

AN ASSESSMENT OF NEED FOR THE

**DELAWARE FOREST LEGACY
PROGRAM**

AUGUST 1, 1998

DELAWARE FOREST LEGACY PROGRAM

TABLE OF CONTENTS

Governor’s Letter Designating Forest Legacy Representative.....	1
Stewardship Committee Resolution Endorsing the Final Version of the Forest Legacy Assessment of Need.....	2
Kent County Letter Endorsing the Final Version of the Forest Legacy Assessment of Need.....	3
New Castle County Letter Endorsing the Final Version of the Forest Legacy Assessment of Need.....	4
The Nature Conservancy Letter Endorsing the Final Version of the Forest Legacy Assessment of Need.....	6
Open Space Council Letter Endorsing the Final Version of the Forest Legacy Assessment of Need.....	7
List of Stewardship Committee Members	8
Introduction	10
DELAWARE FORESTS: Forest Resources.....	11
A. Historical Changes	11
B. Ownership Patterns of Delaware Forests	12
C. Forest Plant Diversity	14
D. Forest Animals and Wildlife Habitat	14
E. Fisheries	15
F. Forest Insects	17
G. Urban Forestry.....	17
H. Economics	17
I. Recreation	18

J. Aesthetic and Scenic Resources	19
DELAWARE FORESTS: Environmental Impacts.....	19
A. Fragmentation	19
B. Air Pollution	19
C. Water Management (Quantity and Quality).....	20
D. Loss of Traditional Uses.....	20
DELAWARE FORESTS : Related Resources.....	21
A. Geology, Topography and Other Geologic Features	21
B. Soils	21
C. Agriculture	21
D. Lakes, Streams and Wetlands	23
E. Mineral Resources	23
F. Cultural Resources	23
DELAWARE FORESTS: Future and Critical Issues.....	24
A. Forest Fragmentation	24
B. Plant and Animal Habitat	24
C. Water Quality and Quantity	24
EXISTING MEASURES TO CONSERVE FOREST LANDS	24
LAND TRUSTS IN DELAWARE	26
PUBLIC INVOLVEMENT PROCESS	26
THE FOREST LEGACY PROGRAM IN DELAWARE	27

A. Eligibility Criteria for Forest Legacy Areas	28
B. Requirements for Forest Legacy Areas	29
RECOMMENDED FOREST LEGACY AREAS.....	30
DESCRIPTION OF FOREST LEGACY AREAS.....	31
A. White Clay Creek.....	32
B. Redden/Ellendale Forests	37
C. Cypress Swamp	41
D. Blackbird/Blackiston Forests.....	45
APPENDIX A: APPLICATION AND EVALUATION FORMS.....	49
I. Application	50
II. Evaluation Package	58
APPENDIX B: PUBLIC REVIEW DOCUMENTATION.....	65
I. Public Notice for Forest Legacy Program Hearings.....	66
II. Summary of Public Comments.....	67
III. Sample Letter Requesting Comments on AON.....	68
IV. Mailing List.....	69

DELAWARE FOREST STEWARDSHIP COMMITTEE MEMBERS

COMMITTEE MEMBER	AGENCY REPRESENTED
Dean Belt	Cooperative Extension Service
James W. Bennett	Delaware Forestry Association
Mary S. Burton	Governors Forestry Advisory Council
George Collins	Local Government Official
Kevin C. Donnelly	Conservation Districts
Mike Valenti	State Forester's Office
Jeff Fisher	Del. Tree Farm Committee
Sally Griffith-Kepfer	Natural Resources Conservation Service
W. Allen Jones	Landowner
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Michael K. Brown	State Forester's Office
Susan Lacy	USDA Forest Service
Mike Felker	Delaware Division Of Parks & Recreation
Michael McGrath	Invited Participant
Nancy Griner	State Forester's Office
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James W. Olson	Stewardship Coordinator
David Poukish	Forest Products Industry
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Bill Lowe

Landowner

Bill Wolter

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Landowner

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Landowner

INTRODUCTION

The forests of Delaware have evolved over the past 400 years from a virgin forest of oak and hickory accessible to the Swedish settlers in the 1600's through timber harvests for ship building, charcoal making, and land clearing for farming and settlements. Currently Delaware is 31.5 percent forested with 389,500 acres of forestland. Ninety seven percent of the timberland is classified as commercial timberland and can provide sawtimber, pulpwood, veneer, and pilings. Biomass may also be a strong future use of the forests. In Delaware, timberland is also valuable for wildlife habitat, recreation, soil protection, water quality and quantity as well as aesthetics.

Over the past three decades, Delaware's forest base has appeared relatively stable, with only a four percent reduction in the past 30 years. A closer look, though, shows that the species composition of Delaware's forestlands is changing from high value upland hardwoods and loblolly pine to lower quality bottomland hardwoods. In addition, with increasing population pressures, the ownership of the forestlands is becoming increasingly fragmented. In the next five years a major transportation route will be completed which will greatly increase Delaware's accessibility to metropolitan areas such as Philadelphia and Baltimore. This new transportation corridor will certainly cause an increase in forestland fragmentation.

The importance of forests to watershed integrity has been documented time and time again. Therefore, forest management is becoming an increasingly popular and effective tool for managing both surface and ground water resources. Delaware has a vast array of these resources and forest management is and shall continue to be a primary means of protecting them.

Delaware has many unique natural areas and is a key location on the Atlantic Flyway for migratory birds. Forestlands are the base for many of these natural areas and unique wildlife habitats. Fragmentation and poor forestland management can seriously threaten wildlife habitat and unique natural areas.

With similar concerns for forestlands across the country, the United States Congress established the Forest Legacy Program as part of the 1990 Farm Bill. The program gives the opportunity to protect forestlands through fee-simple acquisitions and conservation easements.

The Forest Legacy Program Assessment of Need for Delaware evaluates the potential use of this program in Delaware and is the first step in receiving federal funds to establish conservation easements on designated forestlands.

DELAWARE FORESTS: Forest Resources

A. Historical Changes

The forests of Delaware, over a third of a million acres of valuable growing stock,

have had an interesting history since pre-Colonial times. An English sea captain in 1610, whose ship was blown off course into a bay which he named De La Warre, saw huge trees of oak and hickory lining the nearby shore. The peaceful Lenni Lenape Indians gathered food, game, and crude building materials from the forest. Early Swedish settlers, in their colony of New Sweden in northern Delaware in the early 1630s, told of the great expanse of nearby timber suitable for framing and "planking." To build their forts and unique log cabins, they hand-split, with maul and wedge, the abundant native timber. As soon as sawmills were set up on the many streams flowing eastward to the Delaware Bay, rough boards were cut and shipped back to Europe, along with oak barrel staves and cedar shingles. Tree bark for the medicines of the day, along with the bark of the black oak for tanning, were subsequently shipped to England as that country gained control of the settlements in this new and challenging land in 1664.

With the refinement of streamside sawmills, lumber was cut from the plentiful oaks, pines, and cypress for the building of ships to haul the new colony's bounty. In return, the new settlers sought iron, nails, sugar, seeds, cloth, and Indian trade goods from the outside. History books relate that most of the small rivers heading toward the bay could support a sailing ship of 50-100 tons. In later years, Delaware-built wooden ships would carry charcoal, local produce, furs, iron ingots, marsh hay, and passengers up and down the Delaware Bay. It followed that new towns would spring up around the sawmills, gristmills, shipyards and loading docks. This was the genesis of many of today's river towns of Delaware, including Wilmington in the north, Frederica, Milford, and Milton in the east, and Seaford, Bethel, and Laurel in the west.

As towns grew, so did the demand for wood. It was needed for building construction, crates, boxes, wharves, and many other uses. Allied industries, such as charcoal-making to smelt the bog iron, developed, and the "coaling" business lasted over 100 years. Evidence of old charcoaling sites can be found in several locations of the state to this day. (As late as early 1950's, a kiln making tinner's charcoal operated in lower Delaware). Carpenters, shipwrights, wheelwrights, and wagon makers plied their trades, and the new railroad spanning the state from north to south in the 1850s needed oak ties from Delaware woodlands.

As the demand for wood products rose at the turn of the new century, dozens of small to medium-sized sawmills, now fueled by steam (later by electricity), went to work in earnest on the seemingly inexhaustible supply of the state's timber resources. Wood production rose to a high of 55 million board feet in 1909 and dropped to a low of 5.2 million board feet in 1918, notwithstanding a high demand for wooden boxes, crates, and baskets for overseas food shipments. Numerous "basket wood" and "spoon wood" mills flourished until the early 1950s, producing a variety of machine-made products for Delaware agricultural goods. The species most in demand for this use were the "sweet" woods - sweetgum, yellow-poplar, and maple. Box and basket-making machines exist today only in personal collections and local farm museums, their output replaced by that of the plastics industry.

Following a continuous rise in wood production until the mid-50s, output fell again in 1970, and is presently stabilized (early 1988) at approximately 23.4 million board feet annually. In addition to saw timber, a great deal of pulpwood is cut annually in Delaware. Logs for veneer, including plywood and specialty veneer stock (walnut, white oak and red oak) commands a steady market, both locally and overseas. Piling remains an important and highly sought-after product of First State woodlands, particularly that from the tall straight boles of our native loblolly pine.

Delaware's third timber resource report was completed in late 1987, and the results are enclosed in Appendix E. Some interesting changes in the state's timber supply are becoming apparent. Estimated commercial forest acreage of Delaware is presently 389,449, which is one percent less than that shown in the 1957 resource report. Other trends in forest growth are an increase in growing stock volume to 643.9 million cubic feet, and a decrease in the state's loblolly pine/shortleaf pine group from 49 percent to 21 percent of total forestland. (1986 Delaware Forest Inventory)

B. Ownership Patterns of Delaware Forests

Much of Delaware's woodland acreage has evolved into farm woodlots. These areas were typically not suitable to till and were allowed to grow in trees. Traditional uses of these woodlands were occasional timber harvests and providing hunting opportunities for family members and their guests. According to a recent study of forestland owners by the USDA Forest Service, Thomas Birch, farmland owners are still a major component of the forestland owners in Delaware. Acquisition trends indicate an increase in farmers acquiring forestland. Further, of unincorporated businesses, farmers are the most active forest managers, making up three quarters of the unincorporated businesses that have harvested forests in the past.

Although Delaware's forests can be evaluated in the traditional sense by production figures, the forest owner report of 1975 indicates that aesthetics has become a primary concern of many forestland owners. From a multi-disciplinary management standpoint, Delaware's forests have become increasingly valued for other ecological values such as habitat diversity, wetland enhancement, public recreation, and watershed management and protection. Although it is difficult to assign a financial worth to these values, they have nonetheless become as important a management consideration as traditional timber production. This preference for owning forestland for aesthetic reasons was reinforced by the USDA Forest Service study. One fifth of all forestland owners owned their forestland primarily for aesthetic reasons. This approximately equaled the percentage of forestland owners who owned their forests primarily for timber production.

As the State Forester William Taber wrote in his 1962 Annual Report, "Delaware, willing or not, is definitely a part of a megalopolis which extends along the Eastern Seaboard from Boston to Richmond. State, County and local planning are recommended

as remedial measures to what, up to now, has been largely unguided and often haphazard suburban, rural, and urban expansions in total disregard of the requirements for the extension and expansion of all public as well as private services such as schools, water, highways, electric, communication, sanitation, and other services, most of which preempt the use of land for tree growth or other use."

In 1966 he wrote, "The public forestry agencies at the State and Federal levels are generally committed by statute to aid and encourage the public in general and the forest landowner in particular to participate in the protection and management of our forest resources in proportion to the social and economic needs and benefits the resource contributes. Unfortunately, the individuals' degree of interest and participation, in a free society, is something of indeterminate if not indeterminable quality. For rarely is the private owner of forest land in that financial situation that will permit him to own forest land and maintain it for aesthetic or moral benefits."

Ownership trends tend to support these comments by Taber. In Delaware 89% of the commercial forestland is privately owned. Individuals own 287,215 acres, corporations 38,542 acres, and farmers 8,184 acres. There were 7,500 private, nonindustrial private forest landowners in 1956, with an average forest ownership of 46.2 acres. By 1974, there were 11,400 owners, with an average woodland ownership of 30.4 acres. The Forest Service study indicated in 1989 approximately 15,700 individuals who owned 266,000 acres of forest land, 62 percent of which own less than ten acres. Corporations own larger tracts, between 50 to 100 acres for the most part, with a few owning larger blocks. Corporations control approximately 65,000 acres. Another alarming trend picked up by the study is the fact that no new forest land was purchased by the timber industry in Delaware in the latter half of this century. Individuals, especially farmers, have increased their purchase of forestland. This trend shows a pattern of increasing forest fragmentation that will likely continue with Delaware's building population and continuing development.

Fragmentation of the forested areas in the state is a critical issue that needs to be addressed. According to the 1990 Census, the State of Delaware grew 12.1 percent, in ten years compared to a national average of 9.8 percent. Sussex County was the fastest growing, followed by Kent and then New Castle counties. Presently Delaware is constructing a new transportation corridor from Wilmington to southern Kent County. With this increased access to lower Delaware, the population growth may increase. It will be feasible for an urban commuter to travel daily from Dover to Philadelphia. This population pressure may foster fragmentation of the forestlands as urban workers find they can settle in a more rural environment. Thus, forest fragmentation is and will continue to occur in Delaware.

Delaware's population, like our areas, is aging. In fact, twelve percent of the state's population is 65 years of age or older. However, it is important to note that the baby-boom generation will reach age 65 by the year 2010. As this significant portion of our population ages, ownership of land will more frequently change hands, as lands are handed down from one generation to another. Because ownership of larger tracts is likely to be divided

among siblings who inherit property, Delaware's forests will be more susceptible to fragmentation than ever.

Forest fragmentation poses several problems to multiple use forest management. For example, timber harvesting is not as economical when forests are fragmented. In addition, many wildlife species, such as neotropical migratory birds, require vast expanses of unbroken forest cover. Watershed protection also suffers as forests are fragmented. Finally, forest fragmentation typically equates to many different land owners are located in a relatively small area. With a more frequent ownership rotation and a variety of forest management strategies (if any), long-term forest management is highly unlikely in fragmented forests.

C. Forest Plant Diversity

Delaware is unique due to its location within the transition zone between northern and southern plant species. Of more than 1700 native vascular plants in Delaware, over ten percent are rare from a state or regional perspective and about one percent is rare from a national perspective. For a small state, Delaware has an abundance of natural diversity due to both its location within a climatic transition zone and its geologic diversity from its rocky piedmont region to sandy coastal areas. As an example, Delaware has one of the most northern sites for bald cypress, and one of the most southern sites for various oaks and hardwoods.

The 1986 Forest Statistics for Delaware indicated 20 forest types. Table 1 summarizes the acres found in the 20 forest types. In comparing the 1986 inventory with the 1972 inventory, there was a loss in the loblolly/shortleaf group, the oak/pine group and the oak/gum/cypress group, but gains in acreage in the oak/hickory group.

D. Forest Animals and Wildlife Habitat

As with its plant life, Delaware has a large diversity of wildlife. The forestlands in Delaware provide a variety of habitat types for fish and wildlife species. Approximately 37 species of waterfowl, 91 species of other water birds, four species of upland game birds, 24 species of birds of prey, 160 different species of songbirds, and 45 species of mammals inhabit the state. As with the plant species, the climate transition zone between north and south as well as the diversity of habitats from coastal areas to upland sites provide a unique situation for a small state.

Wetlands are recognized as an exceptionally productive wildlife habitat type. In fact, many species of wildlife in Delaware are dependent on either tidal or freshwater wetlands. Delaware's forest lands play a lead role in protecting water quality within various watersheds, and therefore are crucial in maintaining the integrity of both tidal and non-tidal wetlands.

Delaware is committed to protecting its unique and natural areas. Identified resource areas comprise approximately 210,000 acres or 18% of Delaware's total land base. As population pressures build, many of these natural areas will attract development. Protecting the lands bordering these unique areas will be critical to maintaining their integrity.

E. Fisheries

Forests can impact fisheries in many ways. In many areas of Delaware, there is a potential for nonpoint source pollution and ground water contamination. Forestlands play a major role in influencing both water quality and quantity throughout watersheds. In both the Coastal Plain and the Piedmont regions of the state, forestlands help to maintain stream flows, moderate temperatures, and provide shoreline fish habitat.

Proper forest management can also improve estuarine areas by helping to provide a constant water flow into these areas. It is well known that estuarine areas provide nursery areas for many marine fish species. The quality of the estuarine area is very dependent upon watershed activities, including proper forest management.

Table 1. Area of timberland by forest type and forest-type group, Delaware, 1986.

<u>Forest Type</u>	<u>Area (Thousands of Acres)</u>
Loblolly pine	75.1
Virginia pine	5.9
Loblolly/shortleaf group	81.0
Virginia pine/oak	15.9
Loblolly pine/hardwood	44.4
Oak/pine group	60.3
White oak	23.4
Northern red oak	6.5
Yellow poplar/white oak/northern red oak	3.0
Sweetgum/yellow poplar	15.2
Yellow poplar	5.9
Scarlet oak	14.6
Red maple/central hardwoods	5.6
Mixed central hardwoods	82.8
Oak/hickory group	157.1
Swamp chestnut oak/cherrybark oak	5.0
Sweetgum/nuttall oak/willow oak	37.0
Sweetbay/swamp tupelo/red maple	15.8
Oak/gum/cypress group	57.9
Black ash/American elm/red maple	2.2
Red maple (lowland)	5.0
American elm/green ash	3.0
Elm/ash/red maple group	10.3
Black cherry	6.9
Mixed northern hardwoods	3.0
Northern hardwoods group	9.8
All forest types	376.4

F. Forest Insects

The most serious forest insect in Delaware is the gypsy moth. In some areas,

infestations have decimated hardwood stands, primarily oaks. The Delaware Department of Agriculture administers the State's gypsy moth program and is able to monitor the most serious sites and, as money is available, conduct a spray program. The species composition of Delaware's forests has been and will continue to be affected as gypsy moth infestations occur.

Another significant forest pest in Delaware is the southern pine beetle, which can devastate southern yellow pine. Recent outbreaks occurred in two of Delaware's proposed Forest Legacy areas (Cypress Swamp and Redden/Ellendale). The southern pine beetle can produce 3-4 generations per year and can kill a host tree in a very short time. The best treatment for the beetle is proper timber management and the prompt harvest of infected woodlands.

Delaware forests have natural populations of various forest insect pests. A few examples are the forest tent caterpillar, buck moth, and sawflies. However, these seldom reach population levels requiring treatment.

G. Urban Forestry

Although Delaware shows a loss of forestlands of only 4% in over 30 years, a major change is taking place as the state becomes more populated. Residential development is occurring with greater frequency in Delaware's forests, and areas that have historically been managed primarily for timber production are becoming fragmented into smaller tracts. Because the ownership of these timber stands is being divided, forest management is difficult to implement. Many of the land owners may not be interested in forest management, while those that are will very likely have differing priorities and goals. Therefore, managing large forest tracts and entire watersheds in Delaware is becoming increasingly difficult.

Urban forests within city and municipal boundaries are receiving increased attention. The Delaware Department of Agriculture employs an urban forester who works with many of the cities and towns in Delaware to develop urban forestry plans. The benefits of the urban forest are many, including aesthetics, urban wildlife habitat, and the environmental benefits of air quality, water quality, and temperature moderation.

H. Economics

In comparing the forest statistic reports for 1972 and 1986, the following trends were noted. Delaware is 31.5% forested with 97% of these lands having timber potential. During this period, the area of saw timber stands increased by 12.1%. There is 19.9 million tons of dry weight timber available. The growth of Delaware's forests is outpacing forest removals, thus producing a net increase in Delaware's growing stock and an apparent increase in the amount of timber available for harvest.

This increase in available growing stock is the result of two phenomena. First, forestland in Delaware has been and is continuing to be fragmented. A result of this is a greater number of landowners, each owning smaller parcels (on the average) than in years past. Therefore, the frequency of timber harvesting has decreased due to increased logistical problems involved with dealing with multiple sellers as opposed to a single seller. Secondly, Delaware's species composition has changed over the past 20 years. This is due to the lack of applied forest management, insects and disease, improper harvesting techniques, and a number of other contributing factors. Even though there has been an increase in available growing stock, poorer stand quality on the average means that many of today's timber stands in Delaware are not as economically attractive as they once might have been.

Delaware's forests are an important part of the State's economic base. The timber industry in the state is responsible for an estimated annual revenue of \$30 million. Additionally, outdoor recreation in Delaware generates an annual estimated revenue of \$800 million. Therefore, consumptive and non-consumptive uses of our forest resources are crucial to the State's economy.

I. Recreation

Forestlands are a popular arena for outdoor recreation. They are utilized for hiking, nature study, horseback riding, fishing, hunting, and other activities. In the 1990 Outdoor Delaware report, more than 5.5 million people visited Delaware attractions in 1989, and six of the top 20 attractions utilized outdoor recreational resources including Delaware's forests.

In Delaware, recreation is very important and is the backbone of the State's tourist industry. The tourist industry is one of the top four businesses in the state. Because forestlands offer such a wide variety of recreational opportunities, they play a major role in attracting tourists to the State.

Delaware has a balance of federal, state, and local recreational lands. For example two federal land managing agencies own 29,453 acres of outdoor recreational lands. State government has five agencies managing 57,083 acres and local governments manage about 5,469 acres. In addition, schools manage over 2,000 acres of recreational lands. Although these lands have both forested and nonforested areas, the majority of recreational lands are forested.

J. Aesthetic and Scenic Resources

The aesthetic and scenic benefits of Delaware's forestlands are clearly evident to the tourist industry along the coastline and the housing industry in the northern piedmont areas.

More importantly, the forests greatly benefit the quality of life in Delaware. Forests maintain a rural character in the face of urbanizing pressures. A 1975 study of forestland ownership found aesthetics as the most prevalent benefit to forest landowners.

Examples of outstanding scenic resources exist in each of Delaware's Proposed Forest Legacy Areas. The White Clay Creek is one of only a handful of piedmont streams in Delaware. The Blackbird Legacy Area is peppered with Delmarva bays, which are noted for their unique flora and fauna. The Redden/Ellendale Legacy Area is home to stands of Atlantic white-cedar, a rapidly vanishing cover type in Delaware. Finally, the Cypress Swamp Legacy Area is characterized by some of the northernmost natural stands of baldcypress in existence.

DELAWARE FORESTS: Environmental Impacts

A. Fragmentation

Delaware's forests continue to be fragmented at an alarming rate. This fragmentation is somewhat augmented by the fact that a major portion (89%) of the state's commercial forests are privately-owned. Thus with the increasing population and the subsequent increase in forest landowners, the state's forests will become more and more fragmented. This fragmentation is likely to continue with the future completion of the transportation corridor, noted earlier in the report, from Wilmington to southern Kent County.

With increasing fragmentation, it will be increasingly difficult to manage forest lands on a large scale, such as on a watershed basis. Fragmentation also produces additional challenges for timber management and logging operations. These new and "first-time" forest landowners must be educated and involved to ensure continued, successful management of Delaware's forest lands.

B. Air Pollution

Delaware is located in the Northeast metropolitan corridor, and thus is a targeted state for air quality improvement. Poor air quality, such as abnormal amounts of ozone, nitric oxide, and sulfur dioxide, can negatively affect forests through such vectors as increased tree stress and reduced growth. However, well-managed, vigorous forests also provide opportunities for improving air quality, and it is vital that the public understand the role Delaware's forests play in reducing the state's air pollution.

C. Water Management (Quantity and Quality)

The coastal plains of Delaware have a long history of water management activities to provide adequate drainage for towns and farmland. With new concerns for freshwater

wetlands and water quality, water management is becoming more sensitive to the natural values of the land and is being implemented on a watershed basis. Many of the forest lands in Delaware are associated with freshwater wetlands, which are essential for water recharge, wildlife habitat, and plant diversity.

Water management can change forest composition, forest growth, and the potential use of the forest land for development or recreation. The water requirements of an increasingly populated as well as an intensively farmed state such as Delaware need to be addressed to insure a continued supply of quality water. Forest goals need to be integrated into any watershed management plan.

D. Loss of Traditional Uses

Delaware's forested lands have traditionally been used for a multitude of purposes. Some of these are timber production for wood products, recreation, wildlife habitat, and watershed protection. Loss of these traditional forest uses is directly proportional to forest fragmentation. With Delaware's forest fragmentation, the traditional management of privately-owned forest lands for wood products is rapidly changing to include more non-consumptive goals. Furthermore, with Delaware's increasing population, many hunters are having greater difficulty obtaining access to forest lands. The same problem is facing individuals who wish to utilize forests for recreational activities. Again, Delaware's increasing population contributes to another threat to Delaware's forest lands through the loss of traditional forest uses.

DELAWARE FORESTS: Related Resources

A. Geology, Topography and Other Geology Features

Delaware is located in two physiographic provinces, separated by a fall line. The Piedmont province lies north of the fall line and comprises about six percent of the State's area. Ground water in the Piedmont occurs in crystalline rocks. The Coastal Plain province located south of the fall line encompasses the remaining 94 percent of Delaware. The Coastal Plain province is composed of a wedge-shaped deposit of alternating layers of sand and clay that overlies the crystalline basement of rocks and increases in thickness to the southeast, attaining a thickness of 15,000 feet in southeastern Delaware. Although the piedmont region of the state has some rolling terrain, most of Delaware is relatively flat, coastal plain.

Outstanding geologic features are not a significant component of Delaware's forested lands. Thus, geologic features will not be a critical consideration in the eligibility criteria for Forest Legacy Areas.

B. Soils

The soils of Delaware vary greatly from the Piedmont Region in the north to the coastal plain areas of middle and southern Delaware. Delaware's soils are very good agricultural soils either naturally or with drainage. The soils are grouped into 21 Soil Associations. Delaware's soils are outlined in Figure 1.

C. Agriculture

Most of Delaware's soils are classified as prime, unique, and important in terms of agricultural productivity. Agriculture is the largest industry in Delaware, producing over \$600 million of products in 1994 and is critical to both the economic well being and the quality of life in the state.

The poultry industry plays a major role in Delaware. In addition, most tillable acreage is devoted to corn and soybeans. Most of the forests in Delaware occur where the soils are not well-suited to intensive agriculture. Furthermore, most of Delaware's forests are affected by the numerous drainage systems established across much of the state's Coastal Plain region for management of agricultural lands.

The importance of Delaware's agricultural industry is receiving increased attention. This increased awareness of Delaware agriculture, as well as the agriculture industry's increased awareness of the importance of forest lands, may be very beneficial to Delaware's forests. A farmland preservation program was established in 1991 to preserve Delaware's most important economic industry, and both cropland and woodland are

preserved with this program. The Delaware farmland preservation program began purchasing development rights in 1996.

D. Lakes, Streams and Wetlands

There are no natural lakes in Delaware; however, there are numerous ponds throughout the state. The ponds were often established to run mills and most Delaware towns have at least one mill pond. Some of the ponds are quite large, such as Silver Lake in Dover, Noxontown Pond in Middletown and Red Mill Pond near Milton.

Delaware has an abundance of streams and rivers from White Clay Creek in the Piedmont to the Nanticoke River in the southwest corner of the state. The streams have an abundance of life, but many also have pollution concerns. The problems vary from toxins in the Piedmont generated by an urban environment and mushroom industry, to high nitrates in the Coastal Plain generated by animal waste, septic systems, and chemical applications.

Delaware has an abundance of both freshwater and tidal wetlands. The USFWS estimates approximately 200,000 acres of the state are wetlands, with 60% classified as freshwater and 40% as estuarine. Either public ownership or strong state laws protect most of the state's estuarine wetlands. Freshwater wetlands are protected largely through federal legislation. The majority of these freshwater wetlands are forested. The Delaware Freshwater Wetlands Roundtable identified the benefits of wetlands to include water supply, water quality, habitat, rare and endangered species, food chain support, fisheries, recreation, aesthetics, research, education, and timber production.

E. Mineral Resources

Delaware has a limited number of historic mining sites that supplied the iron and gunpowder industries in the 1800's. The main mineral resources in Delaware are sand and gravel.

F. Cultural Resources

For more than 12,000 years prior to the arrival of European colonists, the Lenni Lenape and Nanticoke Indians lived in Delaware. The state has numerous archaeological sites dating from both prehistoric and early historic periods. The state is also rich in colonial history since one of the first Swedish settlements was established in Delaware.

DELAWARE FORESTS: Future and Critical Issues

A. Forest Fragmentation

With increased population pressures, forest fragmentation will continue to occur. Threatened, critical forested areas need to be protected and properly managed to ensure their continued existence.

B. Plant and Animal Habitat

As noted, Delaware is a critical link in the Atlantic flyway for migratory birds. In addition, the diverse habitats in the state and the wetlands characteristics of much of the forested lands provide a high diversity of plant and animal life. Although Delaware is well known for its waterfowl and shorebird populations, these are actually a minority when compared to our forest dependent species. In fact, of Delaware's 346 wildlife species (excluding fish and insects), 273 species require forested habitat. Additionally, many of the remaining species are dependent on clean water, which in turn, is dependent on forested watersheds. Forest management and protection from fragmentation is necessary to protect these natural assets and to preserve species diversity.

C. Water Quality and Quantity

Both the ground water and surface waters of Delaware are greatly influenced by forests. In critical areas of groundwater recharge, forests provide natural water filtration to reduce nonpoint source pollutants. Forests improve surface water quality through filtration, reduction of raindrop impact, and reduction of overland flow, thereby decreasing erosion.

EXISTING MEASURES TO CONSERVE FOREST LANDS

Delaware has aggressively pursued a comprehensive land acquisition program to help protect lands of ecological importance. The existing funding sources include both state and federal funds such as:

- Land and Water Conservation Fund, U.S. Department of the Interior - National Park Service. (Public Outdoor Areas)
- Delaware Land and Water Conservation Trust Fund - Delaware Division of Parks and Recreation. (Public Outdoor Areas)
- Pittman-Robertson Program, U.S. Department of the Interior - Fish and Wildlife Service. (Wildlife Projects)
- Dingell-Johnson Act, U.S. Department of the Interior - Fish and Wildlife

Service. (Sport Fisheries, including land acquisition)

- Endangered Species Act - Section 6, U.S. Department of the Interior - Fish and Wildlife Service.
- Historic Preservation Fund, U.S. Department of the Interior - National Park Service
- Federal Surplus Property Program, General Services Administration. (Abandoned Federal Properties Program)
- National Estuarine Reserve Research Systems - U.S. Department of Commerce
- State of Delaware Capital Budget - Bond Bill
- Advance Land Acquisition Fund
- Private Sources: Delaware Wild Lands, the Nature Conservancy, Delaware Nature Society

In addition, Delaware has two state laws which provide tax benefits to forest landowners:

- The Farmland Assessment Act provides a property tax reduction for certain forest lands. The Forest Plantation Act provides a 30 year property tax exemption for forest lands of ten acres or more with an approved forest management plan. Furthermore, the state has an active agricultural lands preservation program, which has enrolled approximately 57,000 acres in agricultural preservation districts, including 16,000 acres of forest lands, where non-agricultural related uses, such as residential development, are forbidden for at least ten years. In 1996, Delaware's Agricultural Preservation Foundation began purchasing development rights from agricultural district owners, on a voluntary basis. As of September 1, 1996, development rights had been purchased or donated on approximately 8,600 acres of agricultural lands including over 1,400 acres of forest land. In addition, another \$14 million has been allocated for purchase of development rights in state FY 97 (July 1, 1996 to June 30, 1997).
- Other laws that can protect areas include the Endangered Species act, wetlands regulations and historical protection areas. Local land use zoning and planning decisions can play a major role in the protection of natural forested areas as well.

- Various education and technical assistance programs for forest lands are available through the Delaware Department of Agriculture Forest Service, local Conservation Districts, USDA Natural Resources Conservation Service, Department of Natural Resources and Environmental Control, the University of Delaware Cooperative Extension Service, and privately through the Delaware Nature Society.

The USDA Forest Service, through the Forest Legacy Program, will become a partner with the State of Delaware, other federal agencies, and private land trusts in helping to protect environmentally important lands in Delaware. The Delaware Greenspace Committee has identified and prioritized twenty parcels of unique environmental significance and existing protected land bases known as *State Resource Areas*. An overview and listing of special attributes of each of these areas is in *Greenspace for Delaware's Future*. Existing resource protection programs in Delaware often operate through the use of fee simple acquisitions. Because many landowners may not wish to sell their land, the Forest Legacy Program will offer a suitable means for resource protection to these owners by purchasing conservation easements as well as fee simple acquisitions.

LAND TRUSTS IN DELAWARE

There are several land trusts in Delaware, including a few statewide land trusts. A few of the larger organizations include: Delaware Wildlands Inc., Brandywine Conservancy, The Nature Conservancy, and Woodlawn Trustees.

PUBLIC INVOLVEMENT PROCESS

The Delaware Forest Stewardship Committee will be responsible for approving and implementing the public participation plan for the Forest Legacy program in Delaware. The Committee is comprised of a representative cross-section of landowners, natural resource professionals, land trusts, forest industry representatives, and other government personnel, and therefore accounts for a comprehensive representation of Delaware's population. The Forest Stewardship Committee has already prioritized the objectives of the Program for each of the proposed Forest Legacy Areas. Additionally, the Forest Stewardship Committee has reviewed the Assessment of Need and drafted a letter of support for the Forest Legacy Program in Delaware.

Initially, an informational press release was issued explaining the Forest Legacy Program. Public meetings were then held to further explain and Forest Legacy Program and solicit public input. The first was held April 10, 1996, at Glasgow, Delaware. This meeting was intended to target residents in and around the White Clay Creek Forest Legacy Area and the Blackbird Forest Legacy Area. Although the meeting was publicly

advertised, there was no public attendance. The second meeting was held April 11, 1996, near Georgetown, Delaware. This meeting was intended to target residents in and around the Redden / Ellendale Forest Legacy Area and the Cypress Swamp Forest Legacy Area. Five people attended, and each was supportive of the Forest Legacy Program in Delaware. Their specific comments, as well as the original press release for the public meetings, are included in Appendix B of this document.

Delaware's Assessment of Need is now available for review and comment at the State Forester's office, Delaware Department of Agriculture. Additionally, copies of the draft document were sent to a number of conservation agencies in Delaware for review and comment. A sample of the cover letter sent with these copies of the Assessment of Need is included in Appendix B. Most of these agencies are represented on the Forest Stewardship Committee, and thus endorsed the Assessment of Need as part of that group.

Upon final approval of the Assessment of Need, another press release will be issued explaining the Forest Legacy Program in Delaware and announcing public meetings. The finalized Assessment of Need will be available for review at the Delaware Department of Agriculture and at each of Delaware's State Forest headquarters. Interested landowners will then be contacted individually so that easements/acquisitions can be negotiated. Finally, parcels exhibiting features of high priority within a particular Forest Legacy Area will be targeted for future acquisition. Owners of these parcels will be contacted individually to determine their interest in the program.

Forest Legacy Program updates will be given at each Stewardship Committee meeting. Additionally, activities and accomplishments will be listed in the Delaware State Forester's Annual Report. All public participation and notification will be conducted according to State of Delaware guidelines.

THE FOREST LEGACY PROGRAM IN DELAWARE ADDRESSING DELAWARE'S NEEDS

Although Delaware has a sizable timber industry, forests are also valued for other assets including unique natural areas, recreation and aesthetics, habitat for plants and animals and watershed integrity. Forests, both rural and urban, add greatly to the quality of life in Delaware. As part of the densely populated northeast metropolitan corridor, the pressures for development and intensive use constantly increase. As the state plans for the future, threatened forested areas need to be managed for future generations to protect the integrity of the forest base.

The Forest Legacy Program offers the opportunity to purchase land and conservation easements from willing owners. Lands becoming part of the Forest Legacy Program will require the preparation and implementation of a Forest Stewardship Plan or multi-resource management plan. These plans prescribe measures to manage both consumptive and non-consumptive uses of forest land and must be acceptable to the State.

The goals of the Delaware Forest Legacy Program include:

- identify and protect environmentally important, privately-owned forest lands threatened with conversion to non-forest uses;
- reduce forest fragmentation caused by development;
- provide environmental benefits through the restoration and protection of riparian zones, native forest plants and animals, and remnant forest types;
- provide recreational opportunities;
- provide watershed and water supply protection;
- provide employment opportunities and economic stability through maintenance of traditional forest uses;
- maintain important scenic resources of the state;
- provide linkage between public properties, protected properties and greenways;
- provide protection of rare, threatened and/or endangered species of plants and animals;
- promote forest stewardship; and
- provide educational opportunities.

A. Eligibility Criteria for Forest Legacy Areas

To be eligible for a Forest Legacy Area, an area's forest land must:

- be threatened (subject to present or future conversion to non-forest uses, development, or fragmentation into smaller non-contiguous forest stands).
- Contain one or more of the following important public values (priority issues as designated by the Delaware Stewardship Committee).
 - ▶ Scenic resources
 - ▶ Public recreation opportunities

- ▶ Major rivers or streams recognized as important to the State.
- ▶ Wetlands
- ▶ Groundwater aquifers of important public water supplies.
- ▶ Unique habitats.
- ▶ Rare or endangered species.
- ▶ Important cultural resources.
- ▶ Large areas of contiguous forest land.
- ▶ Provide opportunities for continuation of traditional forest uses.
- ▶ Reflect important regional values.

B. Requirements for Forest Legacy Areas

The federal guidelines for the Forest Legacy Program require the following:

- Basic Criteria:
 - ▶ Designation of each geographic area on a map.
 - ▶ Description of each important forest area.
 - ▶ Summary of the important environmental values and how they will be protected and conserved in each Forest Legacy Area.
 - ▶ List of public values that will be derived from establishing each Forest Legacy Area.
 - ▶ Identification of the governmental entity or entities that may be assigned management responsibilities for the lands enrolled in the program.
 - ▶ Documentation of the analysis and the public involvement process.

RECOMMENDED FOREST LEGACY AREAS

Four areas have been recommended to be targeted by the Forest Legacy Program in Delaware. These areas were chosen as a result of the public input process, particularly based on recommendations by the Delaware Stewardship Committee. These areas were selected due to their unique forest resources and freshwater wetlands, historic and cultural resources, protected inholdings, and presence of other eligibility criteria for Forest Legacy Areas. Additionally, the proposed Forest Legacy Areas coincide with four of Delaware's *Resource Areas* as identified by the Greenspace Committee.

The four areas are the White Clay Creek area in northern New Castle County, the Blackbird/ Blackiston area in southern New Castle County and northern Kent County, the Redden/ Ellendale area in central Sussex County and the Cypress Swamp area of southern Sussex County. Each of these areas is characterized by unique watersheds, including natural features like Delmarva bays, pristine Piedmont stream courses, and freshwater wetlands. In addition, much of the land within these areas has already been protected. Therefore, acquisitions by the Forest Legacy Program would be especially valuable, as they would tie in with other protected lands as opposed to being stand-alone sites.

I. WHITE CLAY CREEK FOREST LEGACY AREA

The White Clay Creek Forest Legacy Area is Delaware's northernmost Forest Legacy Area, located in northern New Castle County. Its northern boundary is Delaware's boundary with Chester County, Pennsylvania. It is bound on the west by State Route 896. The area's southern boundary is made up of several roads and property lines. Starting at State Route 896, the southern boundary follows the University of Delaware property line eastward, across White Clay Creek, to Paper Mill Road. It then follows Paper Mill road north to Milford Crossroads, where it follows Possum Park Road south to Kirkwood Highway. It then follows Kirkwood Highway east several thousand feet, until it follows Polly Drummond Hill Road north. It then follows New Linden Hill Road east to State Route 7. It turns north for a short distance on State Route 7, then follows Mermaid Stoney Batter Road east to Mill Creek road. It continues east on Mill Creek Road (which turns into Hercules Road) until it intersects with State Route 48. The boundary turns east on State Route 48 for a short distance, then turns north on Rolling Mill Road. It again turns east on Barley Mill Road and continues until the junction of Centreville Road, where the eastern boundary of the Legacy Area begins. This boundary follows Centreville Road north to State Route 82, where it turns west and crosses Hoopes Reservoir. It then turns north, following Owls Nest Road north (which later turns into Twaddell Road) to the junction of State Route 100. The final leg of the eastern boundary of the White Clay Creek Forest Legacy Area follows State Route 100 north to the Pennsylvania line.

The Delaware Stewardship Committee chose several objectives for the Forest Legacy Program in the White Clay Forest Legacy Area. Their top priority is to identify and protect environmentally important privately owned forest lands threatened with conversion to non-forest use. Second priority was to reduce forest fragmentation caused by development. The Committee's third priority is to protect the area's watershed and water supply capabilities.

This resource area is a very diverse Piedmont stream valley, featuring old growth forests, steep slopes, old fields and freshwater wetlands. The area contains riparian habitat critical to maintenance of water quality and diverse plant communities with rare and endangered species. There are twenty-four rare plant species and two animal species of state concern in the area. The proximity of this resource base to urban centers makes this an excellent area for environmental education.

The resource area historic and archaeological features are prehistoric hunting camp locations, dating from 9000 B.C. to 1650 A.D., and historic settlement camps perhaps dating to as early as the 17th century. Several management units make up this resource area protecting over 2,000 acres and 6 miles of riparian corridor. The 593-acre Walter S. Carpenter Jr. State Park joins the 569-acre White Clay Creek Preserve, Delaware's portion of the Bi-State Preserve. (Pennsylvania manages 1,252 acres). Both units are managed by the State Division of Parks and Recreation. The Middle Run Natural Area is also part of this resource area. It contains 748 acres and is managed by New Castle County

Department of Parks and Recreation.

The Greenspace committee, under the auspices of the Governor's Environmental and Infrastructure Cabinet Council, designated parts of this area as land for increased protection. This resource area with the proposed 2,600 acre additions will become the most extensive greenway corridor in New Castle county and will protect an additional 2.2 miles of riparian corridor.

Goals of the White Clay Creek Legacy Area.

Maintain and enhance this very diverse Piedmont stream valley, and associated biotic communities.

Protect the riparian corridors to maintain water quality, historic, and archaeological sites.

Reduce forest fragmentation by linking state, county and private lands.

Protection of the scenic and wild nature of the area.

Objectives of the White Clay Creek Legacy Area.

Protect the old growth forest, steep slopes, and old fields.

Protect the freshwater wetlands and stream valleys.

Protect rare and endangered plant and animal communities and singular species.

Protect historic and archaeological features.

Reduce forest fragmentation and create public access to greenways

Means for protection.

- A. Acquisition of full-fee is appropriate for tracts within the White Clay Creek Forest Legacy Area, but acquisition of conservation easements is preferred.
- B. Acquire development rights on all tracts. Especially the rights to subdivide, construct buildings, and control utility right-of-way locations.
- C. Timber rights retained by the landowner should be conditioned by using "Best Management Practices," laws and regulations, and with the following provisions:
 1. All timber harvesting for a tract or tracts shall be on consultation with a professional forester. Departures from sustained yield are permitted only in limited response to forest diseases and insect infestations and salvage in the event of fire or natural catastrophe.
 2. Timber harvesting or cutting is prohibited within 150 feet of the high water mark of any stream, creek, river, pond, lake or other permanent surface waters.
 3. Timber harvesting (other than salvage cutting) is prohibited in old growth forests. Old growth forest means a stand of live trees over one acre in size that has an average age of 150 years. This restriction should be re-evaluated and possibly modified in fifty to one hundred years, depending on program effectiveness in the White Clay Creek Forest Legacy Area.
- D. Acquire access rights on all tracts. Exceptions would be upon the decision made by

- the state Stewardship Committee prior to the beginning of negotiations.
- E. To restrict the development on mining, drilling of mineral, sand and gravel pits to one acre or less and for the sole use of the landowner. Upon the landowner completion of operations, the land shall be reclaimed as much as practical to its original contour and re-vegetated. No commercial development will be allowed.
 - F. No disposal of waste or hazardous material will be allowed on properties.
 - G. Prohibit the use of signs and billboards on all properties, except to state the name and address of the property owner and/or provide Forest Legacy information and Forest Legacy Boundary information.
 - H. To acquire the rights to allow all forms of non motorized access for the public.
 - I. Existing dams or water impoundments or similar structures may be allowed to remain and be maintained. Exceptions will be agreed to prior to negotiations with the landowner. Any revision to the easement regarding existing structures may be revised only upon approval by the unit of government holding title to the easement.
 - J. Industrial, commercial and residential activities, except forestry and limited mining uses are prohibited (see E above).

II. REDDEN/ELLENDALE FOREST LEGACY AREA

The Redden / Ellendale Forest Legacy Area is located in central Sussex County. Beginning at the junction of U.S. Route 113 and State Route 18, the southern boundary of the Legacy Area follows State Route 18/404 west to the junction of County Road 42. The

western boundary of the Legacy Area then follows County Road 42 north to County Road 591. It then follows County Road 591 north to County Road 565. After a short distance (west) on County Road 565, the western boundary follows County Route 611 north to the junction of State Route 16. The northern boundary then follows State route 16 east to County Road 594. It then follows County Road 594 north to County Road 224. Next, it follows County Road 224 east to County Road 624 east. Next, it follows County Road 42 north to the junction of County Road 625, which it follows east to County Road 213. It then follows County Road 213 south to County Road 224, and County Road 224 east to the junction of County Road 226. The eastern boundary of the Legacy Area then follows County Road 226 south to the Delaware Railroad, and continues to follow the railroad tracks southeast to the junction of State Route 30. It then follows State Route 30 south to County Road 252, which it follows west to County Road 319. It follows County Road 319 south a short distance, then follows county Road 244 west to the junction of U.S. Route 113. Finally, it follows U.S. Route 113 south to the junction of State Route 18.

The Delaware Stewardship Committee identified program objectives for the Redden / Ellendale Forest Legacy Area. Their top priority was to identify and protect environmentally important privately owned forest lands threatened with conversion to non-forest use. Second priority is to provide watershed and water supply protection. The Committee's third priority in this Legacy Area is to promote forest stewardship.

This resource area consists of one of the largest forested wetland complexes in the state noted for its ground water recharge and yield potential. Freshwater wetlands and five thousand acres of forest lands help maintain high water quality and provide very significant water recharge/yield area. It supports diverse plant and animal communities, with known locations of twenty-five rare plant species of State concern including one of Federal concern (awned meadow beauty).

The most common timber types of the area are coastal plain hardwoods and southern yellow pine. Old growth stands of loblolly pine are present. Significant historical and archaeological features are widely scattered. Prehistoric hunting and gathering sites from 8000 B.C. to 1650 A.D. have been identified. Environmental education and interpretative opportunities are very extensive. A wide array of land based recreational activities exists with very significant hunting opportunities.

Redden and Ellendale State Forests, totaling five thousand acres, are managed by the Delaware Department of Agriculture Forest Service. Additionally the Division of Fish and Wildlife, DNREC, manages a 147 acre tract. Areas targeted for conservation include

extensive freshwater wetlands of the Ellendale Swamp and about 14 miles of riparian habitat, including a portion of the headwaters of the Nanticoke River.

Goals of the Redden / Ellendale Forest Legacy Area.

Maintain traditional forest uses.

Protection of the unique freshwater wetlands and riparian corridors to maintain water quality and groundwater recharge.

Reduce forest fragmentation through greenways corridors and other public lands.

Protection of Gravelly Branch, West Gun Branch, Maple Marsh, and Beaver Branch, and Deep Creek, which is the headwaters of the Nanticoke River.

Objectives of the Redden / Ellendale Forest Legacy Area.

Protect the forested wetlands and Ellendale Swamp and associated biotic communities, both plant and animal rare and endangered species.

Protect the headwaters of the Nanticoke River.

Reduce the loss of forest land and forest fragmentation to other non conservation uses.

Protect historical and archaeological features.

Create additional recreation and public use.

Means for protection.

- A. Acquisition of full-fee is appropriate for tracts within the Redden/Ellendale Forest Legacy Area, but acquisition of conservation easement is preferred.
- B. Acquire development rights on all tracts. Especially the rights to subdivide, build buildings, and control utility right-of-way locations.
- C. Timber rights retained by the landowner should be conditioned by using "Best Management Practices" for alleviating soil erosion. All timber harvesting that is allowed shall require a forest management plan and a timber harvesting plan prepared in consultation with a professional forester.
 1. "Clearcutting", which is an even aged cutting method in which the entire standing crop of trees from an area is removed at one time, is permitted except that clearcuts shall not exceed 100 acres in size.
Within any ten year period no more than twenty five percent of the total easement area may be clearcut. The start on the ten year period would begin on the date the first clearcut commences after the conveyance of this easement.
Notwithstanding this provision, the grantor shall have the right to cut and remove, by clearcut methods, dead, dying, and diseased trees which result from natural occurrences, including wildfire, disease, insect infestations, and blowdown, to prevent or mitigate greater harm to the scenic and recreational values of the easement area.
Any area that has been clearcut shall be adequately restocked by natural or artificial means within three years of the harvesting pursuant to the then

- current stocking guide for the particular species or forest type.
2. Timber harvesting or cutting is prohibited within 150 feet of the high water mark of any stream, creek, river, branch, pond, or any other surface waters.
- D. Acquire access rights to all tracts. Exceptions would be upon the decision made by the State Stewardship Committee before the beginning of negotiations.
 - E. To restrict the development of mining, drilling of material, sand and gravel pits to one acre or less and for the sole use of the landowner. No commercial development will be allowed.
 - F. No disposal of waste or hazardous material will be allowed on properties.
 - G. Prohibit the use of signs and billboards on all properties, except to state the name and address of the property owner and/or provide Forest Legacy information and Forest Legacy Boundary information.
 - H. To acquire the rights to allow all forms of non-motorized access for the public.
 - I. Existing dams or water impoundments or similar structures shall be allowed to remain and be maintained. Improvements to existing structures shall be up to the discretion of the Stewardship Committee. No new construction of dams, impoundments, or other water resource development shall be allowed.
 - J. Industrial, commercial, and residential activities, except forestry and limited mining (see E above) uses are prohibited.

III. CYPRESS SWAMP FOREST LEGACY AREA

The Cypress Swamp Forest Legacy Area is located in south central Sussex County and is Delaware's southernmost Legacy Area. Beginning at the Maryland line, the western boundary of this area follows County Route 455 north to County Route 64. It then follows County Route 64 west to County Route 68, which turns into County Route 461 at Hearn's Crossroads, and continues north to the junction of State Route 24. The northern boundary of the Legacy Area then begins and heads east on State Route 24 to the junction of State Route 30. It then follows State Route 30 eastward to U.S. Route 113. The eastern boundary follows U.S. route 113 southward to the Maryland line, which forms the Legacy Area's southern boundary.

This resource area is the largest contiguous forest wetland complex in Delaware. The complex of ponds and bottomland forested corridors contains significant archaeological sites, many rare plants, and the northern-most natural stand of baldcypress in North America. This unique hydrologic and geologic setting promotes a diverse biological community.

The resource area contains over twenty miles of wooded stream corridors, five ponds and adjacent freshwater wetlands, all of which are essential to maintain high water quality and provide significant water recharge. Being the northernmost natural baldcypress site makes this a very diverse plant community. There are sixteen known locations of rare plant species of concern to the state. Diverse animal communities also exist, with known location for several rare animal species of State and Federal concern. This includes known bald eagle nesting sites. Historical and archaeological features include small prehistoric living sites, and scattered hunting and gathering sites beginning by 6500 B.C.

The Delaware Forest Stewardship Committee selected several program objectives for the Cypress Swamp Forest Legacy Area. Their highest priority is to provide environmental benefits through the restoration and protection of riparian zones, native forest plants and animals, and remnant forest types. The Committee's second priority is to provide protection of rare, threatened, and/or endangered species of plants and animals. Third priority is to reduce forest fragmentation caused by development.

The Greenspace committee, under the auspices of the Governor's Environmental and Infrastructure Cabinet Council, designated this area as land for increased protection. This resource area already includes several different management units. Trap Pond State Park and Trussum Pond State Park totaling 965 acres, along with 122 acres at Raccoon Pond and Records Pond, are protected by the Delaware Department of Natural Resources and Environmental Control. Furthermore 525 acres of the James Branch is dedicated as a Nature Preserve. Delaware Wild Lands, a private conservation organization, is a large private owner with over ten thousand acres protected. The State of Delaware is presently interested in purchasing this unique resource area.

Goals of the Cypress Swamp Legacy Area.

Maintain and enhance the protection of the watershed.
Protection of the unique forested cypress swamp.
Create additional recreation and public use.
Maintain traditional forest and wildlife uses.
Reduce the loss of the swamp land to other land uses.

Objectives of the Cypress Swamp Legacy Area.

Protect the forested wetlands and in particular the Cypress Swamp, and associated biotic communities.
Protect the riparian habitat of Trussum and Trap Ponds, the stream corridor of James Branch, and associated creeks and branches.
Protect freshwater wetlands and millponds.
Protect rare and endangered plant and animal communities and singular species.
Protect historic and archaeological features.
Provide public access to the Cypress Swamp.

Means for protection.

- A. Acquisition of full-fee is appropriate for tracts within the Cypress Swamp Forest Legacy Area, but acquisition of conservation easements is preferred.
- B. Acquire development rights on all tracts. Especially the rights to subdivide, construct buildings, and control utility right-of-way locations.
- C. Timber rights retained by the landowner should be conditioned by using "Best Management Practices" for the alleviating of soil erosion. All timber harvesting is permitted, but shall be on a sustained yield basis according to a plan prepared by a professional forester. Departure from sustained yield is allowed only in limited response to forest diseases and insect infestations, and salvage in the event of fire or natural catastrophe.
- D. Acquire access rights on all tracts. Exceptions would be upon the decision made by the State Stewardship Committee prior to the beginning of negotiations.
- E. Acquire timber rights to create a 200-foot buffer strip on both sides of the James Branch, Bald Cypress Branch, Pocomoke River, North Fork Green Run, Raccoon Prong, Sandy Branch, Polly Branch and Vines Creek.
- F. Acquire timber rights to create a 100-foot buffer strip on both sides of all secondary branches, creeks and prongs not mentioned in (E). Additionally, create a 100-foot buffer strip next to the shore line of all millponds.
- G. To restrict the development on mining, drilling of mineral, sand and gravel pits to one acre or less and for the sole use of the landowner. No commercial development will be allowed.
- H. No disposal of waste or hazardous material will be allowed on properties.
- I. Prohibit the use of signs and billboards on all properties, except to state the name and address of the property owner and/or provide Forest Legacy information and Forest Legacy Boundary information.
- J. To acquire the rights to allow all forms of non-motorized access for the public.

- K. Existing dams or water impoundments or similar structures shall be allowed to remain and be maintained. Improvements to existing structures shall be the decision of the Stewardship Committee. No new construction of dams, impoundments or other water resource development shall be allowed.
- L. Industrial, commercial, and residential activities, except forestry and limited mining (see G above) uses are prohibited.

IV. BLACKBIRD / BLACKISTON FOREST LEGACY AREA

The Blackbird / Blackiston Forest Legacy Area is located in lower New Castle county and upper Kent county. Its western boundary is the Maryland / Delaware line. Its northern boundary starts at the Maryland / Delaware line and follows Coldwell Corners Road east to the town of Townsend, where the eastern boundary begins by following Dexters Corner road south. It then follows Ratledge Road east to State Route 71, where it heads south

and intersects U.S. Route 13. It follows U.S. Route 13 south until it intersects with Blackbird Forest Road, where it turns west for several hundred yards. At that point, it heads south along Blackbird Station Road to the junction of VanDyke Greenspring Road. After a short distance, it heads south on Clayton Greenspring Road into the town of Clayton, where it follows the Maryland and Delaware Railroad Line southwest through the town of Kenton. The southern boundary of the Legacy area begins here, following State Route 300 west to Downs Chapel Road. The boundary then follows Downs Chapel Road north to Pearson's Grove, where it bears northwest until it again joins the Maryland / Delaware line.

The Delaware Forest Stewardship Committee selected key program objectives for the Blackbird / Blackiston Forest Legacy Area. Their top priority for the area is identifying and protecting environmentally important privately owned forest lands threatened with conversion to non-forest use. Reducing forest fragmentation caused by development is their second priority. The Committee's third priority for the area is to provide environmental benefits through the restoration and protection of riparian zones, native forest plants and animals, and remnant forest types.

This resource area consists of coastal plain hardwoods protecting headwaters of three undeveloped watersheds and associated prehistoric resources. Blackbird / Blackiston area is a forested wetland complex containing significant geological and biological features.

This resource area is significant for water recharge and maintenance of water quality. There are over 9.7 miles of stream corridors. Additionally, there are scattered coastal plain ponds known as Delmarva Bays that are geologically and biologically unique. Very significant historical and archaeological features include large hunting and living sites before 3000 B.C. with smaller prehistoric sites. The area is also characterized by scattered 18th century farmsteads. Very diverse plant communities exist, including the known locations of four rare plant species of State concern, three of which are also of Federal concern (small whorled pogonia, Baratt's sedge, Harper's fimbristylis). Three rare animal species of state concern also inhabit the area.

The Greenspace Committee, under the auspices of the Governor's Environmental and Infrastructure Cabinet Council, recommended in 1988 the addition of 13,000 acres for

protection in this resource area. This includes 7.2 miles of riparian headwater corridors and the unique freshwater forested wetland complex.

Goals of the Blackbird / Blackiston Forest Legacy Area.

Maintain traditional forest uses.

Protection of the watershed.

Protection of unique forested areas.

Create additional recreation and public use.

Reduce forest fragmentation through greenway corridors and other state public lands.

Objectives of the Blackbird / Blackiston Forest Legacy Area.

Protect the forested wetlands and Delmarva Bays and associated biotic communities, both plant and animal rare and endangered species.

Protect the headwaters of Blackbird Creek, Sewell/Jordan Branch and Cypress Branch.

Recreation and public access is especially critical in the Cypress Branch watershed.

Reduce forest fragmentation by linking multi-agency state lands.

Means for protection.

- A. Acquisition of full-fee is appropriate for tracts within the Blackbird / Blackiston Forest Legacy Area, but acquisition of conservation easements is preferred.
- B. Acquire development rights on all tracts. Especially the rights to subdivide, construct buildings, and control utility right-of-way locations.
- C. Timber rights retained by the landowner should be conditioned by using "Best Management Practices" for alleviating soil erosion. All timber harvesting that is allowed shall be on a sustained yield basis according to a plan prepared by a professional forester. Departures from sustained yield are permitted only in limited response to forest diseases and insect infestations, and salvage in the event of fire or natural catastrophe.
- D. Acquire access rights on all tracts. Exceptions would be upon the decision made by the State Stewardship Committee before the beginning of negotiations.
- E. Acquire timber rights to create a 200-foot buffer strip on both sides of the Cypress Branch, Sewell Branch, and Blackbird Creek.
- F. To restrict the development of mining, drilling of mineral, sand and gravel pits to one acre or less and for the sole uses of the landowner. No commercial development will be allowed.
- G. No disposal of waste or hazardous material will be allowed on properties.
- H. Prohibit the use of signs and billboards on all properties, except to state the name and address of the property owner and/or provide Forest Legacy information and Forest Legacy Boundary information..
- I. On tracts acquired adjacent to the Cypress Branch, Blackbird Creek and the Sewell Branch, where it is feasible to locate a trail, acquire rights to allow all forms of non

- motorized access for the public.
- J. Existing dams or water impoundments or similar structures shall be allowed to remain and be maintained. Improvements to existing structures shall be the decision of the Stewardship Committee. No new construction of dams, impoundments, or other water resource development shall be allowed.
 - K. Industrial, commercial, and residential activities, except for forestry and limited mining (see F above) uses are prohibited.

APPENDIX A

APPLICATION AND EVALUATION FORMS

STATE OF DELAWARE

FOREST LEGACY PROGRAM - INFORMATION SHEET

Nationwide, the traditional uses of private forest lands for such activities as timber and wood product management, maple sugar production, wildlife management and recreational use have declined at an alarming rate. The primary reasons for this decline have been the conversion of forested tracts to non-forest uses (such as residential or commercial development) and forest fragmentation (the division of large forests into smaller tracts separated by non-forested lands.)

These dramatic changes have had far reaching impacts beyond the loss of our forests, including water quality and quantity, decreased wildlife and habitat diversity, loss of recreational opportunities, and the loss of scenic vistas and historic resources.

Public lands are increasingly relied upon to provide these resources and opportunities, but alone cannot possibly meet this demand., To help maintain the integrity and traditional uses of our forests, Congress created the Forest Legacy Program which allows the U.S. Department of Agriculture, through the Forest Service, in cooperation with state agencies, to acquire land or interests in land. All conservation easements and acquisitions are purchased at no more than fair market value as determined by standardized federal appraisal methods, and are held by the State of Delaware in perpetuity. Landowners must be informed of fair market value, and all sales of property or rights are strictly voluntary. The Program relies on the concept of a "willing seller, willing buyer and no condemnation."

For more information or assistance in filling out an application, please contact the Forestry Section of the Delaware Department of Agriculture at (302) 739-4811.

FOR OFFICE USE ONLY

APPLICATION NUMBER: _____

DATE: _____

STATE OF DELAWARE
FOREST LEGACY PROGRAM
LANDOWNER INSPECTION CONSENT AGREEMENT

I, _____ as the land owner agree to allow inspection, appraisal, and survey of my property being offered for consideration under the Forest Legacy Program. I agree to allow members of the U.S. Forest Service, the Delaware Department of Agriculture, the Delaware Stewardship Committee, or their designated staff to inspect the property as may be required at any time. I shall be notified in advance of all inspection visits.

Signature of Landowner

Date

Delaware Department of Agriculture

Date

Title: _____

FOR OFFICE USE ONLY

Received by: _____

Application Number _____

Date: _____

APPLICANT INFORMATION:

Landowner's Name: _____

Mailing Address:

Daytime Telephone Number: _____

Contact Person / Agent: _____

Mailing Address: _____

Daytime Telephone Number: _____

Delaware House District: _____

Delaware Senatorial District: _____

PROPERTY INFORMATION:

Legal Description: County _____

Hundred _____

Assessor's Plat and Lot Numbers: _____

Deed Reference (Book and Page Number): _____

Current Local Zoning where property is located
(Include minimum lot size and road frontage requirements): _____
Current tax valuation or recent appraisal (attach if available):

Property's Total Forested Acres: _____

Forested Acres of Tract Offered For Forest Legacy: _____

Acres of Cleared/Open Land: _____

LANDOWNER GOALS AND OBJECTIVES

Describe your long term goals and objectives for this parcel:

TRADITIONAL FOREST VALUES

What is/are the "Traditional" use(s) of this forest land?

LANDOWNER COMMENTS

What, in your opinion, is the "Threat of Conversion to Non-Forest Use" of the parcel proposed for enrollment in the Forest Legacy Program? Be Specific:

Do you currently have a forest management plan? _____
If so please provide a copy.

It is important that the following section be carefully and fully completed. The information you supply will directly affect the desirability of the parcel as well as its appraised value and therefore its ranking. Note that checking "yes" does not limit your ability to negotiate price and options in the future, it merely assists the Forest Legacy Committee when evaluating your parcel.

Indicate which of the following interests you desire to retain:

(These should be the rights you want to retain. All other rights will become the property of the State of Delaware upon successful completion of negotiations between the U.S. Forest Service and yourself.)

YES	MAYBE	
___	___	Development Rights
___	___	Timber and wood product rights
___	___	Water rights
___	___	Mineral rights
___	___	No public access
___	___	Hunting
___	___	Fishing
___	___	Camping
___	___	Hiking or other passive recreation
___	___	Bicycling
___	___	Horseback Riding
___	___	Grazing
___	___	Farming
___	___	Construction of roads
___	___	Motorized access
___	___	Expansion of existing improvements
___	___	Mushroom/Ginseng/Craft Material Collection
___	___	Other: _____

CONFIDENTIAL

The following information shall remain strictly confidential until such time as: 1. the application is approved and all financial transactions are concluded, or 2. all title holders give written permission to release the information.

FINANCIAL INFORMATION

State the value of the interests to be enrolled in the Forest Legacy Program, and the method used to determine that value (appraisal, landowner estimate, etc.)

What is/are the estimated sale price(s) of the interests being offered?

State the value of the landowner(s) contribution, if any, either in donated value of in-kind services or financial.

LIENS AND ENCUMBRANCES

List any and all liens and encumbrances on the property proposed for enrollment in the Forest Legacy Program. Examples: utility easements, public rights of way, water flow or use restrictions, septic systems or water easements, deed restrictions, tax liens, etc.

The information provided above is true to the best of my/our knowledge and belief.
ALL TITLE HOLDERS MUST SIGN.

PRINT NAME(S)

SIGNATURE

DATE

FOR OFFICE USE ONLY

Application Number: _____ Date: _____

FOREST LEGACY PROGRAM - Checklist

With your Forest Legacy Program application package, please submit four (one original and three copies) of the following for each contiguous parcel:

- _____ Completed Application
- _____ Name(s) and address(es) of other owner(s) of record for this tract
- _____ Signed consent agreement
- _____ Copy of road map indicating location of the property
- _____ Copy of plat or survey map of the parcel
- _____ Aerial photo (can be obtained through your local FSA office)
- _____ Legal Description (if available)
- _____ List of existing permanent improvements on the tract, including houses, barns, lakes, ponds, dams, wells, roads and other structures, and the total number of acres occupied by improvements.
- _____ Map identifying all dams, dumps, or waste disposal sites on the property
- _____ Forest management plan (if available)

NOTE: All materials become the property of the state of Delaware and are non-returnable.

DISCLOSURE OF THIS INFORMATION IS VOLUNTARY; HOWEVER, FAILURE TO COMPLY MAY RESULT IN THIS FORM NOT BEING PROCESSED.

DELAWARE FOREST LEGACY PARCEL EVALUATION PACKAGE

Directions for Completing the Forest Legacy Program Evaluation Package

COVER SHEET: The first part of the cover sheet is to be completed with information supplied on the enrollment application form. The landscape description is meant to include the physical characteristics of the surrounding area including topography, soils, and surface and ground water hydrologies; brief inventories of major vegetative groups, fish and wildlife resources, scenic resources and any other forest resources; as well as surrounding land uses. The parcel description is to include an in depth description of the above mentioned items as they pertain to the parcel.

PARCEL EVALUATION - PART A: These pages are to be completed by the field personnel directed to do so by the lead agency, in consultation with other pertinent state and local agencies/groups.

Note - both Parts A and B Parcel Evaluation forms will be used to set goals for acquisition of the parcel.

SCORING: The final score will not be used as the sole factor in determining which parcel/interest should be acquired, but merely as a guide to the relative values of the resource under evaluation. Subject to funding, priority will be given to those tracts with the greatest need for protection of the forest and related resources.

FOREST LEGACY PROGRAM PARCEL EVALUATION PACKAGE

_____ Forest Legacy Area

File Number: _____

Date of Evaluation: _____

Landowner's Name: _____

Parcel Location: _____

Legal Description: _____

Investigator(s): _____

Landscape Description:

Parcel Description:

Landowner's Name: _____ File Number _____

Evaluator(s): _____

DELAWARE FOREST LEGACY PARCEL EVALUATION - PART A

I. Reasons for inclusion in the Forest Legacy Program. Prioritize the following reasons for enrollment of the parcel in the Forest Legacy Program:

- Prevent conversion/development/fragmentation of an important forest resource.
- Protection of scenic resources.
- Provide/enhance public recreation opportunities.
- Protect/enhance a watershed or important drinking water supply.
- Protect/enhance an important riparian/hydrologic area.
- Provide linkage between public properties, protected areas, and greenways.
- Protect/enhance/restore fish and/or wildlife habitat.
- Protect/enhance/restore habitat of rare, threatened, and/or endangered species of plants and/or animals.
- Provide for the continuation of traditional forest uses.
- Provide opportunity to implement Forest Stewardship practices.
- Provide opportunities for environmental education.
- Other: _____

II. Degree of threat of development/fragmentation/conversion to non-forest uses.

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	A. Parcel is in danger of conversion within five years.
<input type="checkbox"/>	<input type="checkbox"/>	B. Parcel may remain wooded, but will become further fragmented.
<input type="checkbox"/>	<input type="checkbox"/>	C. Parcel is currently on the open market, or listed by Realtors.
<input type="checkbox"/>	<input type="checkbox"/>	D. Securing one or more sites now will curtail further development.
<input type="checkbox"/>	<input type="checkbox"/>	E. Parcel is remote, but vulnerable.
<input type="checkbox"/>	<input type="checkbox"/>	F. Parcel is under a state or federal forest management program.
<input type="checkbox"/>	<input type="checkbox"/>	G. Parcel is of a remnant forest type.
<input type="checkbox"/>	<input type="checkbox"/>	H. Parcel may remain wooded, but is in danger of being over-harvested.
<input type="checkbox"/>	<input type="checkbox"/>	I. Other: _____

III. Factors affecting acquirability. These factors are to be taken into consideration when prioritizing parcels for acquisition.

Yes	No	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. The property is specifically identified in terms of priority, timing, and cost in the local land use plan, state recreation plan, or open space plans.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Parcel may be available at below fair market value
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Intensity and expense of management activities to protect the property's values is economically feasible.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D. Preservation of the property would increase the protection of existing natural areas or enhance the linking of greenways.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	E. Property can accommodate proposed priority uses and/or management activities without endangering or degrading its natural value.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	F. Property is/can be protected against future degradation from activities occurring on neighboring properties.

Comments:

Landowner's Name: _____ File Number: _____

Evaluator(s): _____

DELAWARE FOREST LEGACY PARCEL EVALUATION - PART B

I. If parcel contains one or more of the following important public values, place a check mark as indicated, circle appropriate score and tally score for each sub-section.

Yes No

A. Scenic Resources (maximum score 35 points)

- 1. Parcel is adjacent to a scenic route listed by the State of Delaware. (30 points)
- 2. Parcel includes locally important panoramic views and/or exceptional short views. (5 points)

Scenic resources total score _____

B. Public Recreational Opportunities (15 points each, maximum score 60 points)

- 1. Water-based recreation is present - boating, swimming, fishing, rafting, canoeing.
- 2. Trail-based and/or day use recreational opportunities exist - hiking, picnicking, horseback riding, ice skating, cross-country skiing.
- 3. Natural resource based recreational activities are available - camping, hunting, nature touring.
- 4. Adjacent land is protected (state park, natural area etc.).

Public recreation opportunities total score _____

C. Riparian/hydrologic areas (15 points each, maximum score 105 points)

- 1. Parcel is situated on a major river or stream.
- 2. Parcel has extensive (over 300') river or wetland shoreline.
- 3. Parcel includes flood plain.
- 4. Parcel contains a minimum 80' strip of native trees and shrubs as a natural buffer and sediment filter.
- 5. Parcel includes a natural wetland.
- 6. Parcel is situated within the surface watershed, or groundwater aquifer, of an important public drinking water supply.
- 7. Parcel provides immediate watershed/water supply protection.

Riparian/hydrologic areas total score _____

Yes No

D. Fish and Wildlife Habitat (maximum score 80 points)

___ ___ I. Parcel contains outstanding habitat and other ecologically recognized criteria for one or more species that include (10 points for each):

- Forest interior nesting birds
- Significant populations of resident species
- Neo-tropical migrant species
- Areas for resting and feeding of migratory species
- Forest inhabiting mammals, reptiles, amphibians and invertebrates

___ ___ 2. Parcel exhibits connective habitats, corridors, habitat linkages, and areas that reduce biological isolation. (30 points)

Fish and Wildlife habitat total score _____

E. Known threatened and endangered species (score 60 points)

(Species to be considered under this criterion are those currently listed by the Delaware Department of Natural Resources and Environmental Control and those listed in the Federal Register.)

___ ___ I. The parcel provides habitat supporting the occurrence of rare or endangered species.

Endangered species total score _____

F. Known cultural/historical areas (score 20 points)

___ ___ 1. Parcel contains forest related cultural resources. (i.e. historic forest, historic mill, or other forest industry site, etc.)

Cultural/historic areas total score _____

G. Other ecological values (10 points each, maximum score 40 points)

- ___ ___ 1. Parcel is part of a large block of contiguous forest land.
- ___ ___ 2. Parcel provides a mix of native ecological communities (biodiversity).
- ___ ___ 3. Parcel includes ecological communities that are dwindling in Delaware.
- ___ ___ 4. Parcel Contains late successional growth forests (natural area).

Other ecological values total score _____

Yes No

H. Provides opportunities for continuation of existing traditional forest

uses (15 points each, maximum score 60 points)

- ___ ___ 1. Parcel will remain available for timber and other forest products management as prescribed in a Forest Stewardship Plan or multi-resource management plan.
- ___ ___ 2. Parcel will continue to serve watershed and water filtration role.
- ___ ___ 3. Parcel will continue to provide fish and wildlife habitat.
- ___ ___ 4. Parcel will continue to provide outdoor recreation opportunities.
- ___ ___ 5. Parcel will continue to provide environmental educational opportunities.

Traditional forest uses total score _____

TOTAL SCORE _____

Comments:

Recommendations:

APPENDIX B

PUBLIC REVIEW DOCUMENTATION