 | 1-5 | Tulip Poplar | 32 | Good | Good |
| 46 | 1-5 | Tulip Poplar | 34 | Good | Good |
| 47 | 1-5 | Tulip Poplar | 48 | Good | Good |
| 48 | 1-5 | Black Oak | 35 | Good | Good |
| 49 | 4-9 | Black Oak | 31 | Good | Fair |
| 50 | 4-9 | Chestnut Oak | 30 | Good | Fair |
| 51 | 4-9 | Tulip Poplar | 30 | Good | Good |
| 52 | 7-2 | Tulip Poplar | 34 | Good | Good |
| 53 | 7-2 | Black Oak | 38 | Fair | Fair |
| 54 | 7-2 | Tulip Poplar | 32 | Good | Fair |
| 55 | 7-2 | Tulip Poplar | 30 | Good | Good |
| 56 | 7-2 | Chestnut Oak | 32 | Good | Good |
| 57 | 7-2 | Tulip Poplar | 37 | Good | Good |
| 58 | 7-2 | Tulip Poplar | 33 | Good | Good |
| 59 | 7-2 | Tulip Poplar | 35 | Good | Good |
| 60 | 7-2 | Tulip Poplar | 37 | Good | Poor |
| 61 | 7-2 | Tulip Poplar | 44 | Good | Fair |
| 62 | 7-1 | Tulip Poplar | 36 | Good | Good |

| Summary of Forest Stands | | | |
|---|---|---|---|
| Stand | Plant Community Type | Forest Stand Description | Acres |
| 1-1 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 13.1 |
| 1-2 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 14.1 |
| 1-3 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 18.6 |
| 1-4 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 13.3 |
| 1-5 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 8.9 |
| 2-1 | Mixed Deciduous Forest | Chestnut Oak Forest | 4.5 |
| 2-2 | Mixed Deciduous Forest | Chestnut Oak Forest | 6.5 |
| 2-3 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 5.1 |
| 2-4 | Successional Hardwood Forest | Chestnut Oak Forest | 5.4 |
| 2-5 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 6.3 |
| 2-6 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.9 |
| 2-7 | Mixed Deciduous Forest | Chestnut Oak Forest | 17.0 |
| 2-8 | Mixed Deciduous Forest | Chestnut Oak Forest | 10.4 |
| 2-9 | Mixed Deciduous Forest | Chestnut Oak Forest | 7.7 |
| 2-10 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.9 |
| 2-11 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.5 |
| 2-12 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.2 |
| 2-13 | Mixed Deciduous Forest | Virginia Pine Forest | 0.1 |
| 2-14 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 28.9 |
| 3-1 | Mixed Deciduous Forest | Chestnut Oak Forest | 6.2 |
| 3-2 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 4.2 |
| 4-1 | Mixed Deciduous Forest | Chestnut Oak Forest | 3.3 |
| 4-2 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 4.5 |
| 4-3 | Mixed Deciduous Forest | Chestnut Oak Forest | 7.2 |
| 4-4 | Mixed Deciduous Forest | Chestnut Oak Forest | 21.6 |
| 4-5 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 3.3 |
| 4-6 | Mixed Deciduous Forest | Chestnut Oak Forest | 30.7 |
| 4-7 | Mixed Deciduous Forest | Chestnut Oak Forest | 6.1 |
| 4-8 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 0.9 |
| 4-9 | Mixed Deciduous Forest | Chestnut Oak Forest | 6.9 |
| 4-10 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 1.6 |
| 4-11 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.9 |
| 4-12 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 1.6 |
| 4-13 | Mixed Deciduous Forest | Chestnut Oak Forest | 20.5 |
| 4-14 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 5.3 |
| 4-15 | Mixed Deciduous Forest | Chestnut Oak Forest | 13.3 |
| 4-16 | Mixed Deciduous Forest | Chestnut Oak Forest | 2.0 |
| 5-1 | Successional Hardwood Forest | Black Locust Forest | 4.0 |
| 6-1 | Mixed Deciduous Forest | Chestnut Oak Forest | 3.0 |
| 7-1 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 3.1 |
| 7-2 | Mixed Deciduous Forest | Sweetgum – Tulip Poplar Forest | 17.0 |
| 7-3 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 1.7 |
| 7-4 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 2.1 |
| 7-5 | Successional Hardwood Forest | Black Locust Forest | 1.3 |
| 7-6 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.4 |
| 7-7 | Mixed Deciduous Forest | Chestnut Oak Forest | 9.2 |
| 7-8 | Mixed Deciduous Forest | Chestnut Oak Forest | 13.5 |
| 7-9 | Successional Hardwood Forest | Black Locust Forest | 2.1 |
| 7-10 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.4 |
| 7-11 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 8.5 |
| 7-12 | Mixed Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 3.4 |
| 9-1 | Mixed Dc. Regeneration Forest | Virginia Pine – Oak Forest | 6.5 |
| 9-2 | Mixed Deciduous Forest | Chestnut Oak Forest | 2.0 |
| 9-3 | Mixed Deciduous Forest | Chestnut Oak Forest | 2.1 |
| 9-4 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.4 |
| 9-5 | Bottomland Deciduous Forest | Sycamore – Sweetgum – American Elm Forest | 0.4 |


Tetra Tech NUS, Inc
Proposed Forest Stand Impacts And Proposed Forest Retention Areas
May 2008
Refoestation Map.mxd
AS NOTED
Figure 2
0
5/23/08
N
W
E
S
Chesapeake Bay
NEW DREDGE MATERIAL DISPOSAL AREA
Existing Wetland Mitigation Area
CONSTRUCTION ACCESS ROAD
Lewis Daines Dredge Disposal Area
Existing CCNPP Units 1 and 2
HEAVY HAUL ROAD
POWER BLOCK
SWITCHYARD
COOLING TOWER
Barge Dock
Calvert Cliffs Parkway
Roads
500 kV Transmission Line Corridor
PEPCO 69kV Transmission Line
Johns Creek
Cedar Cove Road
LEGEND
Proposed CCNPP Unit 3 Project Site Boundary (Addressed in Full FSO)
Proposed Cleared Area
Forest Stand Areas
100-year Floodplain
Wetlands, Wetland and Stream Buffers (50 feet)
25% slope
Forest Retention Area
Existing Plant Communities
Lawns/Developed Areas
Old Field Vegetation (Phragmites-Dominated)
Old Field Vegetation (Other)
Mixed Deciduous Forest
Mixed Deciduous Regeneration Forest
Well-Drained Bottomland Deciduous Forest
Poorly Drained Bottomland Deciduous Forest
Herbaceous Marsh Vegetation
Bottomland Deciduous Forest (Well-Drained or Poorly Drained)
Successional Forest Vegetation
Wetlands 50-ft Buffer
Open Water
Critical Area Boundary
SOURCE: ESRI Data V9.1 2004
0
500
1,000
2,000 Feet

| | | | | |
|---|---|---|---|---|
| Note: Use 0 for all negative numbers that result from the calculations. | | | | |
| **Net Tract Area** | | | | |
| **A.** | Total Tract Area | | A = | 657.47 |
| **B.** | Deductions (Critical Area, area restricted by local ordinance or program) | | B = | 97.79 |
| **C.** | Net Tract Area | Net Tract Area = Total Tract Area (A) - Deductions (B) | C = | 559.68 |
| **Land Use Category** | | | | |
| **D.** | Afforestation Threshold | (Net Tract Area[C] X 15 %) | D = | 83.95 |
| **E.** | Conservation Threshold | (Net Tract Area[C] X 15 %) | E = | 83.95 |
| **Existing Forest Cover** | | | | |
| **F.** | Existing Forest Cover within the Net Tract Area | | F = | 377.12 |
| **G.** | Area of Forest Above Conservation Threshold | | G = | 293.17 |
| | If the Existing Forest Cover (F) is greater than the Conservation Threshold (E), then | | | |
| | G = F - E; otherwise, G = 0. | | | |
| **Breakeven Point** | | | | |
| **H.** | *Breakeven Point* (Amount of forest that must be retained so that no mitigation is required) | | H = | 142.59 |
| | (1) | If the Area of Forest Above Conservation Threshold (G) is greater than 0, then H = (0.2 X the Area of Forest Above Conservation Threshold (G)) + the Conservation Threshold (E); | | |
| | (2) | If the Area of Forest Above Conservation Threshold (G) is equal to 0, then H = Existing Forest Cover (F) | | |
| **I.** | *Forest Clearing Permitted Without Mitigation* | | I = | 234.53 |
| | I = Existing Forest Cover (F) - Breakeven Point (H) | | | |
| **Proposed Forest Clearing** | | | | |
| **J.** | Total Area of Forest to be Cleared | | J = | 216.77 |
| **K.** | Total Area of Forest to be Retained | | K = | 160.35 |
| | K = Existing Forest Cover (F) - Forest to be Cleared (J) | | | |
| **Planting Requirements** | | | | |
| | If the Total Area of Forest to be Retained (K) is at or above the Breakeven Point (H), <u>no planting is required, and no further calculations are necessary</u> (L=0, M=0, N=0, P=0, Q=0, R=0). | | | |
| | Otherwise, calculate the planting requirement(s) as follows. | | | |
| **L.** | *Reforestation for Clearing Above the Conservation Threshold* | | L = | 0.00 |
| | (1) | If the Total Area of Forest to be Retained (K) is <u>greater than</u> the Conservation Threshold (E), then L= the Area of Forest to be Cleared (J) X 0.25; | | |
| | (2) | If the Total Area of Forest to be Retained (K) is <u>less than or equal to</u> the Conservation Threshold (E), then L= Area of Forest Above Conservation Threshold (G) X 0.25 | | |
| **M.** | *Reforestation for Clearing Below the Conservation Threshold* | | M = | 0.00 |
| | (1) | If Existing Forest Cover (F) is <u>greater than</u> the Conservation Threshold (E) and the Forest to be Retained (K) is <u>less than or equal to</u> the Conservation Threshold (E), then M= 2.0 X (Conservation Threshold (E) - Forest to be Retained (K)) | | |
| | (2) | If Existing Forest Cover (F) is <u>less than</u> or equal to the Conservation Threshold (E), then M= 2.0 X Forest to be Cleared (J) | | |
| **N.** | *Credit for Retention Above the Conservation Threshold* | | N = | 0.00 |
| | If the area of Forest to be Retained (K) is greater than the Conservation Threshold (E), then N = K - E; Otherwise N = 0 | | | |
| **P.** | *Total Reforestation Required* P = L + M - N | | P = | 0.00 |
| **Q.** | *Total Afforestation Required* | | Q = | 0.00 |
| | If Existing Forest Cover (F) is less than the Afforestation Threshold (D), then Q = Afforestation Threshold (D) - Existing Forest Cover (F) | | | |
| **R.** | *Total Planting Requirement* R = P + Q | | R = | 0.00 |

# Forest Conservation Worksheet

**Figure 3**