



FOREST SERVICE

***CHESAPEAKE FOREST
FY2005
ANNUAL WORK PLAN***



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CHESAPEAKE FOREST ANNUAL WORK PLAN SUMMARY

This document summarizes the proposed activities that will occur on the Chesapeake Forest during the 2005 fiscal year. The fiscal year runs from July 1, 2004 to June 30, 2005. The following proposed activities are the results of a multi-agency effort. The multi-agency approach has ensured that all aspects of these lands have been addressed within the development of this plan.

Plan Activities

Network with Maryland DNR agencies:

- Wildlife & Heritage – Identify and develop restoration projects, report and map potential Ecological Significant Areas (ESA) as found during fieldwork, release programs for game and non-game species. Mapping will be done with Global Positioning Systems (GPS). Participates on the Inter-Disciplinary Team (ID Team) and assists in the development of a forest monitoring program.
- Natural Resource Police – Enforcement of natural resource laws on the forest.
- Resource Planning – Provides assistance in the development of plans, facilitates meetings with various management groups, develops Geographic Information System (GIS) maps for public review, conducts deed research and boundary recovery. Participates on the ID Team.
- Maryland Conservation Corps (MCC) – Assists in painting boundary lines, installing gates and trash removal.
- State Forest & Park Service – Participates on the ID Team.
- Chesapeake & Coastal Watershed Service – Develops watershed improvement projects, assists in the development of a forest monitoring programs and participates on the ID Team.

Network with other agencies:

- Vision Forestry, LLC – Designs and implements management activities on the gifted half of the forest. Participates on the ID Team.
- The Conservation Fund – Provides guidance in the development of management activities on the forest.
- The Chesapeake Bay Foundation – Identifies sites for future water quality improvement projects.

- National Wild Turkey Federation – Establishes and maintains handicap-hunting opportunities within the forest and provides funding for habitat protection and restoration.
- US Fish & Wildlife Service – Assists in prescribed burns for Delmarva Fox Squirrel (DFS) habitat.
- AmeriCorps* National Civilian Community Corps – Assists in boundary line marking, gate installations, trash pick up, restoration projects, etc..

Network with Universities and Colleges:

- Salisbury University – Conducts species monitoring, a vegetative cross sectional study, and water quality improvement studies.
- Virginia Polytechnical Institute and State University – Conducts loblolly pine growth and yield studies.
- University of Georgia – Studies wood properties of loblolly pine growing on similar soils throughout the southeast region.

Maintenance:

Table 1 illustrates the proposed maintenance required to open 8,868 acres for public hunting for the 2004 / 2005 hunting season.

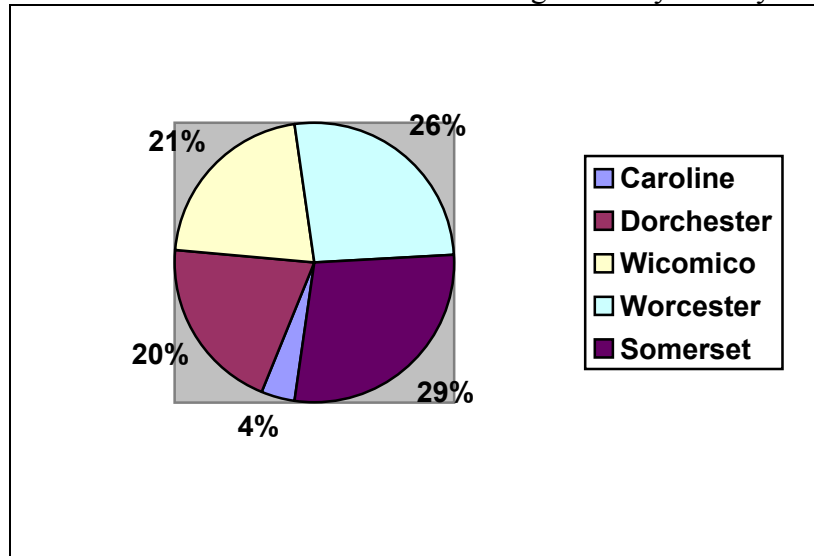
Table 1. Overview of Maintenance requirements for Public Hunting areas

Activity	Amount
1.) Repaint & Post Boundary Lines	111 Miles
2.) Brush & Clear Roads	86 Miles
3.) Install Farm Style Gates	110
4.) Trash Removal	50 Tons
5.) Construct Parking Areas	28
6.) Remove Tree Stands	

Recreation:

- Open up an additional 8,868 acres for public hunting and other recreational activities.

Chart 1. Additional Public Hunting Areas by County



Special Projects:

- Complete the 2nd half of the Continuous Forest Inventory (CFI)
- Update and maintain forest information in a GIS database.
- Protect and enhance wildlife openings with the help of the upper shore NWTF chapter.
- Obtain & maintain dual forest certification from the Forest Stewardship Council (FSC) and the Sustainable Forest Initiative (SFI)
- Conduct information and educational opportunities on the forest including orienteering through the Regional Education Specialist.
- Inventory and protect historic sites (i.e. cemeteries & old home sites) using GPS.

Silvicultural Activity Overview

Table 2 summarizes, the proposed silvicultural activities for the 2005 annual work plan on approximately 8,479 acres (15%) of the CF.

Table 2. 2005 Silvicultural Activity Overview.

Activity	Acres
1. Final Harvest	828
2. Selection Harvest	0
3. Commercial Thin #1	3416
4. Commercial Thin #2	731
5. Pre-commercial Thinning	587
6. Mechanical Site Preparation	167
7. Planting	167
8. Watershed Improvement Project	40
9. Aerial release, natural stands	225
10. Mid-rotation vegetation control	541
11. Fertilization	205
12. Prescribed Fire	998
13. Restoration Projects	470
14. Grass Control	104
Total acres affected*	8,479

* Total acres affected are not the sum of all acres to be treated since many acres are scheduled for multiple activities (e.g. site preparation, planting and grass control or spray-fertilize). Efforts promote natural regeneration should also reduce the acres affected. In addition, several tracts will have significant buffers, which will also reduce the harvest acreage accordingly. The current Geographic Information System (GIS) database is not accurate enough to give a precise acreage. However, the system will be continually updated by using Global Positioning Systems (GPS) to map new stand boundaries as stand prescriptions are carried out in the field.

The following is a list of definitions of proposed management activities that will occur on the Chesapeake Forest.

Final Harvest – A final harvest prescription shifts the management attention to the next generation of trees. The goal for each stand is to match the harvesting technique to the site conditions in order to achieve successful regeneration. These sites will often, but not always, be regeneration harvests. The first choice is to encourage natural regeneration if the seed source is available and the pine component is healthy. If natural regeneration is well established in the understory, the harvest type may be a shelterwood or modified shelterwood cutting. Each harvest prescription will be determined in the field on a site-by-site basis.

Selection Harvest – This includes the removal of single trees and groups of trees within a given stand. This method will be used to distribute age classes and to adjust species composition within a given stand.

Improvement Harvest – This type of harvest is designed to remove less desirable trees of any species from a stand. The goal is very site-specific, and will depend on the condition of the site and existing stand. Each harvest will be guided by specific prescriptions that are noted in the field and forest plan.

Riparian Buffer Zone Establishment – Riparian buffer zones are vegetated areas adjacent to or influenced by a perennial or intermittent bodies of water. These buffers are established and managed to protect aquatic, wetland, shoreline, and/or terrestrial environments. Boundaries of riparian buffer zones will be marked, surveyed (GPS) and mapped (GIS). Selective harvesting and/or thinnings may occur in these areas to encourage a mixed hardwood-pine composition.

Prescribed Fire – Prescribed fires are set deliberately, under proper supervision and weather conditions, to achieve a specific management goal such as enhancing wildlife habitat, encouraging fire-dependent plant species, reducing fuel loads that feed wildfires, and preparing sites for planting.

Pre-Commercial Thinning – Pre-commercial thinning is the removal of trees to reduce over crowded conditions within a stand. This type of thinning concentrates growth on more desirable trees. The treatment will be carried out by hand crews on stands 5 to 10 years of age. The number of trees retained will depend on growth and condition of the stand.

First Commercial Thinning – This will occur on plantations at age 12-20 years old to facilitate forest health and promote development of larger trees over a shorter amount of time. This is accomplished in plantations by removing every 5th row of trees and selectively thinning between rows. In naturally regenerated stands, thinning corridors will be established every 50 feet and the stand will be selectively thinned along both sides of the corridor. Approximately 30-35% of the total stand volume will be removed in this process.

Second Commercial Thinning - Usually performed on stands 20-28 years old. The objective is to lengthen the rotation age of the stand and produce larger trees. In some cases, this technique is used to improve habitat for the Delmarva Fox Squirrel (DFS) and Forest Interior Dwelling Species (FIDS). Approximately 30-35% of the total stand volume will be removed in this process.

Reforestation – Reforestation reestablishes forest cover either naturally or artificially, and is usually accompanied by some kind of site preparation during the same fiscal year. The nature of the site preparation will be determined by field examination. It is almost always followed, in the same fiscal year, with grass control in the form of chemicals (hand-applied by ground crews). Site conditions will dictate application rates, etc., in each case.

Aerial Release Spraying - An aerial spraying is used to reduce hardwood competition in slower growing young pine stands or to eliminate exotic species. This will generally be done on natural stands that have had a pre-commercial thinning to encourage the desired pine stand. Prior field examination and exact boundary locations will be established in each case. All forms of aerial spraying are based on precision GPS mapping and accompanied by on-board flight GPS controls. GPS-generated maps shows each pass of the aircraft and are provided by the contractor to demonstrate precision application. No aerial applications are allowed over riparian or wetland areas or forest buffers.

Ground Spraying – A ground application is used to discourage unwanted hardwood competition in the understory. This treatment is typically done a year or two after a successful thinning to open up the understory and reduce competition for the dominant trees. Each stand will be evaluated for application rates, etc., as well as locations to protect desired hardwood species or islands within a stand.

Fertilization – Fertilizers are nutrients applied to the site to increase tree growth by overcoming nutrient deficiencies in the soil. Soil tests are taken prior to application to guide formulation and application rates as required by the Nutrient Management Plan. These nutrients are typically urea-based and are applied on the ground during thinning operations. To reduce the opportunity for nutrient input into nearby waters, fertilizers are not applied in riparian forest buffers.

**Locations & Descriptions
Of
Silvicultural Activities**

Description of 2005 Activities – Caroline County

1. Complex C01-S3

Merrikan-Gordy (6404):

A pre-commercial thinning is proposed for stand 5 (61 acres).

Description of 2005 Activities – Dorchester County

Complex D12-S3

DeWolfe Tract (4236):

A first thinning is proposed for stands 6, 9 & 14. Stands 6 & 14 are loblolly pine plantations and stand 9 is a natural loblolly stand. Total area of prescription is 81.1 acres.

Mansion Farm (4257):

A second thinning is proposed for stand 3 (36 acres). This is a 28-year old natural loblolly pine stand that was first thinned in 1996.

Puckam Tract (4205):

A second thinning is proposed for stand 15 (21.8 acres). This is a 32-year old loblolly pine plantation that was first thinned in 1993.

Complex D14-S3

Indiantown Tract (4225):

A first thinning is proposed for stands 3 & 8. Total prescription area is 119.1 acres.

A final harvest is proposed for stands 2 & 6. Stand 2 & 6 are 15-year old loblolly pine plantations. The purpose of this harvest is to help balance the age classes across the entire forest. The 15-year old loblolly pine age class currently dominates the forest landscape and needs to be reduced. Total prescription area is 202.7 acres.

Chester Tract (4207):

A final harvest is proposed for stand 4 (16 acres). This stand is 15-years old and adjacent to the Indiantown Tract (4225).

Complex D22-2

Reids Grove Tract (4218)

Aerial or preferably a ground herbicide application and fertilization are planned for stand 1 (50 acres), which was thinned for the first time in 2002. A field inspection will be made in FY05 to assure that spraying is needed and justified, and soil testing will be done to establish the need for fertilization. Either or both activity may be altered or cancelled if field conditions at that time indicate that change. Adjacent wetlands will be buffered. This is in a DFS Friendly area.

Complex D23-S3

Bennett Tract (4251):

A prescribe burn is proposed for stand 3 (65.6 acres). This 20-year old natural loblolly pine stand had a first thinning in 2003. A prescribe burn will reduce undesirable woody vegetation in the understory and reduce the fuel load in the stand.

Complex D26-S3

Lewis Tract (4262):

A final harvest is proposed for a portion of stand 4 (162.7 acres). Stand 4 is a 15-year old loblolly pine plantation. The stand to be harvested is located on the northeast corner of the complex. The riparian buffer (stand 11) width will be increased to 150 feet. No harvesting or heavy equipment will be permitted within the newly established buffer area. An aerial spray is proposed prior to the harvest to help prevent an outbreak of phragmites that currently occurs on the site. The purpose of this harvest is to help balance the age classes across the entire forest. The 15-year old loblolly pine age class currently dominates the forest landscape and needs to be reduced. Over 700 acres of this complex is in the 15-year old age class.

Description of 2005 Activities - Wicomico County

Complex W10-2

Wright Tract (3518)

A first thinning is proposed for stand 1 (13.1 acres, 17 years old) and stand 4 (32.2 acres, 14 years old).

Athol Tract (3542)

A first thinning is proposed for stand 3 (15.3 acres, 16 years old). A 150-foot buffer will be established on the west side of this stand for wildlife and water quality.

I. James Wright Tract (7137)

A first thinning is proposed for stand 3 (41.3 acres, 14 years old).

Complex W14-2

Helmick Tract (3517):

A first thinning is proposed for stand 6 (8.3 acres) and a second thinning for stand 7 (11.1 acres). Both stands will be 26 years old at the time of the operation. Stand 6 has not been previously thinned. Stand 7 is a natural stand that was first thinned in 1996.

Complex W18-2

Bacon Tract (3563)

A group selection / second thinning combination is proposed for stands 1 and 2 (102.2 acres, 36 years old). This stand has been classified as a DFS Friendly area.

Pinkett Tract (3595)

A first thinning is proposed for stand 1 (61.8 acres, 15 years old). This stand has been classified as a DFS Friendly area.

Complex W20-2

Dr. Phillips Tract (7138)

A first thinning is proposed for stand 2 (70.6 acres, 19 years old).

Complex W23-2

C. Nichols Tract (3504):

A second thinning is proposed for stand 7 (121.2 acres). This stand is a 28 year-old stand that was initially thinned in 1997. This is in a DFS rotation.

Pearl Wright (3591)

A prescribed fire is proposed for stand 1 (2 acres, 53 years old).

Mary Lank Anderson (3592)

A first thinning is proposed for stand 3 (50.4 acres, 18 years old).

Green Hill Tract (7102)

A first thinning is proposed for stand 4 (32.6 acres, 15 years old) and a portion of stand 6 (63.5 acres, 14 years old), with stand 7 (7.7 acres, 18 years old). This thinning will occur in an ecologically significant area (ESA).

A final harvest is proposed for a portion of stand 6 (115.2 acres, 16 years) to provide structural and habitat diversity in this large complex.

Austin Tract (7107)

A second thinning is proposed for stand 6 (35.7 acres, 28 years old). A portion of this stand is located within an ESA.

A first thinning is proposed in stands 8 (38.5 acres, 21 years old) and 11 (7.5 acres, 18 years old). These projects, affecting several tracts in the complex, will not completely follow existing stand boundaries, but will be designed to re-shape the structural diversity patterns in this large complex, which has been identified as an important habitat area.

S.O. Jones Tract (7132)

A first thinning is proposed for stand 2 (11.7 acres, 21 years old) and stand 3 (3 acres, 18 years old).

Complex W26-S3

Robertson (3581), Robertson No.2, 3, &4 (3586/7113/7127) & Rencher (7142):

A 108-acre pre-commercial thinning is proposed within this complex. The stand to be thinned is a 13-year old loblolly pine plantation.

Complex W27-2

Cox Tract (7139)

Stands 1 and 2 (33.4 acres) were harvested in 2002 and found to have adequate regeneration in 2003. An experimental planting of Atlantic white cedar (northern side of stand) and bald cypress (southern end of stand) was conducted within the hydric areas. This tract will be monitored for progress in 2005. If competition appears to be overtaking the stand, it will be aerial or backpack sprayed to release the young pines and other desired species.

Complex W37-2

Farlow Tract (3555)

A final harvest is proposed for stands 2 (10.8 acres, 13 year old mixed hardwoods) and a portion of 5 (24.8 acres, a 13 year old plantation). This harvest will create a diversity of age classes among forest types within this complex.

A first thinning is proposed for a portion of stand 5 (43 acres). Two 150-foot buffers will be established for wildlife and water quality.

Complex W39-2

Dr. Dick Tract (3540)

A first thinning is proposed for stand 2 (33.7 acres, 15 years old). A 150-foot buffer will be established on the north side of this thinning to for wildlife and water quality.

Complex W46-2

Ed Richardson Tract (7128)

A first thinning is proposed for stand 1 (29.7 acres, 18 years old). A second thinning is proposed for stand 2 (16.6 acres, 27 years old).

Complex W51-2

Givens Tract (3546)

A first thinning is proposed for stand 1 (27.5 acres, 13 years old) and stand 4 (13.4 acres, 22 years old).

Complex W56-2

Gordy Tract (3573)

A second thinning is proposed for stand 2 (8.8 acres, 28 years old).

Description of 2005 Activities – Worcester County

Complex WR02-2

Littleton Fooks Tract (3760)

A final harvest is proposed for stands 3 (8.6 acres, mixed hardwoods), 5 (11.5 acres, 20 years old), 6 (16.8 acres, 17 years old), and four segments of stand 8 (25.9 acres, 12 years old).

A first thinning is proposed for two segments in stand 8 (128.4 acres, 12 years). A 150-foot buffer will be established along the southwest neck of stand 8 for wildlife and water quality.

Complex WR04-2

Jones Bros. Tract (3784)

A first thinning is proposed for stand 1 (122.1 acres, 11 years old).

Complex WR07-2

Bradford Tract (3708)

A first thinning is proposed for stands 1 (49.2 acres, 13 years old) and 6 (5.2 acres, 24 years old). A 150-foot riparian buffer will be established through the middle of stand 1 for wildlife and water quality.

Complex WR08-2

Kelly Tract (3733)

A first thinning is proposed for stand 3 (29.6 acres, 12 years old).

Stand 5 (10.8 acres) is being harvested in 2003 and will be evaluated for site preparation, planting, and grass control in 2005 in the event that natural regeneration is unsuccessful.

A second thinning is proposed for stand 7 (30 acres).

Godfrey Tract (3749)

A second thinning is proposed for stand 1 (82 acres, 33 years old). The thinning on the portion north of Laws road will be concentrated on the southeast and northwest corners where the timber is the thickest surrounding the ESA. A 150-foot riparian buffer will be established on the north side of the southern section for wildlife and water quality.

A prescribed fire is proposed for stands 2 (67.3 acres, cutover) and 5 (79.9 acres, cutover).

Complex WR10-S3

Cordery Tract (3720):

A pre-commercial thinning is proposed for stand 3 (17.8 acres). This is a 9-year old natural loblolly pine stand.

Perdue Tract (3740):

A pre-commercial thinning is proposed for stand 2 (67.2 acres). This is a 10-year old loblolly pine plantation. Heavy thinning will occur adjacent to rare plant communities to facilitate propagation.

Complex WR12-S3

Purnell Tract (3742):

A first thinning is proposed in stand 1 (46.3 acres). This stand is a 34-year old loblolly pine plantation.

Complex WR13-2

Carter #2 Tract (3734)

Portions of stands 1 (93.8 acres, 33 years old) and 2 (12.9 acres, 33 years old) will be evaluated for spraying and fertilizing in 2005. Both stands were first thinned in 2001. The portions of these stands located along the north side Central Site Road will not be included in the applications to act as a large water quality protection zone.

Complex WR16-2

Wainwright Tract (3744)

A first thinning is proposed for stand 2 (41.9 acres, 15 years old).

A final harvest and prescribed fire is proposed for stand 4 (33 acres, 18 years old). The objective of this prescription is to restore early successional habitat in this ESA. This prescription follows the recommendations of the DNR Wildlife & Heritage ecologists.

A pre-commercial thinning is proposed for stand 7 (29.3 acres, 5 years old).

Complex WR17-2

Livingston Tract (3710)

A prescribed fire is proposed for stand 4 (71.5 acres, 35 years). This stand is located within an ESA.

Complex WR19-S3

Buck Harbor Tract (3738):

A prescribed fire is proposed for stand 7 (46.9 acres). This stand is a 19-year old loblolly pine plantation that had a first thinning in 2001. The understory burn will eliminate undesirable vegetation and reduce the fuel load within the stand.

Priscilla Pusey Tract (3781):

An aerial spray is proposed for stands 9 & 11 to reduce the red maple and gum component. Both stands are 3-year old natural loblolly pine stands that regenerated after a final harvest in the late 1998. A 150-foot no spray buffer will be reestablished and mapped using GPS. Spraying will not occur on the northern portion of this stand due to an eagle nest that has been identified within the vicinity. Total prescription area is approximately 94.5 acres.

Complex WR22-S3

Whitesburg No. 1 & 3 Tract (3788):

A pre-commercial thinning is proposed in stands 5 & 10. The stands are 10 & 7 year old. Stand 5 is a loblolly pine plantation and stand 10 is a natural loblolly stand. Total prescription area is 62.2 acres.

A first thinning is proposed in stand 1 (32.4 acres). This is a 17-year old loblolly pine plantation.

Complex WR24-S3

Cox Farm Tract (3709):

A prescribe burn is proposed for stand 9 (127.7 acres) that has had a first thinning in 2002. This stand is an 18-year old loblolly pine plantation. A low intensity fire will remove fuel from the forest floor, and reduce the number of undesirable hardwood species present in the stand.

A second thinning is proposed in stand 1 & 11. Stand 1 is a 33-year old loblolly pine plantation that was last thinned in 1993. Stand 11 is a 28-year old loblolly pine plantation that was last thinned in 1994. Both stands have adjacent streams that will be located using GPS. A 150-foot riparian buffer will be mapped and managed during this thinning. Desirable hardwood species will be encouraged within the buffer through the thinning operation. The total prescription area is 89.9 acres.

Johnson & Johnson Tract (3714):

A final harvest is proposed for stands 2 & 8. This loblolly pine plantation is 37 years old. Natural loblolly regeneration is the preferred form of reestablishment from adjacent stands. The purpose of this harvest is to diversify the age classes within this complex. Over half (62%) of this complex is the same age (37 years old). Total prescription area is 88.4 acres.

A first thinning is proposed in stand 7 (14 acres). This is an 18-year old natural loblolly pine stand.

A prescribed burn is proposed for stand 9 (368.8 acres). This stand is a 37-year old loblolly pine plantation that was thinned in 2003. The objective of the burn is to reduce undesirable vegetation in the understory and to reduce the fuel load.

Complex WR25-S3

Creek Tract (3705):

A pre-commercial thinning is proposed in stand 3 (100.9 acres). The stand is a 10-year old loblolly pine plantation.

Complex WR27-2

W.T. Onley Tract (3777)

A prescribed fire is proposed for stands 4 (33.4 acres, 23 years) and 6 (62.9 acres, 22 years).

Complex WR29-2

Milton Barnes Tract (3774)

A prescribed fire is proposed for stand 2 (39.5 acres, old hardwood pine stand).

Complex WR36-S3

Mathews Farm Tract (3718):

A pre-commercial thinning is proposed in stands 7 & 9. The stands are 9 & 7 year old loblolly pine plantations. Total prescription area is 112.1 acres.

Complex WR39-2

W.T. Byrd Tract (3717)

A first thinning is proposed for stand 9 (25 acres, 19 years old).

Stand 4 (30.3 acres) will be evaluated for site preparation, planting and grass control in FY 2005 in the event that natural regeneration is unsuccessful. It is scheduled for final harvest in 2004. This area is located within an ESA. The riparian buffer on the south west side of the final harvest will be retained. The riparian buffer in the northwest corner for the tract will be expanded into the proposed first thinning area of stand 9 for wildlife and water quality.

Complex WR40-2

Dunn Swamp Tract (3716)

A first thinning is proposed for stands 1 (34.6 acres, 13 years old) and 2 (95.2 acres, 15 years old).

Payne Tract (3725)

Stand 2 (38.2 acres) is being harvested in 2003. While natural regeneration is our goal, this area will be evaluated for site preparation, planting, and grass control if necessary in 2005. The riparian buffer established along the west side of the tract during the 2003 harvest will be retained.

Description of 2005 Activities – Somerset County

Complex S03-2

Covington Tract (4807)

Stand 1 (67.2 acres) was harvested in 2002 and has a good stand of natural regeneration. It is proposed for an aerial or a ground release (preferable) application in 2005 if field investigations indicate the need to control undesirable species.

Complex S04-2

English Tract (4870)

Stand 5 (23.9 acres) will be field-evaluated for site preparation, planting, and grass control in 2005.

Bill Murray Tract (5421)

Stand 2 (9.3 acres) will be field-evaluated for site preparation, planting, and grass control in 2005.

Complex S09-2

Backbone Tract (5439)

Stand 1 (50.5 acres, 22 years old) will be field-evaluated for aerial or preferably a ground herbicide application and fertilization in 2005. A 150-foot no spray zone will be established that will follow the ditch along on the southern stand boundary.

Hickman Tract (4858)

Stand 1 (48 acres, 24 years old) will be field-evaluated for aerial or preferably a ground herbicide application and fertilization in 2005. A 150-foot no spray zone will be established along on the northeastern stand boundary.

Complex S11-2

Smith Earl Tract (4827)

An aerial spraying and fertilization is proposed for Stand 6 (13.7 acres, 17 years old) based on stand conditions and soil tests at that time. A 150 foot no spray zone will be established to protect the ditch along on the eastern stand boundary.

Peters Tract (4854)

A first thinning is proposed for stand 1 (46.8 acres, 18 years old).

An aerial or preferably a ground herbicide application and fertilization is proposed for stand 3 (33.1 acres, 17 years old) based on stand conditions and soil tests at that time. A 150-foot no spray zone will be established that will follow the ditch along on the southern stand boundary.

Complex S12-2

Green-Polk Tract (5423)

A final harvest is proposed for stand 3 (48.8-acre, 12 years). This young stand is being harvested in to help level out the age class distribution problem, which occurs across the Chesapeake Forest. A 150-foot buffer will be established along the northern stand boundary for wildlife and water quality.

Complex S14-2

Bloxom Tract (4828)

A second thinning is proposed for stand 1 (46.4 acres, 34 years old). This stand was first thinned in 1996. The portion east of the access road will not be harvested and will be managed as a riparian buffer for wildlife and water quality

A pre-commercial thinning is proposed for stand 2 (28.8 acres, 7 years).

Complex S16-2

Barnes Tract (5440)

Stands 1 (32.9 acres) and 2 (21.9 acres) are scheduled for a harvest in 2003. They will be evaluated for site preparation, planting, and grass control in 2005 in the event that natural regeneration is unsuccessful.

A first thinning is proposed for stands 6 (8.6 acres, 19 years old) and 7 (16 acres, 19 years old). A 150-foot riparian buffer will be established between stand 2 and 6 for wildlife and water quality.

Complex S17-2

Miles Tract (4817)

A first thinning is proposed for stand 4 (71 acres, 15 years old). A 150-foot riparian buffer will be established within the northern neck of stand 4 for wildlife and water quality.

Complex S18-2

Smullen #1 Tract (4818)

An aerial or ground herbicide application and fertilization is proposed for stands 1 (20.7 acres, 32 years old) and 3 (6.8 acres, 27 years old), based on stand conditions and soil tests at that time.

Complex S21-2

E. Mace Smith Tract (4847)

A first thinning is proposed for stands 2 (21.6 acres, 16 years old), 10 (67.8 acres, 18 years old) and 11 (66.9 acres, 14 years old).

A second thinning is proposed for stand 4 (4.8 acres, 35 years).

E. Mace Smith, Jr. Tract (4852)

A first thinning is proposed for stands 1 (33.6 acres, 11 years old) and 4 (18.9 acres, 21 years old).

Rounds Tract (4857)

A first thinning is proposed for stand 1 (2 acres, 21 years old).

E. Mace Smith #3 (4861)

A first thinning is proposed for stand 2 (8.8 acres, 18 years old).

E. Mace Smith #2 (4863)

A first thinning is proposed for stand 3 (16.8 acres, 21 years old).

Roy Smith (4864)

A first thinning is proposed for stand 1 (7.1 acres, 21 years old).

A second thinning is proposed for stands 2 (23.5 acres, 24 years old) and 3 (43.4 acres, 26 years old).

Complex S27-S3

Mathews Tract (4828):

A first thinning is proposed for stand 1 (110.6 acres). This is a 15-year old loblolly pine plantation.

Wells Tract (5422):

A first thinning is proposed for stand 2 & 12 (644.2 acres). Stand 2 is a 14-year old loblolly pine plantation. Stand 12 is an 18-year old loblolly pine plantation.

Complex S29-S3

Ruark (4814):

A first thinning is proposed in stand 1 (25.3 acres). This is a 22-year old stand that was partially thinned prior to the land transfer.

Ewing Tract (5418)

A first thinning is proposed for stand 1 (52.7 acres, 21 years).

Complex S30-2

Hamlet Tract (4844)

A first thinning is proposed for stand 8 (122.2 acres, 12 years).

Complex S36-2

Backfield Tract (5431)

A first thinning is proposed for stand 1 (43.8 acres, 15 years). This stand has been identified as a DFS Core area. The stand will be thinned to promote a mixture of hardwoods and pine.

Haislip Costons Station Tract (5412)

A first thinning is proposed for stands 4 (16.1 acres, 15 years) and 5 (74.6 acres, 14 years). These stands will be thinned to promote a mixture of hardwood and pine to help promote DFS habitat.

Young Tract (5442)

A first thinning is proposed for stands 2 (78.2 acres, 16 years) and 5 (47.6 acres, 15 years). These stands will be thinned to promote a mixture of hardwood and pine to help promote DFS habitat.

Strickland Tract (5443)

A first thinning is proposed for stand 1 (32.2 acres, 22 years). This stands will be thinned to promote a mixture of hardwood and pine to help promote DFS habitat.

Cluff Tract (4835)

An aerial (or preferably a ground) herbicide application and fertilization is proposed for stand 3 (16.2 acres, 20 years old), based on stand conditions and soil tests. Only low rates of herbicide will be used to target undesirable hardwood species (maple, sweet gum), while maintaining oaks within the stand.

Complex S42-2

Haislip Rehobeth Tract (5409)

A second thinning is proposed for stand 1 (25.4 acres, 24 years).

Complex S43-2

Williams Tract (4887)

A first thinning is proposed for stand 3 (37.4 acres, 20 years).

Complex S47-2

Haislip Price Tract (5404)

A first thinning is proposed for stand 1 (24.1 acres, 15 years).

Haislip Savannah-Burke Tract (5405)

A second thinning is proposed for stand 1 (31.9 acres, 24 years).

Complex S49-2

Handy Tract (4867)

A first thinning is proposed for stand 2 (95.8 acres, 21 years).

Golda Whittington Tract (5434)

A first thinning is proposed for stand 1 (52.3 acres, 16 years).

Complex S55-2

Haislip Marumscot Tract (5403)

A first thinning is proposed for stand 2 (69.3 acres, 15 years), a portion of 5 (34.8 acres, 20 years) and 8 (13.6 acres, 20 years). A final harvest is proposed for two segments of stand 5 (63.2 acres, 20 years) in order to reduce the over abundance of 15-year old pine stands across the entire forest.

Complex S56-3

Howard Tract (4813)

A first thinning is proposed for stand 3 (26.6 acres). This stand is a 21-year old loblolly pine plantation. Tree rows adjacent to the access road will be removed to help maintain dry road conditions for easement holders.

**Locations & Descriptions
Of
Watershed Improvement Projects**

PROPOSED WETLAND RESTORATION

AT

DUNN SWAMP

BACKGROUND

The Dunn Swamp (Tract # 3716) is a 1,275-acre parcel located in Worcester County approximately 3 miles southwest of Pocomoke City. The site is bisected by an existing ditch, which drains agricultural fields on the tract. The origin of the ditch is located on site within an existing agriculture field. The ditch runs south to north and drains into Pitts Creek, which eventually drains into Pocomoke Sound. After exiting the existing agriculture field, the ditch runs approximately 500 feet through a mature riparian forest.

This site is the only farmed tract within the Chesapeake Forest. There is approximately 88 acres of agricultural land at this site. The area that appears to be appropriate for wetland restoration is approximately 15 - 20 acres. The soils at the site consist mostly of Fallsington, Pocomoke, Woodstown and Fort Mott soil series (ref. Worcester County Soil Survey, 1973). The Fallsington and Pocomoke soil series is considered to be a hydric soil. This means that these soils are generally somewhat poorly or are very poorly drained. The Fallsington and Pocomoke soil series occupy approximately 80% of the area being investigated for wetland restoration.

The specific area of interest for wetland restoration is the area on either side of the existing agriculture ditch. The ditch runs approximately 800 linear feet from the southern boundary of the proposed wetland restoration area to the northern boundary of the site. The soils adjacent to the stream/ditch consist primarily of Fallsington sandy loam. The soil and typical landscape is described as follows:

“The Fallsington series consists of level, or nearly level, poorly drained soils on upland flats and at the base of gentle slopes. These soils formed in old, moderately coarse textured material that contains moderate amounts of silt and clay and is underlain by coarse-textured material. The native trees are loblolly pine, pond pine, water-tolerant oaks, sweetgum, sourgum and red maple. The understory in wooded areas is holly, sweetbay and briar... Good sites for excavated ponds are on these soils. The high water table severely limits these soils for many nonfarm purposes.”

CHARACTERISTICS OF ADJACENT LAND USE

The manmade ditch drains most of the area in agricultural production and forested land. The watershed area appears to be divided evenly between forested and agricultural land. Approximately 88 acres is currently in agricultural production. Water draining from agricultural lands to the proposed restoration site would be intercepted and impounded in the proposed wetland restoration area. This would provide additional water quality benefits in terms of

sequestering nutrients, sediments, etc.

RESTORATION GOALS

The goal of this restoration project would be to restore the forested wetland that likely existed prior to the farming activities. This would effectively reduce the flow of water leaving the site and provide opportunities for water quality improvements as well as ground water recharge. In addition it may be feasible design the project to incorporate white cedar as part of the wetland forest restoration. This project is an excellent opportunity to improve habitat and water quality by:

- Capturing agricultural run-off and routing it through forested wetlands
- Allowing more residence time for storm and flood flows;
- Providing nutrient uptake and storage of sediments in the floodplain; and
- Enhancing the habitat value adjacent to the existing unnamed tributary.

RESTORATION PROPOSAL

It is the intent, at this preliminary stage, to do the following:

1. Establish low-level berms adjacent to the forested area on the north side of the agriculture field;
2. Plugging the existing ditch; and
2. Sculpt areas within the restoration site to provide for native forest communities.

The practices outlined above would serve to capture surface runoff from rain events as well as impede the existing flow of water off-site via the ditch. Plugging the ditch and building a low-level berm would allow the existing run-off to braid its way through the restoration area and provide the hydrology for wetland forest communities. The proposed wetland restoration area is approximately 15 - 20 acres.

PROJECT BENEFITS

By impeding the conveyance of run-off and ground water, we can increase retention of storm flows and thereby increase the uptake and sequestration of nutrients and sediments. In addition, on-site habitat conditions can be improved restoring the native wetland forest community, which provide habitat for a host of important wetland dependant species.

ESTIMATED COST = \$18,000.00

PROPOSED WETLAND RESTORATION

AT

MORRIS MILLWORK/JESSIE BRATTEN TRACT

BACKGROUND

The Morris/Bratten Tract (Tract #'s 7144 and 3568 respectively) is a combined 205-acre parcel located in Wicomico County approximately 7 miles northwest of Salisbury. The site is bisected by two streams (one is South Prong Leonard Pond Run and the other is unnamed), which run in a westerly direction and flow into Leonards Mill Pond and eventually drain into the Wicomico River. The streams on the Morris Millwork site appear to have been ditched at some time in the past. These streams run through loblolly pine stands in varying stages of silvicultural development on the site.

The soils at the site consist mostly of Elkton, Klej, Portsmouth and Bayboro soil series (ref. Wicomico County Soil Survey, 1966). All of these soils, with the exception of the Klej soil, are considered to be hydric soils. This means that these soils are generally somewhat poorly or are very poorly drained. There are a number of ditches throughout the site, which were most likely established, to help drain the site.

The specific area of interest for wetland restoration is the area adjacent to the unnamed tributary, which bisects the northern area of the site. The stream/ditch runs approximately 3,200 linear feet from the eastern boundary of the site to the western boundary of the site. The soils adjacent to the stream/ditch consist primarily of Portsmouth sandy loam. This soil and typical landscape is described as follows:

“The Portsmouth series consists of very poorly drained, loamy soils that occupy upland flats and depressions. The native vegetation is mainly wetland hardwoods. Gums, red maple and water-tolerant oaks are the principal trees, but pond and loblolly pines are common, and there is understory of shrubs and briers. The Portsmouth soils generally are still wooded. They are wet most of the year and may be ponded late in winter and early in spring. Although the soils warm up slowly in spring, they are well supplied with organic matter and have a high capacity for absorbing and holding moisture available to plants.”

The area of interest for wetland restoration is currently planted to loblolly pines and appears to be five to eight years old.

CHARACTERISTICS OF ADJACENT LAND USE

The unnamed tributary drains an area approximately 450 acres in size. The watershed area is mostly forested or silvicultural production. However, nearly 100 acres is currently in agricultural production. Water draining from agricultural lands to the proposed restoration site could be intercepted and impounded in the proposed wetland restoration area. This would provide additional water quality benefits in terms of sequestering nutrients, sediments, etc.

RESTORATION GOALS

The goal of this restoration project would be to retard the movement of water off-site via the existing ditches and provide retention time for flows originating upstream. This would improve habitat and water quality by:

- Attenuating storm and flood flows;
- Allowing more residence time for storm and flood flows;
- Providing nutrient uptake and storage of sediments in the floodplain; and
- Enhancing the habitat value adjacent to the existing unnamed tributary.

RESTORATION PROPOSAL

It is the intent, at this preliminary stage, to do the following:

1. Establish low-level berms on the north and south sides of the existing ditch; and
2. Install and low-level weir, or series of weirs, in the existing ditch.

The practices outlined above would serve to capture surface runoff from rain events as well as impede the existing flow of water off-site via the ditch. Water impeded in the ditch through the weir(s) would be forced out-of-bank and up into the floodplain area. This would occur only during storm events.

PROJECT BENEFITS

By impeding the conveyance of stormwater through the site, we can increase retention of storm flows and thereby increase uptake and sequestering of nutrients and sediments. In addition, on-site habitat conditions can be improved and restored to native wetland shrubs and hardwoods, which provide habitat for a host of important wetland dependant species.

ESTIMATED COST = \$20,000.00

**Locations & Descriptions
Of
Ecologically Significant Area (ESA)
Restoration Project**

Restoration Plan for Campbell Complex Ecologically Significant Area

Submitted by Scott Smith & Wesley Knapp, MD Natural Heritage Program

The Campbell Complex Ecologically Significant Area (ESA) is located in Wicomico County south of the town of Pittsville and west of Sixty Foot Road, adjacent to the Wicomico Demonstration Forest. This ESA contains 395.15 acres of Chesapeake Forest (CF) including all of tracts 3507 and 3536 and some stands within tracts 3539, 3598, 7123, 7148 and 7164. These tracts were previously managed by Chesapeake Forest Products Corporation to maximize pulpwood production of loblolly pine (*Pinus taeda*) by such silvicultural practices as windrow creation, bedding, wetland ditching, chemical hardwood control, fertilizing, planting of a loblolly pine monoculture and extensive road construction. Though signs of anthropogenic disturbance are evident throughout the complex, the majority of the 21 species of plants and animals found here that are tracked by DNR's Natural Heritage Program (Table 1), require a disturbed habitat.

The size and shape of the Campbell Complex ESA (Map 1) is the result of a landscape-level conservation effort aimed to protect rare communities as well as the rare species found within them. The ESA boundary encompasses a powerline right-of-way (ROW) that is refugia for rare, threatened and endangered (RTE) plant species, four wetlands of special state concern (WSSC), a number of Delmarva bays (a.k.a. "Carolina Bays") supporting a rare amphibian species, dry sand ridges supporting two plant and one insect species, tracked by heritage, and a forested mosaic supporting rare plants with pine-barren affinities. The ESA boundary was delineated based on an integration of various criteria associated with rare species habitat, the potential for managing for that habitat, and for the future expansion of rare species populations. These criteria included soil type, wetland type, wetland buffers, amphibian "life zones" and the actual location of rare species populations.

This plan is an outline and justification for the management practices that will be utilized at the Campbell Complex in FY2005. The plan focuses on two areas of management. The first portions of management concern two small sand ridges, and the logging road that connects them. The second area is the habitat supporting the only state known occurrence of the pine-barren sandwort (*Minuartia caroliniana*).

1) Sand Ridge/Dune Community:

The sand ridge communities are remnants of late Pleistocene dunes, which are characterized as having dry sandy soils typically within the Parsonsburg Formation (Sirkin et al. 1977, Denny and Owens 1979). Woody vegetation naturally occurring on sand ridges across Delmarva include shortleaf pine (*Pinus echinata*), pitch pine (*Pinus rigida*), Virginia pine (*Pinus virginiana*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), southern red oak (*Quercus falcata*), white oak (*Quercus alba*), scarlet oak (*Quercus coccinea*), water oak (*Quercus nigra*) and sand hickory (*Carya pallida*) (Bowman 2000). Some sand ridges also develop dense stands of ericaceous shrubs such as blueberries (*Vaccinium spp.*) and huckleberries (*Gaylussacia spp.*),

though this is not the desired outcome of our management. Herbaceous vegetation on Delmarva's sand ridges are usually sparse and are composed of various sedges, grass and forbs. Loblolly pine plantations currently dominate the ridges at the Campbell Complex, but historically a sparse *Pinus (taeda, virginiana)*, - *Quercus* spp. - *Carya pallida* (hardwood dominated) community may have been found here. This is a common community type found on ridges across Delmarva, and similar to communities found in the New Jersey Pine Barrens (Bowman 2000). It is likely that loblolly pine was not a dominant component on these ridges before European settlement. Brown et al. (1987) state, "the expansion of pines since colonial times has resulted from the cutting of native hardwood species coupled with the invasion of weedy pines into old-field sites resulting from heavy overgrazing or cultivation". Loblolly pine has a broad ecological tolerance (Tiner 1988) while Virginia, shortleaf and pitch pine are generally restricted to dry sandy soils.

The sand ridges within the Campbell Complex (Map 2) have been planted and managed as loblolly pine stands within the last 50 years, and some of these ridges were agricultural fields as seen on 1938 aerial photographs. There are currently small openings along the ridges that support native sand ridge species, including four species tracked by the Natural Heritage Program: an uncommon tiger beetle (*Cicindela scutellaris*); the state watchlist species' sweetleaf (*Symplocus tinctoria*) and shortleaf pine (*Pinus echinata*); and bristling panic grass (*Panicum aciculare*), a species of uncertain state-status. Pitch pine and sweetleaf occur sympatrically on at least two dunes in the complex. Sweetleaf is locally common on dunes and sand flats at Campbell, and is the larval host plant (Woodbury 1994) for King's Hairstreak (*Satyrium kingi*), a state-threatened butterfly species yet to be discovered at the site.

Goal: The goal for the Sand Ridge restoration is to return these ridges to a native community type, supporting a mixed-hardwood dominated woodland with a species composition similar to that described by Bowman (2000), while expanding population of the four state-tracked species currently found here.

Objective: There are three objectives for the restoration of the sand ridge Community. These objectives are to:

1. Restore a natural shortleaf pine sand ridge community;
2. Increase the habitat and population size available for the state-tracked species;
3. Limit the amount of ericaceous shrubs and loblolly pine present in the understory in favor of a graminoid dominated layer; and
4. Establish some pitch pine within the hardwood-dominated woodland.

Methods: Restoration of the sand ridges will be mostly experimental due to the lack of corresponding data regarding restoration for this community type, and the lack of detailed historical data describing these communities. The restoration will consist of a multi-stage process of removing trees to restore an open or partially-open canopy, prescribed burning to remove undesirable woody tree species while aiding in releasing the herbaceous plant seed bank,

and the removal of woody species along the logging roads that transverse the sand ridges. These ridges will have to be actively managed after harvest to prevent resprouting and to suppress ericaceous shrubs. Prescribed fire will be used to maintain this community in an open state, and should be burned every 4-6 years (Frost 1998), or as available fuel load dictates. Proper management of the ridges may be dependant on results gathered from current and future experiments, as well as input from a team of ecologists.

Step 1: Remove all loblolly pine from the ridges, retaining any desirable hardwood or other coniferous species (e.g., shortleaf pine, pitch pine, etc.). Tree removal will be done manually on each of the sand ridge units proposed for management in FY2005 (Map 2), and the roadside habitat connecting these two ridges will be widened. Widening this roadside will add habitat for the rare species found along the roadside. The loblolly pines along the roadside will be cut and removed, and the loblolly on the ridges will be girdled and left on site to be used as fuel for a prescribed burn. The sand ridge community restoration will be considered experimental as methods are developed and tested. An experimental sand ridge restoration is ongoing at Stump Gut ESA, which involved standard silvicultural harvest techniques, e.g., the loblolly pine area was selectively harvested using a hydro-axe and skidders.

Step 2: Prescribed burning. To retain and enhance sand ridge vegetation, fire will be necessary to suppress woody shrubs and undesired tree species, and stimulate germination of any fire-adapted species that may be in the seed bank. Prescribed burning should be repeated at the historical interval previously mentioned, 4-6 years (Frost 1998). If this rate is too often for sufficient fuel loads to carry a burn, then a 7 –12 year fire frequency, the theorized historical frequency for the upper shore (Frost 1998), should be used instead. These frequent burns will encourage hardwood species such as oaks, to regenerate in place of the loblolly pines, because oaks have several characteristics that increase survival following fire (Abrams 1992).

Expected Results: Successful restoration of sand ridges will mean that the majority of the loblolly pine has been removed from the ridges and replaced by a sparse pine-oak woodland containing a diverse graminoid layer consisting of native sedges and grasses. It is expected that the sparse woodland community will allow for the population expansions of the two state-tracked species.

Monitoring: A monitoring program for the sand ridge restoration effort will consist of permanent plots to study vegetation changes (species composition, percent cover, and abundance) and visual/trapping surveys for tiger beetles and other fauna. These latter may be expanded depending on need and interest. Permanent photo-plots will also be established to visually record vegetation changes over time.

Timeline: The girdling of loblollies on the two-targeted areas and the widening of the logging road will begin in 2004, and will be followed by a fall 2004 or winter 2005 prescribed burn. Other sand ridges can be restored in subsequent years after techniques are studied and refined.

Projected Budget: The majority of the restoration expenses stems from the sand ridge

restoration. The projected cost for clearing the trees from the roadsides (5,770 ft) to the 20-foot width desired is \$900. The estimated cost for removing the trees adjacent to the powerline (12.3 acres) at \$200/acre will cost approximately \$2400. The total cost for these restoration activities will be \$3300. **The cost of these restoration activities should be covered by the Chesapeake State Forest budget.** . Scott Smith of the Maryland Natural Heritage Program will coordinate the management activities proposed for the sand ridge restoration plan.

2) **Minuartia Restoration:**

The only known Maryland occurrence of the pine-barren sandwort (*Minuartia caroliniana*) is located in the southeastern portion of the Campbell Complex (Map 2). Though the pine-barren sandwort is common in some areas of the east coast, particularly in the New Jersey pine-barrens, the only other extant occurrence on the Delmarva Peninsula is at Cape Henlopen State Park, Delaware. Additionally, the only historical record on Delmarva is from a collection by Albert Commons in 1874. The collection label reads “near Little Hill Church, ½ mile N.E. of Pepperbox, [Delaware] in dry pine barrens”.

The habitat supporting the pine-barrens sandwort in the New Jersey pine-barrens typically consists of early successional areas composed of open sands, moderate to high sunlight penetration to the soil, and little to no herbaceous plant competition. The habitat supporting the pine-barrens sandwort at the Campbell Complex is an abandoned sandy road that has been encroached upon with loblolly pines allowing for almost no light penetration to the soil surface. The loblolly pines have advanced into this once open area markedly within the last 50 years, as can be seen in comparison with 1938 aerial photographs.

Goal: The goal of this management plan is to secure the long-term viability of the pine-barren sandwort by increasing available habitat and population size, while decreasing competition and limiting succession in this area.

Objective: There are two objectives for the management of the pine-barrens sandwort. These objectives are:

1. Increase the population of the pine-barrens sandwort; and
2. Ensure the long-term viability of the population through habitat restoration and management.

Methods: Management for the pine-barrens sandwort will be very conservative because this is the only known Maryland location for this species. Restoration goals for this species were determined by examining the habitat supporting this species in other states, conducting a literature review to determine what is known about the species, and talking with experts who are familiar with this species.

Step 1: Complete closure of the area to motorized traffic. **The area supporting the pine-barrens sandwort population is approximately 10 x 10 meters and could be significantly damaged by ATV's or other illegal traffic. Potential habitat east of the population shows signs of ATV traffic, and is theorized to be the**

reason that the pine-barrens sandwort is not found there. The management activities proposed for the population will increase the potential for ATV traffic and subsequent destruction of the species. Complete closure of the logging road that passes to the east of the sandwort population is a necessity for long-term species viability at this site. It is proposed that additional gates be installed at the two locations where ATV's can access the barrens sandwort population.

Step 2: Manual thinning of woody species from the primary and secondary population boundaries (Map 3). **Removal of woody species from the population boundary is a necessity to ensure the population's existence. In states where the pine-barrens sandwort is common, it is found in early successional habitat with sandy soils. The habitat supporting the pine-barrens sandwort in Maryland is a dense stand of young loblolly pines. These pines will be cut, and this material will be stacked in an adjacent woodland.**

Step 3: Removal of the leaf litter. **Because the pine-barrens sandwort is a prostrate creeping perennial, the accumulation of leaf litter on the plant is a major concern. Currently, dried pine needles cover many individuals, directly impacting photosynthesis. These needles will be removed by lightly raking the surface of the site.**

Step 4: Chemical treatment of adjacent weedy species. **The south side of the population boundary is interrupted by a small windrow with many potentially invasive species growing on it such as pokeweed (*Phytolacca americana*). These pest species will be treated with small amounts of roundup. The chemical treatment will be done with a backpack sprayer to spot spray exact location of pest species, in an effort to prevent negative impacts on the pine-barrens sandwort population.**

Expected Results: It is expected that the sandwort population will respond favorably to these management activities by increasing in the number of individuals and expanding into the newly created habitat. It is also expected that the sandwort will utilize the habitat to the east, found along the newly closed logging road.

Monitoring: A monitoring program for the pine-barrens sandwort will consist of permanent plots or transects to study vegetation changes and the response of the sandwort population over time. Permanent photo-plots will also be established to visually record vegetation changes over time.

Timeline: It is proposed that all activities outlined above be conducted in 2003. It is feasible that all management activities proposed (woody plant removal, leaf raking, and spraying of adjacent pest species) could be conducted over a few days in the summer of 2004.

Projected Budget: The only expected cost associated with this project would stem from the use of herbicide to eliminate pest species. This is estimated at \$350 for backpack sprayer, herbicide, surfactant and associated tools and safety equipment. **The cost of these restoration activities should be covered by the Chesapeake State Forest budget.** The management activities proposed for the *Minuartia* restoration plan will be completed by Jason Harrison and Wesley Knapp of the Maryland Natural Heritage Program.

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Table 1. Rare, threatened and endangered species of the Campbell Complex

Scientific Name	Common Name	State Status	Global Status ¹
<i>Aristida virgata</i>	wire grass	Endangered*	G4
<i>Cicindela scutellaris</i>	a tiger beetle	Watch list	G5
<i>Drosera capillaries</i>	pink sundew	Endangered*	G5
<i>Eupatorium leucolepis</i>	white-bracted boneset	Threatened*	G5
<i>Iris verna</i>	dwarf Iris	Endangered*	G5
<i>Kalmia angustifolia</i>	sheep-laurel	Watch list	G5
<i>Minuartia caroliniana</i>	pine-barren sandwort	Endangered*	G5
<i>Panicum aciculare</i>	bristling panicgrass	Unknown status	G4
<i>Panicum scabriusculum</i>	tall swamp panicgrass	Endangered*	G4
<i>Pinus echinata</i>	shortleaf pine	Watch list	G4
<i>Platanthera blephariglottis</i>	white fringed orchid	Threatened*	G4
<i>Platanthera cristata</i>	crested yellow orchid	Threatened*	G5
<i>Podilymbus podiceps</i>	Pied-billed grebe	State rare	G5
<i>Pycnanthemum setosum</i>	awned mountain-mint	Watch list	G3
<i>Rana virgatipes</i>	Carpenter Frog	In Need of Conservation*	G5
<i>Rhynchospora torreyana</i>	Torrey's beakrush	Threatened*	G4
<i>Sabatia campanulata</i>	slender marsh pink	Endangered*	G5
<i>Scleria minor</i>	slender nutrush	Endangered*	G4
<i>Scleria triglomerata</i>	tall nutrush	Highly state rare	G5
<i>Symplocos tinctoria</i>	horse sugar	Watch list	G5
<i>Utricularia subulata</i>	zig-zag bladderwort	Watch list	G5

¹ Global Status – indicates the range wide status of a species, with G1 being the rarest globally and G5 being the most common.

* Indicate species in Maryland with legal protection status.

Fiscal Year 04 Work Plan Comments:

The Maryland Department of Natural Resources Forest Service has proposed first thinnings in 213.1 acres of loblolly pine stands in the Campbell Complex. The thinnings are proposed to occur within tracts 3705, 3539, 3536 and 7123. The Heritage Program has determined that the first thinning proposed in tract 3539 contains no hits and should proceed as planned.

Tracts 3507 and 7123 should also proceed however; machinery may only access the stands to the west of the powerline right-of-way (ROW) by the pre-existing logging road entering the east side of tract 3507. At no point should machinery go under the powerline during this thinning. The stands located within tract 3507 and 7123 should be thinned to 60 ft²/acre to increase available habitat for the rare plant occurrences, now restricted to the powerline ROW.

Tract 3536 contains many Delmarva bay communities that are known to support the In Need of Conservation Carpenter Frog (*Rana virgatipes*). The Heritage Service will flag these wetlands and each will be given a 350-foot buffer. Additionally, the stands within this tract should also be thinned to 60 ft²/acre.

**Restoration of Rare and Endangered Species Habitat in Chesapeake Forest:
Nontidal Wetlands of Special State Concern in
Brookview Ponds and Marshyhope Sand Ridge ESAs**

Project Leader: Wayne Tyndall
Maryland Natural Heritage Program

At least six Carolina bay wetlands, designated Nontidal Wetlands of Special State Concern, will be managed for invasive deciduous species and loblolly pine during 2003 – 2007. The goal of the project is to restore and protect freshwater emergent marshes, which provide habitat for rare and endangered species of amphibians and plants.

Invasive deciduous species include red maple, sweet gum, and persimmon; other invasive taxa may be discovered during the project period. Invasive vegetation will be managed using manual labor and hand-held power tools, to minimize environmental impacts. Seedlings and saplings (dbh < 4 in.) will be cut and burned in brush piles, carried off-site and stacked in piles, or left in place for disposal by prescribed burning, or a combination of these tactics. Stumps of deciduous seedlings and saplings will be treated with glyphosate. Deciduous trees (dbh > 4 in.) will be girdled and treated with glyphosate, with the exception of red maple which will be dropped and burned in brush piles, as time and resources permit, to destroy herbaceous allelotoxins. Loblolly pine trees will be girdled and left standing.

The project boundary will be 50-200 feet from the original marsh boundary, as determined from local topographic and vegetative features. The wide range is due to the close proximity of merchantable stands of loblolly at some of the sites. Boundaries for this project should be regarded as temporary minimum limits, delineated for short-term marsh restoration and protection. Resolving the more complex and broader issue of ecosystem (wetland-upland) restoration and protection is not a goal of this effort, although results should be helpful in better understanding ecosystem restoration requirements.

Annual reconnaissances will be conducted through the 2007 calendar year for treatment of resprouts, as necessary, and to monitor rare species populations. Annual reports will be submitted by the end of calendar years 2003 - 2007. The final report will include an assessment of the effects of these management practices on rare species habitat and populations during the five-year period.

Monitoring

Continuous Forest Inventory

See the Forests by Counting the Trees

A Continuous Forest Inventory (CFI) project is a large and complex undertaking. It requires a considerable capital investment and tremendous amounts of planning and coordination. The project utilizes three person crews that measure and record each tree on approximately 200 permanent one-fifth acre plots. Using the latest in high-tech equipment including: Global Positioning Systems, laser rangefinders, digital compass, and portable field computers, the CFI crews record both plot and tree data. Examples of plot level data include: stand size class, site productivity, land use and management zone, forest type, and physical limitations. Tree data includes basic information such as tree species, diameter, height, quality, and position. Ultimately this data will be compiled to report growth and volume estimates, stand size, class, and individual tree information such as species diversity, quality, and site conditions and land use classifications. The data collected during a CFI is typically compared to data that was collected ten years ago. This information is critical for forest management, as it is the guide of all silvicultural prescriptions over the short and long term.

Historically, a CFI is conducted every ten years to continuously monitor and evaluate the condition of our four largest State forests: Savage River and Potomac-Garrett in Garrett County, Green Ridge in Allegany County, and Pocomoke in Worcester County. The most recent CFI began in May 1999 and was completed in the fall of 2001. Each CFI enables us to comprehensively and scientifically assess the health of the forest according to such indicators as diversity of species, age class, mortality and growth rates. As successive CFI's are completed, they are compared to earlier CFI's. This provides a "history" of forest conditions, and thereby assists the Department in making management decisions. This will be the Chesapeake Forest's first CFI.

New plots will be established and used for future comparison across the forest in each of the forest types. Plots will be located using a Global Positioning Systems (GPS). This will ensure that future CFI crews can easily and accurately relocate the plot centers. Plot centers are marked with a twelve-inch steel spike that is hammered into the ground. In addition, reference trees will be scribed and documented by distance and azimuth from the plot center.

The Department has partnered with the U.S. Forest Service (USFS), Forest Inventory Analysis program. The USFS will perform the data analysis and table generation for the Department's use, as it has in the past for the State Forests.

Projected Annual Budget

CHESAPEAKE FOREST FY 05 PROJECTED BUDGET

<i>Cost of Management</i>	
<i>(*Costs will vary from year to year)</i>	
State CF Salaries & Contract Management	\$ 300,000
Land Operation	\$ 500,000
Monitoring Program	\$ 70,000
Sustainable Forest Certification	\$ 68,000
Watershed Improvement & Other Restoration Projects	\$ 100,000
County Payment (15% of revenues)	\$ 166,000
Fixed Cost (ditch drainage payments to counties)	\$ 8,000
TOTAL COST	\$1,212,000

<i>Operating Revenues & State Funding</i>	
Timber Sale Revenues	\$ 750,000
Hunt Club Revenues	\$ 355,000
State Funding	\$ 125,000
TOTAL REVENUES & FUNDING	\$1,230,000