New York State
Department of Environmental Conservation

Division of Lands & Forests

CHARLESTON
UNIT MANAGEMENT PLAN

FINAL

**Towns of Charleston, Glen, and Root in Montgomery County,
and the Town of Duanesburg in Schenectady County**

AUGUST 2009

NYS Department of Environmental Conservation
Region 4 Sub Office
65561 State Route 10
Stamford NY, 12167
(607) 652- 7367

DAVID A. PATERSON
GOVERNOR

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK 12233-1010

ALEXANDER B. GRANNIS
COMMISSIONER

MEMORANDUM

TO: The Record

FROM: Alexander B. Grannis

DATE: AUG - 4 2009

SUBJECT: Final Charleston Unit Management Plan

The final unit management plan for Charleston has been completed. The Plan is consistent with Department policy and procedure, involved public participation and is consistent with the Environmental Conservation Law, Rules and Regulations. The plan includes management objectives for a ten year period and is hereby approved and adopted.

Alexander B. Grannis, Commissioner

AUG - 4 2009

Date

CHARLESTON UNIT MANAGEMENT PLAN

PREPARED BY:

VICKI CROSS
FORESTER I

TOM EDMUNDS
FOREST RANGER

JAMES HALEY
ASSISTANT LAND SURVEYOR III

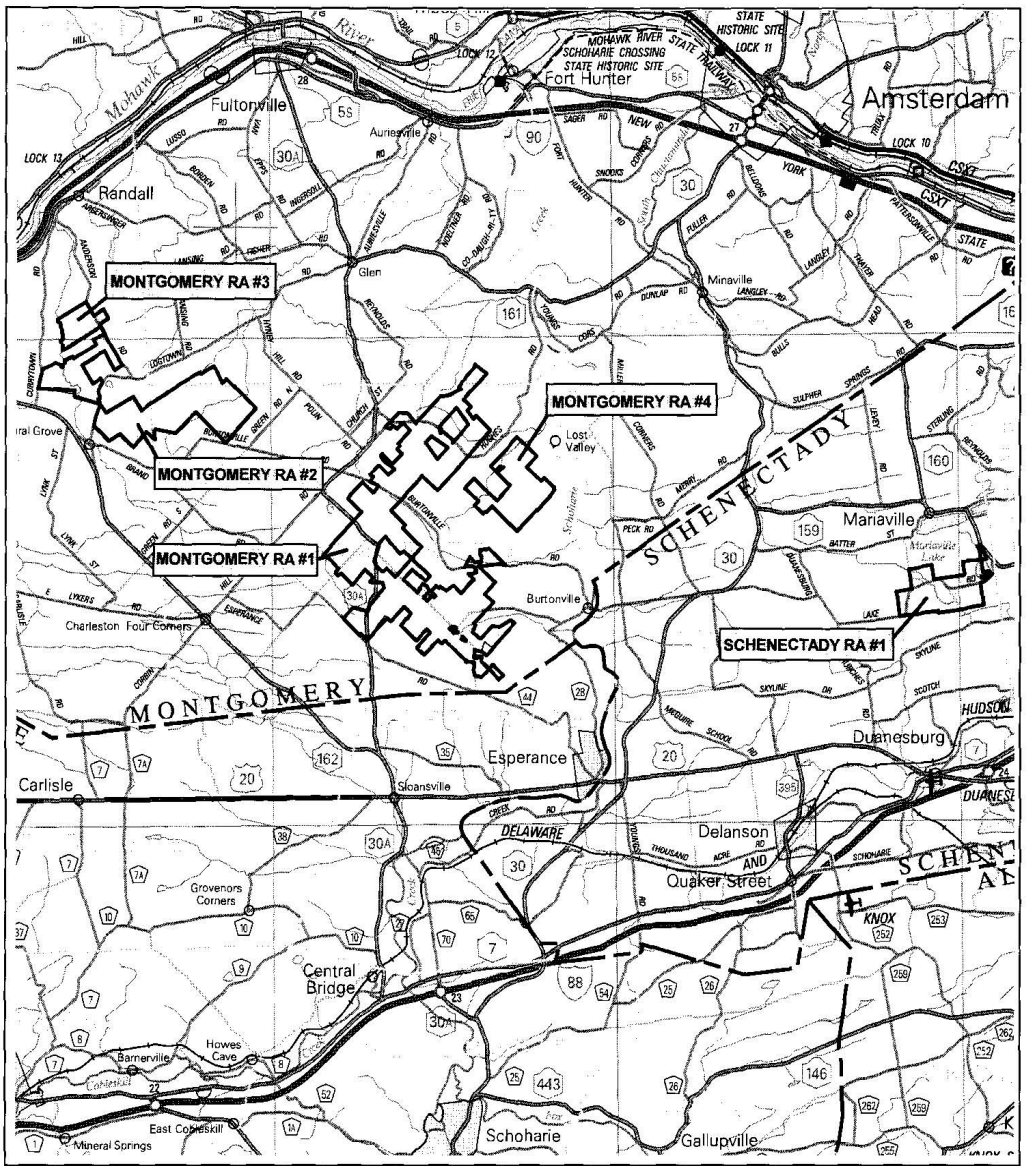
BRIAN LAYMAN
CONSERVATION OPERATIONS SUPERVISOR III

NORM McBRIDE
BIOLOGIST I AQUATIC

KARL PARKER
WILDLIFE BIOLOGIST II

BILL SCHONGAR
FORESTER II

CHARLESTON UNIT
LOCATION MAP



LEGEND	SCALE: 1" = 2.5 MILES	N
State Reforestation Area Boundaries		Map drawn by: Vicki Shorey Forester, NYSDEC 9/8/04

PREFACE

It is the policy of the Department to manage State Forests for multiple uses to serve the People of New York State. This Unit Management Plan is the first step in carrying out that policy. The plan has been developed to address management activities on this Unit for the next ten years and beyond, with a review and update planned in five years. Factors such as wood product markets, budget and manpower considerations, and forest health problems may necessitate deviations from the scheduled management activities.

TABLE OF CONTENTS
Charleston Unit Management Plan

INTRODUCTION

A. History of State Forests

The forest lands outside the Adirondack and Catskill regions owe their present character, in large part, to the impact of pioneer settlement. Following the close of the Revolutionary War, increased pressure for land encouraged westward expansion. Up to 91% of woodlands in New York State were cleared for cultivation and forage.

Early farming efforts met with limited success. As the less fertile soils proved unproductive, they were abandoned and settlement was attempted elsewhere. The stage of succession was set and new forests of young saplings re-occupied the ground once cleared.

The State Reforestation Law of 1929 and the Hewitt Amendment of 1931 set forth the legislation which authorized the Conservation Department to acquire land by gift or purchase for reforestation areas. These State forests, consisting of not less than 500 acres of contiguous land, were to be forever devoted to "reforestation and the establishment and maintenance thereon of forests for watershed protection, the production of timber, and for recreation and kindred purposes". This broad program is presently authorized under Article 9, Title 5 of the Environmental Conservation Law.

In 1930, Forest Districts were established and the tasks of land acquisition and reforestation were started. In 1933 the Civilian Conservation Corps (CCC) was begun. Thousands of young men were assigned to plant millions of trees on the newly acquired State lands. In addition to tree planting, these men were engaged in road and trail building, erosion control, watershed restoration, forest protection and other projects.

During the war years of 1941-1945, very little was accomplished on the State lands. Plans for further planting, construction, facility maintenance and similar tasks had to be curtailed. However, through the postwar funding, conservation projects once again received needed attention.

The Park and Recreation Land Acquisition Act of 1960, the Environmental Quality Bond Acts of 1972, 1986, and 1996, the Environmental Protection Act, and the 1996 Clean Water/Clean Air Bond Act contained provisions for the acquisition of State lands. These lands would serve multiple purposes involving the conservation and development of natural resources, including the preservation of scenic areas, watershed protection, forest management and recreation.

Today there are over 750,000 acres of State Forest land throughout the State. The use of these lands for a variety of purposes such as timber production, hiking, skiing, snowmobiling, fishing, trapping and hunting is of tremendous importance both economically and to the health and well-being of the people of the State.

B. Green Certification of State Forests

In 2000, New York State DEC-Bureau of State Land Management received Forest Stewardship Council (FSC) certification under an independent audit conducted by the National Wildlife Federation - SmartWood Program. This certification included 720,000 acres of State Forests in DEC Regions 3 through 9 managed for water quality protection, recreation, wildlife habitat, timber and mineral resources (multiple-use). To become certified, the Department had to meet more than 75 rigorous criteria established by FSC. Meeting these criteria established a benchmark for forests managed for long-term ecological, social and economic health. The original certification and contract was for five years.

By 2005 the original audit contract with the SmartWood Program expired. Recognizing the importance and the value of dual certification, the Bureau sought bids from prospective auditing firms to reassess the Bureau's State Forest management system to the two most internationally accepted standards - FSC and the Sustainable Forestry Initiative ® (SFI) program. However, contract delays and funding shortfalls slowed the Department's ability to award a new agreement until early 2007.

Following the signed contract with NSF-International and Scientific Certification Systems, the Department was again audited for dual certification against FSC and additionally the SFI program standards on over 762,000 acres of State Forests in DEC Regions 3 through 9. This independent audit of State Forests was conducted by these auditing firms from May 2007 until July 2007, with dual certification awarded in January 2008. Forest products derived from wood harvested on State Forests from this point forward could now be labeled as "green certified" through chain-of-custody certificates. Green Certified labeling on wood products assures consumers that the raw material was harvested from well-managed forests.

The Department now joins an elite few States, representing less then 10% of working forests, certified as well managed throughout the Northeastern Region of the United States. The Department's State Forests can also be counted as part of over 2.3 million acres of public, private and industrial certified forests in New York. That's over 15% of the total working forest land in New York *third-party certified* as well managed to protect habitat, cultural resources, water, recreation, and economic values now and for future generations.

#**SCS-FM/COC-00104N**
©1996 Forest Stewardship Council
FSC certification means that NY DEC State Forests are managed according to strict environmental, social and economic standards.

#**NSF-SFIS-6l741**
NY DEC use of the Sustainable Forestry Initiative® program logo mark indicates that State Forests have been certified by a qualified independent auditor to be in conformance with the SFI Standard.

C. History of the Charleston Management Unit

Two major waterways helped shape the history of the Charleston Unit. The Mohawk River and the Schoharie Creek provided both the Native Americans and later the white settlers with means of transportation and settlement. The area is rich in Revolutionary War history. Part of the Unit was once believed to have served as the route traveled by Johnson's Raiders back in 1780 when both the Schoharie and Mohawk Valleys were ransacked by the British and the Indians.

The towns included in this Unit in Montgomery County are as follows: the Town of Charleston, created in 1793 from the Town of Mohawk; the Town of Root, created in 1823 from the Town of Charleston and the Town of Canajoharie; and the Town of Glen, created in 1823 from the Town of Charleston. In Schenectady County, the Town of Duanesburg was created in 1788 (Beers, 1878).

The Charleston State Forest and the Rural Grove State Forest contain a large portion of what was called the Clarke Lands. James Clarke, the original grantee, had a three life lease with the tenants on the land. Clarke's great grandson raised the rent when the three life lease expired. This happened in the 1840's during the height of the anti-rent wars and resulted in much of the land being abandoned. Rather than leave the houses and barns that they had built intact for Clarke's great grandson to benefit from, many of the tenants set fire to their homesteads when they abandoned them. The abandoned lands were vacant and unproductive for a long time. The Town of Charleston lost over two thirds of its population between the 1840's and 1900 (Beers, 1878).

The Warrior Trail is a path running generally north to south through Charleston State Forest near the Waite Drive area. It was said to have been a major access route for Indians to access the coast from the Mohawk River. It was also reportedly used by Johnson's Raiders in 1780.

The Sara Lib/Gordon Road area was reportedly used as a Tory training ground during the Revolutionary War. While plowing a fire break in the area in the 1950's, a Revolutionary War Era sword was found in the ground and is still housed in the Charleston Town Historical Society Museum (Whiting, 2004).

Rural Grove State Forest was named after the nearby hamlet of Rural Grove, which had previously been called Leatherville because of the tannin industry present in the area at the time. Rural Grove's most prominent resident during that time, John Bowdish, suggested the name. Bowdish is given credit as the father of the free school system. He operated a store and post office in the hamlet (Farquhar, 2004).

Yatesville Falls, historically known as Buttermilk Falls, was the site of a gristmill owned by the Vrooman family. General George Washington and his entourage reportedly spent the night at Vrooman's house in Yatesville (site of present day Randall). Several Mohawk Indian villages are known to have been located near this State Forest. They generally date back to the 1600's (Marino, 2004).

Featherstonhaugh State Forest was named after George W. Featherstonhaugh, a British gentlemen who moved to the area and married Sarah Duane, the youngest daughter of James Duane, the patron of Duanesburg. Featherstonhaugh practiced scientific farming, crop rotation, held county fairs with agricultural competitions and served as the United States' first geologist and agricultural commissioner. He is also considered the father of the steam railroad.

INFORMATION ON THE UNIT

A. Geographic and Geological Information

The Charleston management Unit is located in the Town of Duanesburg, Schenectady County and the Towns of Charleston, Glen and Root in Montgomery County. This Unit is bounded by the Village of Duanesburg on the southeast corner, the Mohawk River to the north and State Route 162 to the south and west.

This Unit is comprised of five State Forests as listed in Table 1.

Table 1. State Forests within the Charleston Unit.

State Forest #	State Forest Name	Acreage
Montgomery 1	Charleston	3,954
Montgomery 2	Rural Grove	1,289
Montgomery 3	Yatesville Falls	714
Montgomery 4	Lost Valley	750
Schenectady 1	Featherstonhaugh	697
Total for Charleston Unit		7,404

The elevation in this Unit ranges from 540 to 1,420 feet above sea level. The lower extreme can be found where a tributary of the Schoharie Creek passes through the northern portion of the Lost Valley State Forest. The highest elevations are found in the southeast portion of Featherstonhaugh State Forest, with many areas on the Charleston State Forest also in the 1,300 foot range. According to "Ecological Units of the United States, First Approximation," the Unit is located at the confluence of the northernmost portion of the Catskill highlands, the easternmost portion of the Central Alleghany plateau, and the southern portion of the Mohawk Valley. These ecological units are characterized by open high hills to low mountains. According to the "New York State Forest Resources Assessment Report #14 – Forests in the Visual Landscape" these subsections are classified as having rolling hills to undulating lands.

The Charleston Unit is located in the uplands of both counties, which are adjacent to the Schoharie Creek. The lands are typically bisected by numerous streams. The general features of these uplands have been smoothed by glaciation, giving the landscape smooth curves rather than sharp, abrupt features. The bedrock is mainly of Ordovician age, consisting mainly of shales with some imbedded sandstone... .

Soils are mainly composed of glacial tills (materials deposited beneath a moving glacier) with some lacustrine based soils (lake laid soils generally formed later). Due to the abundant shale in the area, the majority of soils are clay rich. These till based soils range from level to steep and from deep to shallow. They generally have a firm substratum, range from poorly drained to well drained, have a seasonally high water table, low fertility and erodibility on steeper slopes.

Some of the larger and more resistant particles found in the tills are of igneous and metamorphic origins which came from the Adirondack mountains and were moved southward by glaciation. A good example of a lake left from the retreat of the glaciers is Mariaville Lake (just north of Featherstonhaugh State Forest). More detailed information about the soils and geology of the area can be located in the USDA publication Soil Survey of Montgomery and Schenectady Counties, New York.

Please see the maps in Appendix I for more information on the boundaries and topography of the Charleston Unit.

B. Vegetative Types & Stages Within the Unit

Please see Table 2 on the next page for a summary of the vegetative types found on the Charleston Unit.

Table 2. Acreage of vegetative types within the unit.

Vegetative Type	Acres	Seedling/Sapling (0-5" dbh)	Intermediate Trees (6-11" dbh)	Large Trees (12"+ dbh)	Percentage
Natural Hardwoods	1,939	702	1,153	84	26.2
Mixed Hardwoods/Conifers	1,584	0	1,480	104	21.4
Conifer Plantations	3,252	105	2,559	588	44.0
Open/Brush	70	--	--	--	0.9
Wetlands	335	--	--	--	4.5
Ponds	125	--	--	--	1.7
Other	99	--	--	--	1.3
TOTAL	7,404	807	5,192	776	100.0

The above data was compiled from existing inventory records.

"Natural hardwoods" contain trees that have been established through natural regeneration. Some common hardwood species include sugar maple, red maple, beech, red oak, white birch, basswood, and white ash.

"Mixed hardwoods/conifers" contain trees that have been established naturally and are composed of at least l0% white pine, Eastern hemlock or red spruce.

"Conifer plantations" contain trees established by mechanical means. These stands contain red, Scotch, white or jack pine, European or Japanese larch, Norway or white spruce, white cedar, balsam or Douglas fir.

Please see the various maps in the Appendix for the locations of the vegetative types on the Charleston Unit.

C. Wildlife

The five State Forests comprising this Management Unit are located in the Mohawk Valley ecozone (Will et. al 1982). This linear zone is dominated by the Mohawk River and encompasses 920 square miles. Annual snowfall ranges from 80 to 100 inches. Northern hardwoods is the predominant forest type within this ecozone. The Reforestation Areas in the Charleston Unit all fall within DEC Wildlife Management Unit 4A.

The Charleston Unit supports a wide variety of habitat types, including conifer plantations, natural stands of eastern hemlock and white pine, northern hardwoods, and red maple swamp, as well as numerous stream corridors, one lake, numerous created ponds and many beaver impoundments. Forest management practices create and maintain openings, and allow for a diversity of age and size classes of trees. This diversity in habitat results in a diversity in the wildlife which use State Forest lands for all or part of their life needs.

1. Birds

The New York State Breeding Bird Atlas was assembled in 1985. The work to update the atlas was initiated in 2000 and was completed in 2004. The Bird Atlas data are gathered and presented on the basis of 5 km x 5 km Breeding Bird Atlas blocks, which are 1/4 of a U.S.G.S. 7.5' topographic quadrangle. This means that the atlas data does not give precise information regarding the location where the individual species were found. The identification of a bird species in a specific atlas block that includes State land does not necessarily mean that the species

was identified on the State forest land itself. This is especially true with a widely dispersed area such as the Charleston State Forest, which is included in portions of six different atlas blocks (Table 1, Appendix II).

In addition to identifying the distribution of birds, each record also has one of three broad breeding codes associated with it regarding breeding status - Possible, Probable or Confirmed. The complete species list is included in Appendix III.

2. Reptiles and Amphibians

Some of the best data on reptiles and amphibians for New York comes from the recent Reptile and Amphibian Atlas, which was assembled in 1998. Data was collected on the basis of county, town and 7.5 minute topographic quadrangles. This means that the precise location of a particular species record may not have been recorded, and the record does not necessarily mean that the observation occurred on State land. While the survey period for this atlas has been completed, data are still being entered and edited prior to final publication of the atlas (Appendix IV). Some reptiles and amphibians are difficult to observe, and the Atlas effort undoubtedly did not identify all species which occur in the area of this State Forest Management Unit. A more extensive list of amphibians and reptiles likely to be located within this ecozone was prepared by Chambers (1983) and can be found in Appendix V.

3. Mammals

There has been no formal survey done of mammals in New York State. However, a variety of resources are available which provide information regarding this group of vertebrates. Connor (1960) conducted an extensive study of the small mammals of nearby Otsego and Schoharie Counties, and included a list of 49 species of mammals known from those counties. Chambers (1983) published lists of mammals likely to occur in each ecozone and by forest type in New York State. His list includes 49 species for the Mohawk Valley ecozone (Appendix VI). Finally, DEC monitors the harvest of mammals which are hunted or trapped. Take is monitored both by Wildlife Management Unit (WMU), as well as by Town and County. Common small mammals found on the Charleston Unit include mice, voles, moles, shrews, bats, gray squirrels, beavers, muskrats, mink, opossum, striped skunks, red foxes, gray foxes, fishers, coyotes, and white-tailed deer. Bobcat and river otter are less common, while black bear are likely only transients.

White-tailed deer are an important game species and are actively sought after by many visitors to these State Forests. Deer populations are managed by issuing deer management permits which allow for the harvest of antlerless deer. By controlling the number of female deer, DEC biologists strive to control overall deer numbers in each WMU, so that deer populations remain in balance with the habitat, as well as with human populations and their use of the land. Citizen task forces, convened by DEC to represent a broad range of public interests, participate in deer management by setting goals for deer population levels. Task forces consider many issues, including habitat availability and quality, highway safety, agricultural interests, as well as the interests of hunters and those interested in observing wildlife. Together, they strive to balance the wants and desires of each constituency in order to arrive at a consensus on the number of deer desired for a particular WMU. In WMU 4A, the Citizen Task force last met in 1993. At that time, a goal was set to maintain the deer herd at a buck take index of 1.9 bucks/square mile. The buck take rose from 1.3/ square mile in 1993 to between 1.8 and 2.0 bucks/square mile for the years 1998 through 2002. In 2003, the buck take dropped to 1.4, for reasons which are not completely clear, although the deer take was down statewide that year. Compared to other areas of the state, this WMU has very few agricultural damage complaints, and a fairly low incidence of deer vehicle collisions. There is a high demand for deer management permits, which far exceeds the level DEC issues in order to maintain the population near the level set by the Citizen Task Force.

DEC collects data from successful big game hunters who report their kill. DEC also obtains information on the deer harvest by inspecting deer through road checks and at meat processors. From this information, DEC is able to estimate the deer harvest and the buck take per square mile for each county, town and WMU in the state. Recent deer harvest information is contained in Tables 2 and 3 in Appendix II.

4. Invertebrates

One of the most rapidly growing areas of wildlife interest among the public is in the area of invertebrate watching. Typically, butterflies, diurnal moths, dragonflies and damselflies are targeted. There have been no formal surveys of the many invertebrates which occur on these State Forest lands. DEC has had an interest in assembling a statewide butterfly atlas, which has been done in other states, including Connecticut.

D. Wetlands and Water Resources

In New York State, freshwater wetlands qualify for mapping and protection if they meet the criteria found in Environmental Conservation Law (ECL) Section 24-0107, the Freshwater Wetlands Act. In general, wetlands must be at least 12.4 acres in size to merit protection under NYS law, though smaller wetlands can also be mapped and regulated if they are determined to be of "unusual local importance". The Charleston Unit includes almost all of two mapped wetlands, as well as portions of thirteen mapped wetlands. An additional two mapped wetlands adjoin State property boundaries, but are not mapped as occurring on State land itself.. Please see Table 4 in Appendix II for more information on the wetlands found on each State Forest in the Charleston Unit.

Freshwater wetlands are protected because of the benefits they provide to the people of New York. Not all wetlands provide these benefits equally. Article 24 of the Environmental Conservation Law requires that the Commissioner classify wetlands in a way that recognizes that all wetlands are not of equal value. The act establishes four ranked classes of wetland depending on the degree of benefits supplied. The benefits are translated into specific characteristics. Each wetland is classified based on the presence of these characteristics (Freshwater Wetlands Maps and Classification Regulations, 1980). Please see Appendix VII for more details on the wetland classification system. The regulations for Class I wetlands are more restrictive than those for Class II wetlands, which are more restrictive than those for Class III wetlands, etc.

Of the 15 wetlands occurring on State property, 11 are designated as Class II wetlands, while four are designated as Class III wetlands. Class II characteristics identified for these wetlands include: flood control, being one of the three largest wetlands in the Town, or containing two or more wetland structural groups. Actually, all wetlands which occur on State Forest land should be identified as at least a Class II wetland, by virtue of their location on a publicly owned recreation area [6NYCRR Part 664.5(b)(17)].

1. Small Wetlands - Wildlife Marshes

The Charleston State Forest contains 11 wildlife marshes that were constructed in the 1950's under Federal Aid to Wildlife programs. The intention of these marshes was to provide habitat for wildlife, particularly waterfowl. These marshes typically include a dike, as well as an outlet structure that allows for manipulation of water levels. At the time of their creation, beaver were absent from much of New York State. Since that time, beaver have re-occupied most of New York State, including most of these marshes. Beaver activity has resulted in plugged water control structures on most of the wildlife marshes. The control structures that are plugged require maintenance so that the level of water in the marsh can be controlled. Please see Table 5 in Appendix II for a list of the wildlife marshes on the Charleston State Forest.

2. Streams

The Charleston Unit encompasses portions of Auries Creek, Wilsey Creek, Yatesville Creek, and ten unnamed streams that total 9.3 miles. The streams found on the Charleston Unit are listed in Table 6, Appendix II. None of the stream reaches located within the State Forests provide sportfishing opportunities nor have they ever been surveyed. Many of these stream reaches are most likely intermittent or dry.

3. Lakes and Ponds

Featherstonhaugh Lake, located in the Featherstonhaugh State Forest, is a 38 acre warmwater lake having a maximum depth of 9.5 feet. It is a eutrophic lake subject to significant periodic winter fish kills which have occurred in 1982, 1994, and 2003. These were not complete fish kills and fish populations rebounded fairly quickly.

The lake was last sampled in 1983. Largemouth bass were the only game fish species present and they were common. Panfish species included black crappie, bluegill, brown bullhead, pumpkinseed, rock bass, and yellow perch. Bluegill and pumpkinseed were abundant. Golden shiners were the only non-sport fish species present.

There is no designated boat launch site on Featherstonhaugh Lake. However, there is a nearby parking area with a carry of 70 feet to the lake that car-top boaters can use to access the lake.

Some of the 11 wildlife marshes on the Charleston State Forest have open water areas that may be fishable. However, there are no records showing that these areas were stocked with fish nor have the open water reaches ever been surveyed to determine the status of fish populations. Presumably, these wetland areas are relatively shallow and would be subject to frequent catastrophic winter fish kills if fish were present. The high probability of frequent winter fish kills negates the potential of these wetland areas to provide any significant sportfishing opportunities.

Statewide angling regulations apply to all waters within Charleston Unit. They are as follows for regulated species:

- Black bass, open season of 3rd Saturday in June through November 30th, 12 inch minimum total length, and a daily limit of 5 fish.
- Sunfish, open season all year, any size, daily limit of 50 fish.
- Crappie, open season all year, 9 inch minimum total length, daily limit of 25 fish.
- Yellow perch, open season all year, any size, daily limit of 50 fish.

E. Endangered, Threatened, and Special Concern Species

There are no significant habitats currently identified by the New York State Natural Heritage Program database for any of the State Forests covered by this Unit Management Plan. However, a portion of the Featherstonhaugh Lake wetland complex has been identified as an area of interest. This wetland contains a wide variety of structural types, including red maple swamp, submergent marsh, emergent marsh, open water, and in particular, a bog wetland located along the west and south shore of the six acre lake. The floating bog mat contains black spruce, as well as pitcher plant and sundew, both insectivorous plants. The wide variety of habitat types in turn attract a wide variety of wildlife. In particular, Featherstonhaugh Lake is an important area for migrating waterfowl and other water associated birds. A decision regarding classification of this wetland complex as a Significant Natural Community will not be made until a formal Natural Heritage survey of the area is completed. Currently, a formal survey is scheduled for 2008.

Portions of the Lost Valley State Forest provide a habitat of significance as a deer wintering area. Historically, the Burtonsville area along the Schoharie Creek and valley has been an important deer wintering area. In recent years, the use of traditional deer wintering areas has declined, probably due to the many mild winters which have allowed deer to move freely and remain more dispersed than in the past. Its location immediately adjacent to the Burtonsville area, the

mixture of mast producing trees such as red oak and shagbark hickory, the presence of conifer plantations which provide thermal cover and areas of reduced snow depth, as well as the slopes and ravines associated with the primary stream and unnamed tributaries, indicate that the Lost Valley State Forest provides many of the key attributes of deer wintering areas. The only critical element of deer wintering areas present in limited amounts is south and west facing slopes.

1. Birds

The Breeding Bird Atlas has identified four threatened species and ten special concern species that were found in atlas blocks which included portions of Reforestation Areas in this Unit. The threatened species are Pied-billed Grebe, Henslow's Sparrow, Northern Harrier, and Upland Sandpiper. These latter three species are grassland birds, which are not likely to be found on State Forest land, due to the general absence of grassy fields and meadows. Harriers are associated with wetlands, and several of the State Forests include beaver meadows which might prove attractive for nesting or hunting. The Pied-billed Grebe is a species found in marshlands. Wetland CA-7 at Rural Grove State Forest, which occurs in the same atlas block as this species record, does contain marsh habitat that could be attractive to grebes. However, this wetland is not currently occupied by beaver, with the result that the amount of open water is fairly limited.

In addition to those threatened species identified as breeders, Bald Eagles winter along the Schoharie Creek, in close proximity to Lost Valley State Forest. There are no recent records of Bald Eagles nesting along the Schoharie Creek or Mohawk River, though DEC wildlife biologists anticipate that eventually this will occur as eagle populations continue to expand in numbers and geographic range.

Of the ten special concern species, three woodland hawks are likely to occur on State Forest land. These include the Sharp-shinned Hawk, Red-shouldered Hawk, and Northern Goshawk. The Sharp-shinned was recorded as a possible breeder in three blocks, and a probable breeding in one block. The records for the other two hawks were of possible breeders. The Red-headed Woodpecker was recorded as a probable breeder in a single atlas block which includes portions of Charleston State Forest. This colorful woodpecker prefers open deciduous woods and wooded swamps with dead trees and stumps, as well as beaver ponds. Due to the amount of wetland and beaver activity at Charleston State Forest, these habitats are quite common. The other six species of special concern all prefer grassland or early successional brushy habitats, which are common on private lands in this area of Montgomery & Schenectady Counties, but are very limited on State Forest lands. It is unlikely that these birds occur on State lands, or that it would be feasible to establish sufficient suitable habitats for them on State lands due to the extensive tree cutting and habitat modification required.

Please see Table 7 in Appendix II for more information on the threatened and special concern bird species mentioned above.

2. Amphibians and Reptiles

Based on the current data, there are no records of endangered or threatened reptiles or amphibians occurring within the vicinity of State Forest lands covered by this Unit Management Plan. There are two records of a special concern species - Jefferson salamander and Jefferson salamander complex, a hybrid with the blue-spotted salamander. Both of these records came from survey units which included Featherstonhaugh State Forest. Both the Jefferson and blue-spotted salamanders are fossorial, which means they spend much of the year in forested areas buried under leaf litter, logs, or the soil. They are most likely to be observed in early spring when they move to ponds to breed.

It is also possible that the wood turtle (special concern) occurs on many of these forest units. Wood turtles are widely distributed throughout the State (Figure 1, Appendix II) , though they are difficult to find due to their habits. They prefer wooded streams and forested wetlands, though they can range across fields and upland wooded areas during the summer.

3. Mammals

There are two listed species of mammals which may occur on or near State lands. The first of these is the Indiana bat, which is listed as both state and federally endangered. There is a known winter hibernaculum of Indiana bats in western Albany County, which is situated about 11 miles from Featherstonhaugh State Forest and between 18 and 25 miles from the four State Forests in Montgomery County. Indiana bats disperse widely from wintering sites to summer roosts and maternity colonies - they are capable of moving several hundred miles. Recent radio telemetry work on wintering Indiana bats in Essex County has shown that females moved an average of 16.2 miles (range 8.8 to 24.0 miles) to summer maternity roosts (NYSDEC Endangered Species Investigation 2002-2003). In summer, Indiana bats roost under the loose bark of trees in semi-wooded areas, upland or bottomland forests. Preferred roost trees are red oak, shagbark hickory, silver maple, cottonwood, sugar maple, white oak and American elm. Both dead and living trees can be used as roost sites though dead trees are preferred. In Illinois, 32 of 48 identified roost trees were in closed canopy forests, while 12 were in forests with 30-80% closure (Gardner et al. 1991 *in* Whitaker and Hamilton 1998).

The second species, listed as special concern, is the small-footed bat. This bat has been located during hibernation in a cave less than two miles from Yatesville Falls State Forest, and about four miles from Rural Grove State Forest. It is also known from several caves in western Albany County, including the same cave discussed above where Indiana bats also hibernate. Hitchcock (1955) recovered a small-footed bat ten miles away, and another 12 miles away, from a cave where they had been banded in winter. Little is known about summer habitat preferences. They are most commonly, though not always, found in mountainous areas. In South Dakota, they roost in small numbers in horizontal cracks in rocks on hillsides, crevices in the walls of vertical banks, and in sloping banks. In Ontario, a summer roost was found behind a sliding barn door. (Whitaker and Hamilton, 1998). This bat is reported as feeding over water, and among trees (Saunders, n.d.).

F. Roads

The State Forest road system provides for both public and administrative access to the Unit. The roads are constructed to standards that will provide reasonably safe travel and keep maintenance costs at a minimum. There are three types of roads, including public forest access roads, haul roads and access trails. Each provides different levels of access, depending on the standards to which they are constructed.

Public forest access roads are permanent, unpaved roads. They may be designed for all weather use depending on their location, surfacing, and drainage. These roads provide primary access for administration and public use within the Unit. The design standards for these roads are as provided in DEC's Unpaved Forest Road Handbook (see Appendix XVIII). As a general guideline, sufficient access is typically achieved when 1 mile of public forest access road is developed for each 500 acres of State land, and no position within the Unit lies more than one half mile from a public forest access road or public highway. This general guideline may not be appropriate for every situation, and may not be required on every State Forest area.

Haul roads are permanent, unpaved roads which are not designed for all-weather travel, but may have hardened or improved surfaces with artificial drainage. They are constructed according to best management practices primarily for the removal of forest products, providing limited access within the Unit by log trucks and other heavy equipment. These roads may or may not be open for public motor vehicle use, depending on management priorities and objectives. They may serve as recreational access corridors, but are not maintained according to specific standards or schedules. The design standards for these roads are as provided in the Unpaved Forest Road Handbook (see Appendix XVIII).

Access trails are temporary, unpaved roads which do not provide all-weather access within the Unit. They are not designed for long term and repeated use by heavy equipment. These corridors were originally constructed for the seasonal removal of forest products by skidding to landings or other staging areas. Constructed according to best management practices, these trails may be used to support other management

objectives such as recreational access corridors. Maintenance is limited to activities which minimally support seasonal access objectives.

There are approximately six miles of unmaintained Town roads on the portion of the Unit that is within the Town of Charleston. Although the Town hasn't maintained these roads in years, they were never formally abandoned and are still on the Town of Charleston Highway Inventory. These roads are the primary access to much of the Charleston State Forest and more than half of the Rural Grove State Forest. Because the Town has not maintained these roads, in some cases the DEC has been forced to maintain them in order to keep them open for administrative and sometimes public access. Depending on their current condition, the mileage of these roads has been included in the list below either under "Public Forest Access Roads" or "Haul Roads" and their names appear under "State, County, and Town Roads".

The following roads are located within the Unit:

Public Forest Access Roads (See Appendix VIII for locations)

Montgomery Reforestation Area #2 - 3.8 miles
Montgomery Reforestation Area #3 - 1.2 miles

Haul Roads

Montgomery Reforestation Area #1 - 6.1 miles
Montgomery Reforestation Area #2 - 1.1 miles
Montgomery Reforestation Area #4 - 1.3 miles

Access Trails

Montgomery Reforestation Area #1 - 23.0 miles
Montgomery Reforestation Area #2 - 2.0 miles
Montgomery Reforestation Area #3 - 2.1 miles
Montgomery Reforestation Area #4 - 4.7 miles

State, County, and Town Roads (See Appendix VIII for locations)

Montgomery Reforestation Area #1:
- State Route 30A
- Burtonville Road
- Butler Road
- Crane Road (unmaintained)
- Esperance Road
- Fox Street (portion unmaintained)
- Gidley Road
- Gillen Road (portion unmaintained)
- Gordon Road
- Hughes Road
- Robinson Road
- Sara Lib Road (portion unmaintained)
- South Johnson Road

Montgomery Reforestation Area #2:
- Carron Road (portion unmaintained)
- Shibley Road (unmaintained)
- Logtown Road

Montgomery Reforestation Area #3:
- Anderson Road
- Logtown Road

Montgomery Reforestation Area #4:
- Goewey Road

Schenectady Reforestation Area #1:
- Tidball Road
- Lake Road

Maximum speed limit on public forest access roads is 25 m.p.h. Section 190.8(m) of the New York Code Rules and Regulations, Title 6 states: "Use of motor vehicles on State land under the jurisdiction of the Department of Environmental Conservation outside the Forest Preserve is prohibited, except where specifically permitted by posted notice or by permit issued by the Department." The DEC sign "Motor Vehicle Trail" shall be the posted notice permitting motor vehicle use on the public forest access roads on this Unit.

No haul roads or access trails are posted for vehicular use. Vehicles are permitted only on the posted public forest access roads, State roads, County roads, and Town roads on the Unit.

G. Recreation

Various recreational opportunities exist throughout the Unit, including hunting, nature observation, trapping, cross-country skiing, fishing, camping, hiking, snowmobiling, horseback riding, mountain biking, and access trails for people with mobility impairments.

1. Designated Trails (See Appendix IX for locations):

Montgomery RA #1
- 22.8 miles of designated cross county ski trails
- 4.7 miles of designated snowmobile trails

Montgomery RA #4
- 2.2 miles of access trail specifically designated for mobility impaired use (CP-3 Trails)
- 2.0 miles of designated snowmobile trails

Schenectady RA #1
- 3.7 miles of designated cross country ski trails
- 1.4 miles of designated snowmobile trails
- 0.2 miles of graveled access trail specifically designated for mobility impaired use (CP-3 Trail)

H. Other Facilities

1. Wildlife Viewing Area

In 1996, the Bureau of Wildlife oversaw the construction of a Wildlife Viewing Area at Featherstonhaugh Lake. The site improvements consist of a small parking lot, informational kiosk, graveled trail, floating dock, and an observational platform on the shore of the lake. The NYS Department of Transportation cooperated by installing directional signs with the standard Watchable Wildlife binoculars logo on State Route 20 and State Route 159. This site has proven to be very popular with the public.

2. Boundary Lines

The Charleston Unit includes a total of approximately 64 miles of State land boundary. Please see Table 8 in Appendix II for a break down of miles of boundary by State Forest area.

3. Forest Identification Signs

Forest identification signs are large, wooden signs with yellow lettering that indicate the name of the State Forest and its approximate acreage. They are generally located at points where main roads intersect State Land boundaries and at major State Land access points. The forest identification signs found on the Charleston Unit are as follows (See Appendix X for locations):

Montgomery Reforestation Area #1 - 7 signs
Montgomery Reforestation Area #2 - 2 signs
Montgomery Reforestation Area #3 - 1 sign
Montgomery Reforestation Area #4 - 1 sign
Schenectady Reforestation Area #1 - 3 signs

4. Other Facilities

Gates (See Appendix X for locations):
Montgomery Reforestation Area #1 - 6 gates
Montgomery Reforestation Area #2 - 4 gates

Cemeteries
Montgomery Reforestation Area #1 - 1 cemetery
Montgomery Reforestation Area #2 - 1 cemetery
Montgomery Reforestation Area #3 - 1 cemetery
Montgomery Reforestation Area #4 - 2 cemeteries

Bridges (See Appendix X for locations):
Montgomery Reforestation Area #1 - 8 cross country ski bridges

I. Other Uses

There are three shale pits in the Charleston Unit. One is located off Sara Lib Road on Montgomery Reforestation Area #1, one is located off the haul road on Montgomery Reforestation Area #4, and one is located off of Butler Road on Montgomery Reforestation Area #4 (See Appendix X for locations). Small amounts of shale from these pits is occasionally used to surface the public forest access roads, haul roads, and log landings on the State Forests in the Unit. Not more than 750 cubic yards of material is removed from any one shale pit in a year. When shale from any of these pits has been depleted or when the pits are no longer needed, the pits will be reclaimed according to the plan in Appendix XI. The shale pits on this Unit will not be ready for reclamation within the next 20 years.

J. Property Records

Please see Appendix XII for a summary table of the individual parcels that comprise this Unit. Please see Appendix XIII for information on the property taxes paid on the taxable State land on this Unit. Please note that the Featherstonhaugh State Forest was acquired as multiple use and therefore the acreage of that area is not taxable.

The following is a summary of known right of ways and/or easements in the Charleston Unit. Please note that this summary in no way excludes other easements and right of ways that may exist which DEC Region 4 Bureau of Real Property is unaware of at the present time.

Montgomery Reforestation Area #1:
Proposal "P" - Power Line ROW
Proposal "Q" - Power Line ROW
Proposal "S" - Power Line ROW
Proposal "T" - Telephone Easement
Proposal "AA" - ROW of Others

Montgomery Reforestation Area #2:
Proposal "C" - Cemetery Plot
Proposal "G" - Possible ROW of Others to wood lot

Montgomery Reforestation Area #3:
None noted

Montgomery Reforestation Area #4:
None noted

Schenectady Reforestation Area #1:
Proposal "B" - Driveway encroachment and unrecorded utility easement

Proposal "D" - Judith Lane crosses State land for access to cottage lots of the State and others

K. Archaeological and Historical Sites

The term cultural resources encompasses a number of categories of human created resources including structures, archaeological sites and related resources. The Department is required by the New York State Historic Preservation Act (SHPA) (PRHPL Article 14) and SEQRA (ECL Article 8) to include such resources in the range of environmental values that are managed on public lands.

On lands managed by the Division of Lands and Forests, the number of standing structures is limited due to the nature of land use. Often those that remain are structures that relate to the Department's land management activities such as fire towers, "ranger" cabins and related resources. There are no standing structures on the Charleston Unit.

Archaeological sites are, simply put, any location where materials (artifacts, ecofacts) or modifications to the landscape reveal evidence of past human activity. This includes a wide range of resources ranging from precontact Native American camps and villages to Euroamerican homesteads and industrial sites. Such sites can be entirely subsurface or can contain above ground remains such as foundation walls or earthwork features.

As a part of the inventory effort associated with the development of this plan the Department arranged for the archaeological site inventories maintained by the New York State Museum and the Office of Parks, Recreation and Historic Preservation to be searched in order to identify known archaeological resources that

might be located within or near the Unit. The two inventories overlap to an extent but do not entirely duplicate one another. The purpose of this effort was to identify any known sites that might be affected by actions proposed within the Unit and to assist in understanding and characterizing past human use and occupation of the Unit. No inventoried resources are located within the Charleston Unit.

The quality of the site inventory information varies a great deal in all respects. Very little systematic archaeological survey has been undertaken in New York State. Therefore all current inventories must be considered incomplete. Even fewer sites have been investigated to any degree that would permit their significance to be evaluated. Many reported site locations result from 19th century antiquarian information, artifact collector reports that have not been field verified. Often very little is known about the age, function or size of these sites. This means that reported site locations can be unreliable or be identified as encompassing a large area. Should systematic archaeological inventory be undertaken at some point in the future it is very likely that additional resources will be identified.

The archaeological sites located within this land unit as well as additional unrecorded sites that may exist on the property are protected by the provisions of the New York State Historic Preservation Act (SHPA - Article 14 PRHPL), Article 9 of Environmental Conservation Law, and Section 233 of Education Law. No actions that would impact these resources are proposed in this Unit Management Plan. Should any such actions be proposed in the future, they will be reviewed in accordance with SHPA. Unauthorized excavation and removal of materials from any of these sites is prohibited by Article 9 of Environmental Conservation Law and Section 233 of Education law.

The archaeological sites located on this land unit as well as additional unrecorded sites that may exist on the property will be made available for appropriate research. All future archaeological research to be conducted on the property will be accomplished under the auspices of all appropriate permits. Research permits will be issued only after consultation with the New York State Museum and the Office of Parks, Recreation, and Historic Preservation. Extensive excavations are not contemplated as part of any research program in order to assure that the sites are available to future researchers who are likely to have more advanced tools and techniques as well as different research questions.

Although the New York State site location map lists no known archaeological or historical sites on the Unit, there are five cemeteries and numerous old house foundations and stone walls located on the Unit. The cemeteries are all located in wooded areas and usually consist of 10 to 15 headstones surrounded by low stone walls. The old house foundations are typically overgrown with shrubs and their locations are not as obvious as the cemeteries.

Protection of cultural resources of historic significance is provided for under the New York State Historic Preservation Act. Procedures for review and assessment of impacts are provided under the State Environmental Quality Review Act. Assistance in reviewing sites is available through the New York State Department of Parks, Recreation and Historic Preservation, Field Services Unit.

MANAGEMENT CONSTRAINTS AND RESOURCE DEMANDS ON THE UNIT

The Charleston Management Unit offers a number of diverse resources. Legislation, industry, individuals and DEC alike have influence on these resources. The flexibility of management programs is governed by the degree of restrictions imposed by legislative mandates and Department policies, rules and regulations.

A. Management Constraints

The management plan has been developed within the constraints set forth by the Environmental Conservation Law (ECL), Rules and Regulations of the State of New York, and established Policies and Procedures for the administration of the lands involved. The following is a list of applicable laws, rules, regulations and policies which govern specific management actions of the Unit.

1. Environmental Conservation Laws

ECL Article 8 - Environmental Quality Review
ECL Article 9 - Lands and Forests
ECL Article 11 - Fish and Wildlife
ECL Article 15 - Water Resources
ECL Article 23 - Mineral Resources
ECL Article 24 - Freshwater Wetlands
ECL Article 33 - Pesticides
ECL Article 51 - Implementation of Environmental Quality Bond Act of 1972
ECL Article 52 - Implementation of Environmental Quality Bond Act of 1986
ECL Article 71 - Enforcement

2. Parks, Recreation & Historic Preservation Law

Article 14
Chapter 354-Cultural and Historic Resources

3. New York Code, Rules and Regulations

Title 6
Chapter I - Fish and Wildlife
Chapter II - Lands and Forests
Chapter III - Air Resources
Chapter IV - Quality Services
Chapter V - Resource Management Services
Chapter VI - State Environmental Quality Review
Chapter VII - Subchapter A - Implementation of EQBA of 1972
Chapter X - Division of Water Resources

4. Department Policies - Divisions of Lands and Forests and Fish, Wildlife and Marine Resources

Adopt-A-Natural Resource
Public Use
Temporary Revocable Permits
Commissioner's Policy #3 (CP-3)
Motor Vehicle Use
Timber Management
Unit Management Planning
Pesticides
Prescribed Fire
Draft State Forest Master Plan
Inventory
Acquisition
Road Construction
Fish Species Management Activities
Habitat Management Activities
Public Use Development Activities
Wild Species Management

5. Permanent and Ongoing Uses

The following are of a permanent or ongoing nature which are regulated by Legislative Action, Memoranda of Understanding, Deeded Rights, Leases or Easements:

Electrical Transmission and Telephone Lines
County and Town Roads
Deeded Rights-of-Way
Deeded Water Rights
Ongoing Forest Products Agreement Contracts
Cooperative Research Projects

B. Resource Demands

Within the constraints listed above, the legislative mandates allow a flexibility of management actions. This flexibility provides the opportunity to balance the available resources with the usage demands from public and industrial sources. The following show the actual and perceived demands on the resources that have formulated the objectives and resultant management actions contained in this plan.

1. Protection of Natural, Historic and Archaeological Resources

There is recognition that protection of soil and water resources is of critical importance. Water quality is important for the welfare of all users, including wildlife, and enhances the enjoyment of water-based recreational pursuits.

Soils are a fundamental component of biological productivity on the area. Any activities with the potential to cause excessive erosion or reduce soil fertility must be carefully planned and executed to reduce or eliminate such erosion.

The area has supported human populations since the end of the last ice age. Artifacts of historic and prehistoric origin are present or may be present in some areas. Because of their cultural significance, disturbance of cultural resources will be avoided when possible. If it is necessary to disturb cultural resources, efforts will be taken to keep such disturbance to a minimum. The Department's Archaeological officer will be consulted in these cases.

NYS Archaeological Site inventory maps will be checked to identify sites. Visual checks will be made before any harvesting or construction operations take place and a buffer zone will be maintained around archaeological and historic sites where possible.

2. Public Use and Recreation

State Forests are open for the use of the public with no entry fees and few restrictions. As subdivision, development and posting of surrounding private land continues, the recreational value of State Forests increases. Recreational demands on the Charleston Unit that have been identified include:

- Hiking, snowmobiling, cross-country skiing, horseback riding, mountain biking, nature observation, hunting, fishing, and trapping.
- Watchable Wildlife opportunities.
- Scientific study, research, and education.
- General nature observation and aesthetic appreciation opportunities.

More detailed information regarding trends in hunting and trapping across New York State is contained in Table 9, Appendix II.

3. Plant and Animal Habitats

The value of maintaining healthy populations of both plants and animals is generally well accepted. The State has a mandate to protect and manage species that are endangered, threatened or of special concern.

4. Timber Resources

There is a strong market for most of the variety of wood products which are found on State lands. Over the past two decades, the demand for hardwood sawtimber, red pine logs and utility poles, and spruce sawlogs has increased. The demand for spruce pulpwood is not currently stable, while the demand for red pine pulpwood and hardwood fuelwood has decreased.

5. Education and Research

It is well recognized that the ultimate survival of the human species depends on a healthy environment. Yet, serious study of the ecosystem as a science began less than a century ago. More information and greater understanding is needed.

As the world's population and standard of living grows, greater pressure is inevitably put on land, water and forests. This pressure is reflected by increasing use of the area for all types of recreation and by substantial increases in the price received for wood products. In many parts of the world these increasing demands result in conflicts and loss of natural habitat.

There is an opportunity to use the Charleston Unit as an example of the successful integration of natural use and natural resource protection. If effectively communicated, this will help the public to understand that it is possible to use resources without compromising the viability of the ecosystem. The Department will cooperate with colleges and other groups to assist in research and by providing an outdoor laboratory setting for such study.

THE GOAL OF MANAGEMENT

It is the policy of the Department to manage State Forests for multiple uses to serve the needs of the People of New York State. This management will be carried out on a landscape level to ensure the biological diversity and sustainability of the forest ecosystem, and to optimize the many benefits to the public that forest lands provide. This goal will be accomplished through the applied integration of compatible and sound land and forest management practices.

OBJECTIVES

State Forests are managed for multiple uses including watershed protection, wildlife, timber crops, recreational use, and other kindred purposes. The objectives which are listed below are derived from the previously identified resource demands and the management goal statement. They form the basis for the schedule of management actions which follow.

A. Protection Management

A fundamental aspect of State land management is to ensure that the basic environmental integrity of the land is not damaged since it forms the basis for all life forms. The following objectives will ensure that both the cultural and biological resources that are present on the Unit will be protected from detrimental activities:

- Protect 732 acres of wetlands and ponds.
- Protect water quality on the Unit through the implementation of the New York State forestry best management practices. These best management practices (BMPs) are outlined in the New York State Forestry BMP Field Guide printed in January of 2000.
- Protect the forests against damaging fires, insects and diseases using integrated pest management principles.
- As resources permit, additional surveys will be made to determine if there are any rare, threatened and endangered plant and animal species on the Unit. Public input on the occurance of these species is welcome. If sensitive species are found, they will be protected and, where appropriate, habitat may be manipulated to improve their chances of survival.
- Protect cultural resources (cemeteries, etc.), where they exist, as provided for under the New York State Historic Preservation Act. Protect old house foundations, mill sites, and stone walls when feasible.
- Protect State lands from encroachment by maintaining well marked boundary lines.
- Control vandalism, dumping, and other illegal activities by regular patrols of the area by Forest Rangers and other DEC staff.

B. Public Use and Recreation

1. General

The opportunity for public use and recreation is one of the most direct benefits that these lands provide to the public. The objectives listed below will provide for a number of recreational opportunities that are compatible with each other and consistent with the natural characteristics of the land.

- As resources permit, provide and improve access to the Charleston Unit.
- Provide maps and informational brochures on the Unit.
- Identify State land by maintaining boundary lines, posting State Forest signs along public highways and by maintaining State Forest identification signs.
- Continue present recreational opportunities.
- Provide additional opportunities when they are or can be made to be compatible with the other uses on the Unit.
- Limit access or recreational opportunities where degradation of the Unit's resources are occurring.
- Provide for trash pick-up on the Unit.
- Where possible, protect and enhance scenic resources including vistas, stone walls, large old trees, wildflower beds, etc.
- Provide opportunities for clubs and organized groups to participate in the Adopt-A-Natural Resource program.
- Identify and enhance opportunities for people with disabilities.

2. The Americans with Disabilities Act (ADA) and Its Influence on Management Actions for Recreation and Related Facilities

The Americans with Disabilities Act (ADA), along with the Architectural Barriers Act of 1968 (ABA) and the Rehabilitation Act of 1973; Title V, Section 504, have had a profound effect on the manner by which people with disabilities are afforded equality in their recreational pursuits. The ADA is a comprehensive law prohibiting discrimination against people with disabilities in employment practices, use of public transportation, use of telecommunication

facilities and use of public accommodations. Title II of the ADA applies to the Department and requires, in part, that reasonable modifications must be made to its services and programs, so that when those services and programs are viewed in their entirety, they are readily accessible to and usable by people with disabilities. This must be done unless such modification would result in a fundamental alteration in the nature of the service, program or activity or an undue financial or administrative burden to the Department. Since recreation is an acknowledged public accommodation program of the Department, and there are services and activities associated with that program, the Department has the mandated obligation to comply with the ADA, Title II and ADA Accessibility Guidelines, as well as Section 504 of the Rehabilitation Act.

The ADA requires a public entity to thoroughly examine each of its programs and services to determine the level of accessibility provided. The examination involves the identification of all existing programs and services and an assessment to determine the degree of accessibility provided to each. The assessment includes the use of the standards established by Federal Department of Justice Rule as delineated by the Americans with Disabilities Act Accessibility Guidelines (ADAAG, either adopted or proposed) and/or the New York State Uniform Fire Prevention and Building Codes, as appropriate. The development of an inventory of all the recreational facilities or assets supporting the programs and services available on the unit was conducted during the UMP planning process. The assessment established the need for new or upgraded facilities or assets necessary to meet ADA mandates. The Department is not required to make each of its existing facilities and assets accessible. New facilities, assets and accessibility improvements to existing facilities or assets proposed in this UMP are identified in the " Management Actions" section.

3. The Americans with Disabilities Act Accessibility Guidelines

The ADA requires public agencies to employ specific guidelines which ensure that buildings, facilities, programs and vehicles as addressed by the ADA are accessible in terms of architecture and design, transportation and communication to individuals with disabilities. A federal agency known as the Access Board has issued the ADAAG for this purpose. The Department of Justice Rule provides authority to these guidelines.

Currently adopted ADAAG address the built environment: buildings, ramps, sidewalks, rooms within buildings, etc. The Access Board has proposed guidelines to expand ADAAG to cover outdoor developed facilities: trails, camp grounds, picnic areas and beaches. The proposed ADAAG is contained in the September, 1999 Final Report of the Regulatory Negotiation Committee for Outdoor Developed Areas.

ADAAG apply to newly constructed structures and facilities and alterations to existing structures and facilities. Furthermore, it applies to fixed structures or facilities, i.e., those that are attached to the earth or another structure that is attached to the earth. Therefore, when the Department is planning the construction of new recreational facilities, assets that support recreational facilities, or is considering an alteration of existing recreational facilities or the assets supporting them, it must also consider providing access to the facilities or elements for people with disabilities. The standards which exist in ADAAG or are contained in the proposed ADAAG also provide guidance to achieve modifications to trails, picnic areas, campgrounds, campsites and beaches in order to obtain programmatic compliance with the ADA.

4. ADAAG Application

Current and proposed ADAAG will be used in assessing existing facilities or assets to determine compliance to accessibility standards. ADAAG is not intended or designed for this purpose, but using it to

establish accessibility levels lends credibility to the assessment result. Management recommendations in each UMP will be proposed in accordance with the ADAAG for the built environment, the proposed ADAAG for outdoor developed areas, the New York State Uniform Fire Prevention and Building Codes, and other appropriate guiding documents. Until such time as the proposed ADAAG becomes an adopted rule of the Department of Justice, the Department is required to use the best information available to comply with the ADA; this information includes, among other things, the proposed guidelines.

C. Wildlife Objectives

These objectives will ensure protection of wildlife resources and ample wildlife related recreational opportunities:

- Maintain and enhance important wildlife habitats, including those used by songbirds, reptiles, and amphibians.
- Maintain deer and beaver populations at a level compatible with the carrying capacity of their habitats, consistent with forest management and public use objectives.
- Maintain wildlife-related recreational opportunity for the public including hunting, trapping, wildlife observation and photography, and scientific study. Provide for 5,000 big game hunting, small game hunting and trapping visits/year on the Unit. Provide for 1,000 Watchable Wildlife visits/year at the Featherstonhaugh Wildlife Viewing site. Provide for 4,000 visits/year by birders, hikers, and other wildlife enthusiasts elsewhere on the Unit.
- Maintain and enhance populations of Endangered, Threatened and Special Concern wildlife species through a combination of habitat protection and management techniques.
- Maintain and enhance wildlife diversity by considering the needs of reptiles, amphibians, and birds in timber management decisions and by employing specific habitat management techniques.

D. Fishery Management Objectives

This objective will promote a healthy population of fish and ample fishing opportunities:

- Manage Featherstonhaugh Lake as a warmwater fishery for largemouth bass and panfish species to provide about 400-800 angler trips annually.

E. Forest Resource Objectives

These objectives will provide a sustainable yield of various wood products for the benefit of society, and will provide income and employment opportunities without compromising the overall health and productivity of the forest ecosystem.

- Work toward establishing a variety of tree species and age classes on the Unit in order to provide for biodiversity of both flora and fauna on a landscape basis.
- Work within the annual allowable cut for a sustained yield of wood products that is within the productive biological capacity of the forest and which does not significantly compromise other resource values.
- Manage 2,040 acres of the natural hardwood and the mixed natural hardwood/conifer types to develop even-aged forests with a maximum age class of approximately 100-120 years. As resources permit, these stands will be thinned every 20 to 30 years. Some acres presently in plantation will be converted to this type.
- Manage 1,006 acres of the natural hardwood and mixed natural hardwood/conifer types to develop all-aged forests with a maximum age class of approximately 120-150 years. These stands will also be thinned every 20 to 30 years, as resources permit.
- Manage 3,122 acres of conifer plantations. These acres are mostly made up of plantations established in the 1930's and plantations established in the past 20 years. As the 1930's plantations are harvested, the percentage of plantations on the Unit will be reduced over time from 44% to 25% of the total acreage of the Unit. Areas that are suitable for conifer plantations will be maintained as such. Most of the acreage which is not retained as conifer

forest will grow into even aged natural hardwoods. As resources permit, the conifer plantations will be thinned every 15 to 20 years with a final harvest scheduled for 80 to 100 years of age in a healthy stand.

- Maintain 169 acres in an open-brush or a grassland condition. Most of this acreage is made up of the road corridors and landings adjacent to the road corridors on the Unit. These areas are mowed and brushed on a semi-annual basis as resources permit to keep them in an open condition. Currently, this type of habitat makes up about 2% of the Unit. For wildlife benefits and sufficient habitat diversity, this habitat type should be between 5% and 12% of the total acreage of a given area. However, on a landscape basis, much of Montgomery County and Schenectady County are currently maintained in an open condition through ongoing agricultural use. Brushy and early-successional habitat are also plentiful in both counties where fallow farm fields are reverting to a wooded condition. Therefore, increasing this type of habitat on the Unit is not a primary management objective. However, if opportunities present themselves and resources permit, more acreage of this habitat type will be created and maintained. Some temporary habitat of this type (for 10-20 years) will be created when mature plantations or even-aged natural stands are harvested.
- Conduct a forest inventory program on a 10 year cycle as resources permit.

F. Education and Research Objectives

The following objectives will provide for opportunities to learn about the area and natural resource management:

- Encourage research and educational endeavors by accommodating researchers and educators where possible and appropriate.
- Provide information to the general public about the Unit through brochures, signs, and press releases.

INFORMATION IN SUPPORT OF THE GOAL AND OBJECTIVES

Article 9, Titles 5 and 7, of the Environmental Conservation Law authorizes the Department of Environmental Conservation to provide for the management of lands outside the Adirondack and Catskill Parks. Management as defined by these laws includes watershed protection, the production of forest products, recreation and kindred purposes.

For the Charleston Management Unit, the land management goal has been established in recognition of the legal mandate and also follows the guidelines set forth in DEC's draft State Land Master Plan. The goal incorporates the potential of the natural resources to provide benefits to as broad a constituent group as possible while maintaining a healthy environment over the long term. In meeting this goal, specific objectives have been listed to direct our management efforts. These objectives are a means of promoting biodiversity and maintaining the health of the plant and animal species on the Unit. The objectives will also expand public use opportunities on the Unit.

A. Protection Management

Protection of wetlands and the maintenance of water quality in several streams fulfill the watershed protection objectives on the Unit. These specialized habitats also add vegetative diversity to the ecosystem.

The objectives that ensure fire, insect, and disease control systems are in place will provide a reasonable measure of protection from unpredictable outbreaks of fire, diseases and insects, as well as providing for the controlled use of fire to accomplish vegetative manipulation.

Those objectives concerning the protection of rare, endangered and threatened plant and animal species, as well as the protection of cultural resources, take into account an increasing awareness that rare plant and animal species and cultural resources should be protected whenever possible.

B. Public Use and Recreation

These objectives provide direction for achieving public use of the Unit. Public use and recreation will be encouraged if the activities are compatible with the overall goal of management on State Forests and this plan. Additional recreation opportunities will be provided if and when they are compatible with the other objectives for this Unit. Present uses may be restricted if they become incompatible with other objectives or if those uses are causing resource degradation of the Unit.

C. Wildlife Management

The composition and structure of forest habitats are one of the primary factors influencing the distribution and abundance of wildlife species. The system of timber management employed on forest lands is the primary determinant of the character of the forest landscape, and their wildlife habitat value. Commercial timber sales are one proven way to manipulate forested habitats and wildlife populations on a large scale. Certain timber harvest strategies can increase diversity in tree species type, age, and size classes.

As in most State Forest lands, the early successional stages (grassy fields and shrub/scrub) are the most limited habitat type on the Charleston Unit in terms of overall acreage. Early successional stages are very important to deer, wild turkey, ruffed grouse, eastern cottontail, golden-winged warblers, and many other species. Young turkeys and grouse, as well as other birds, need to grow rapidly in a very short period of time in order to put on sufficient body weight and fat reserves to make it though the winter. Early successional fields and brushy areas are abundant in the insect foods these birds need. These areas provide food and cover from predators to vulnerable chicks, rabbits, and numerous species of frogs and toads. Since these habitats are relatively rare on the Unit, if opportunities present themselves and resources permit, we will take steps to create and maintain such areas.

In addition to mowing certain trails and roadsides and clear cutting plantations, small forest openings will be created through group selection cuts (GSCs) of 0.5 to 5 acres in natural stands managed under the uneven-aged management system described in the "Timber Management" section of this plan. These GSCs will either be incorporated into commercial timber harvests or will be accomplished through the use of either volunteer labor or inmate labor from the Summit Shock Facility. GSCs should be widely dispersed over the area, and irregularly shaped. A few years after harvest, these forest openings are typified by an abundance of grassy forage, woody browse, shrub cover and dead and down material from tree tops and branches (logging slash) left on the site. Blackberries, raspberries, and wild grape invade these cuts and are used by many wildlife species. Fruit-producing shrubs and trees, such as apples, viburnums, dogwood, blueberry, beech, black cherry, birch, maple, and hophornbeam will be encouraged. The explosion of growth which follows clear cuts allows species preferred by deer, such as maple, ash and oak, to grow above browse level and become established as future forest trees. While clear cutting typically initially decreases the attractiveness of an area to amphibians, due to loss of shading and decreased soil moisture, within a few years, these areas can greatly increase in their habitat suitability as vegetation begins to regrow. As dead and down material becomes moist and begins to decay, it provides important habitat for many amphibians which can also be attracted to the high numbers of insects found on such areas.

Habitat should be managed for diversity, an intermingling of habitats of different ages, sizes and types. Forests in which small clear cuts are created have a high degree of structural heterogeneity and edge. These areas are visually interesting, and can be good places to hunt, watch wildlife or hike.

In areas managed by small GSCs, there is a high level of plant species richness (diversity) due to a wide range of shade regimes which are present. The species most intolerant of shade will be found on the clear cuts, while shade-tolerant species will be found in the older stands. Forests managed with some clear cutting and long rotation length have the potential of benefitting the greatest number of wildlife species, including those that require early stage forest growth, intermediate stages, old growth, or a mixture of growth stages.

Forest openings may have an equal or greater aesthetic value and recreational value to the public than intrinsic value to wildlife. It is necessary to consider the wildlife and the recreational values of forest openings when deciding the nature, frequency, and distribution of openings to be included in the management scheme. Openings should comprise about 5 to 12 percent of the total acreage of an area to meet the needs of forest wildlife. In general, a larger number of small openings spread over the forest is better than a few larger ones. Given the current character of most of the State Forest, and the time and expense involved, it is highly unlikely that currently forested areas will be converted to grasslands, for example. However, there is the potential for the Department to acquire existing private properties that have been maintained in these habitats. If such is the case, it would be desirable to maintain these areas in early succession by periodic mowing.

Releasing and pruning apple trees and pear trees is a recommended practice to improve wildlife habitat. The apples are consumed by deer, wild turkey, grouse, and a great many other mammals. The buds, twigs and bark are consumed by birds and mammals. As previously farmed lands revert to forest, many apple trees become shaded out by other trees and eventually die. When releasing and pruning fruit trees, the brush can be used to form brush piles which provide wildlife cover for such species as rabbits and small mammals. Brush piles that are formed with an opening underneath them, by piling brush over a log, rock or stump, provide better cover than brush piled directly on the ground. Apple trees on many Region 4 State Lands are typically released by work crews from the Summit Shock Facility. Ideally, apple trees should be gradually pruned over a period of several years after they are released. Pruning trees the same year they are released, or pruning too heavily, can result in sun scald, which can cause loss of tree vigor or even kill the tree.

Where found, mature stands of aspen may be clear cut to improve habitat for ruffed grouse. Mature stands provide food in the form of catkins and buds, but intermediate-age stands are more beneficial. Once cut, aspens will quickly re-sprout, forming dense stands. It typically takes 8 to 12 years for the stands to thin out and become inviting to grouse. With thinning, the stands become available for brood cover. The stands are preferred by grouse until they are about 25 +/- years of age, and longer if there is a dense understory. Ideal stand size ranges from 1.0 to 2.5 acres. Management of forest lands for grouse can be very labor intensive and expensive due to the short cutting rotation required. For this reason, it is best accomplished on State Forest lands though cooperative agreements with private conservation organizations such as the Ruffed Grouse Society.

Snag and cavity trees are typically in short supply throughout any forest age class except for old growth forest, because it can take 60 to 100 years for these to develop. In addition, cavities rarely develop in conifers which comprise a large percentage of the forest cover on this Unit. For this reason, it is important to actively manage for production and retention of snag and cavity trees. While such snags may be seen as a safety hazard, and both snag and cavity trees do take up forest space that could otherwise be occupied by more productive trees, they are essential features of a diverse forest. For this reason, snags and trees with evidence of cavities will be maintained at a density of at least five trees per acre.

D. Fishery Management

Featherstonhaugh Lake is the only water body on the Charleston Unit that provides any significant sportfishing opportunities. Its proximity to Schenectady suggests that angler use could be potentially heavy at times. Part of the lake is privately owned and shoreline development could be potentially harmful absent regulatory review.

E. Timber Management

The harvest of pulpwood and timber is a basic and legislatively mandated objective as well as an important tool for achieving many of the other management objectives for the area. For example, the removal of trees by a logging contractor can be used to make openings in the forest to create wildlife habitat. Tree removal can also eliminate diseased or insect infested material that would otherwise spread to surrounding forest and can be the means by which storm damaged trees can be salvaged. The removal of slow growing trees stimulates the growth of residual trees, resulting in a healthier forest. Tree removal results in the creation of skid trails and woods roads which can subsequently

be used for recreational trails. Tree removal can be used to create conditions needed for the survival of specific species and thus contributes to the maintenance of biodiversity.

The acreages segregated by rotation age, hardwood/conifer type, plantation, open grassland and brush land, as well as snag retention rates, reflect the best information to date for the silvicultural requirements of various tree species and the habitat requirements of a variety of plant and animal species.

The two basic forest management systems that will be used to manage this Unit are the even aged system and the uneven or all aged system.

1. Even-Aged Natural Forest

In an even-aged stand, most of the trees are approximately the same age and have developed under full light conditions. The different age or size classes found on the Unit include seedling-sapling, intermediate, and large sized trees. Each of these size classes provide differing habitats for breeding, forage and shelter for a variety of animal species.

Approximately 58% of the acreage in the natural hardwood and natural hardwood/conifer cover types on this Unit are even-aged and will continue to be managed under an even-aged management system. Under this system, the stands will be maintained as single-aged through periodic harvests called intermediate harvests. Intermediate harvests will take place approximately every 20-30 years, depending on site productivity. These harvests will improve overall stand quality and vigor by focusing growth on the residual trees, and will be accomplished using the single tree selection method. Using this method, fewer trees are removed at each harvest as the stand matures. Once the stand reaches maturity, it will be harvested all at once, in a regeneration harvest. The determination of when a stand has reached maturity can be based on economics, biology, or desired tree size. The purpose of a regeneration cut is to completely remove the mature overstory and promote the development of the seedlings which will become the new forest stand. These seedlings may develop naturally or, in the case of a plantation, be planted. The method of the regeneration cut will depend on the species composition of the stand, and may be accomplished through clear cutting, shelterwood, or seed-tree cutting methods (Bakke, n.d.). Please see the Glossary of Terms in Appendix XIV for the definitions of these terms.

Currently, most of the natural, even-aged acreage on the Unit is in the intermediate size class. Eventually, through the regulation of these stands through intermediate and regeneration cuts, an equal amount of natural, even-aged acreage across the Unit in all age classes will be created. However, it will take several rotations (the time it takes for a stand to reach maturity) to achieve this condition because these stands will all be due for harvest at about the same time. This means that during the current rotation, some stands will grow beyond maturity.

2. Uneven-Aged (All-Aged) Natural Forest

In an uneven-aged stand, there are trees of several different age or size classes. Unlike the even-aged management system, a continuous cover of trees is maintained because there is no regeneration harvest. Seedlings are established through the creation of small openings of various sizes spread evenly throughout the stand. These openings are created through the harvest of single trees or small groups of trees, a method that is very similar to the single tree selection method used for even aged management. As with even-aged management, these intermediate harvests will take place every 20-30 years, depending on site productivity, and will improve overall stand quality and vigor by focusing growth on the residual trees. This management system is appropriate in stands of shade-tolerant species such as hard maple and hemlock, because the small size of the openings created only allows a limited amount of sunlight to reach the forest floor.

Uneven-aged natural stands can provide some of the characteristics of old growth forest (there are always large trees, dead snags, breaks in the canopy, etc. present) and they provide habitat for those species that require these characteristics. However, these stands are difficult to maintain because of excessive deer browsing of the new seedlings. Intermediate harvests in uneven-aged stands produce a small number of seedlings compared to the number of seedlings that can regenerate

in a even-aged stand that has had most or all of the overstory removed. In short, there aren't enough new seedlings produced to overcome the damage done by heavy deer browsing.

3. Plantation Forest

Plantations are another forest type that add to the diversity of the area. Benefits to wildlife include escape and thermal cover, roosting and nesting areas, and a food source. Plantation species are often best suited to the hilltop sites. Sixty year old plantations on these sites often contain three to four times the volume of timber of adjacent 100 year old hardwood stands. Plantations are managed under the even-aged management system. When they are harvested, they are allowed to regenerate naturally or new plantations are mechanically established. At the present time, there is not much age diversity within the plantation type on this Unit. Most of the plantations were established in the 1930's. Some of them, especially the red pine, are now biologically mature or approaching biological maturity. Some of these plantations will be harvested by clear cutting, resulting in the establishment of new forest stands. The reasons for doing this include the following:

- Once a stand of plantation pine has reached biological maturity, tree mortality is often extensive, occurring in just a few years. The dead and dying trees have little value for wood products, are often unsightly, constitute a fire hazard, and provide a breeding ground for insects that may threaten healthy trees. In addition, they may create a danger to humans recreating beneath them.
- As plantation pines and spruces reach maturity, their large crowns make them susceptible to windthrow and ice damage. The clay soils associated with this Unit cause trees to develop shallow root systems. These shallow root systems cannot support the heavy crowns of the trees during wind events and ice storms, resulting in blown over or snapped off trees.
- Young stands provide benefits, such as escape cover for some wildlife species, that are not provided by the older plantations. They also provide habitat for early successional species such as the golden-winged warbler and woodcock. Harvesting some of the older stands will increase the habitat diversity of the Unit.
- Young stands are more vigorous and less susceptible to insect and disease attack.
- Harvesting some of the mature stands now may alleviate future large scale mortality. In most cases, harvesting will be limited to blocks of 20 acres or less.
- Establishing new stands now will help ensure a future sustained yield of forest products. The goal is for these new stands to be producing forest products before the last of the 1930's plantations are harvested. The 1930's red pine plantations are scheduled to be harvested over the next 30 years. In the schedule of management actions, only the next 10 years of red pine harvests are listed. This schedule will be reevaluated at the end of that time. Surveys of the 1930's red pine plantations have shown reduced tree vigor in recent years. This is indicated by reduced growth rates and mortality. Red pine reaches biological maturity at an earlier age when it is growing in the heavy, wet, clay soils associated with this Unit. If there is increased mortality at the ten year reevaluation, the rate of cutting may be increased.

4. Other Protection Forest

There are 709 acres where timber harvesting will not take place. This acreage is comprised of wetlands and ponds and their surrounding areas, as well as some stream corridors. It also includes some areas where soil conditions are very wet and therefore are not conducive to timber management practices. The purpose of these "no harvest" areas is to protect fragile sites and also to provide acreage on the Unit that will be allowed to develop and mature without human intervention.

Adjacent to some of these untreated areas will be areas of the uneven aged forest type. These areas, even after a timber harvest, will only have small openings in the forest canopy. This will increase the area of relatively unbroken forest canopy, and when added to the acreage in untreated areas, should provide sufficient acreage for interior wildlife species requiring the large acreages of unbroken forest canopy.

MANAGEMENT ACTIONS

Management actions scheduled for the Unit are outlined below. Scheduled management actions to achieve the stated objectives are dependent upon several factors:

1. The markets for forest products are constantly changing. The treatment of some stands may be delayed by a lack of markets at the time of scheduled treatment. If markets develop for the products from stands that are presently considered non-commercial, these stands may be included in the cutting schedule.
2. Disease, insect or storm damage may necessitate unscheduled salvage actions.
3. Budget and personnel constraints may also delay scheduled management actions. These actions will be completed as soon as possible within these constraints.

PROTECTIVE ACTIONS

A. Insect and Disease

Authority to conduct forest insect and disease control activities is found in §9-1303 of the ECL and 6 NYCRR Part 190. The health of plant populations on the Unit will be maintained through the integrated pest management approach. Observations of harmful agents will be made and reported by State personnel. Public reports received may be investigated. Monitoring of problems will be performed. When warranted, appropriate control strategies will be developed to keep damage within acceptable levels.

B. Fire Control, State Land Security and Public Safety

An adequate level of program involvement will be maintained so as to assure minimum risk of loss to the forest and land resources, facilities and minimum risk to the public.

C. Temporary Revocable Permits

Authority for the issuance of temporary use permits is provided by §3-0301 of the ECL. Permits may be granted for the temporary use of State land by the public within stated guidelines and legal constraints so as to protect the State lands and their resources.

D. Wetlands

Protection of the significant benefits of wetlands will be sought by adhering to the requirements of Article 24 of the ECL and the provisions of the Federal Clean Waters Act. Please see the "Wetlands and Water Resources" section of this plan for more information on the presence of protected wetlands on this Unit.

State wetland laws regulate the clearing, grading, filling and other similar disturbance to mapped wetlands as well as such activities occurring within 100 feet of the wetland boundary. On State Forest land, the most typical activities that may occur in mapped wetlands which may be regulated include road and trail maintenance and repair, as well as certain timber harvest operations. The process of timber removal is not regulated either in the wetland or its 100 foot adjacent area, but clearcutting may not occur without a permit in such areas. Generally speaking, timber within a mapped wetland would most likely not be cut, but it may be necessary to remove timber from the area within 100 feet of the wetland boundary.

E. Watersheds

Efforts will be made where possible to protect streamside vegetation, stream beds, and the water purity of all continuously flowing streams. For maximum stream protection, the following practices are recommended:

- On hardwood sites, streamside vegetation will be left standing during logging operations unless it is necessary to remove it for a bridge or some other type of stream crossing. Care will be exercised when marking trees within 50 feet of any continuously flowing stream. No trees shall be marked within ten feet of any continuously flowing stream unless they are considered a hazard to the water course, a hazard to the public, or their removal is required in order to install a bridge or some other type of stream crossing.

- On conifer sites, it may not be possible to leave streamside vegetation uncut. For example, if a continuously flowing stream passes through a plantation that is to be clear cut, any trees left uncut along the stream will be subject to windthrow and ice damage. Blown-over trees and snapped off tree tops can block the stream channel and alter the course of the stream. In situations where a plantation adjacent to a continuously flowing stream is to be clear cut, the softwood trees adjacent to the stream will be removed. If there are hardwood trees mixed in with the softwoods adjacent to the stream, the hardwood trees will be left uncut if, in the opinion of the Forester, they are not likely to blow over once the softwoods are removed. If the clear cut area is to be replanted to softwoods, a 50' buffer on either side of the stream will not be replanted and will be allowed to revert to hardwoods. This will eliminate the need to clear cut trees next to the stream in the future.
- Harvesting equipment shall not be allowed in any stream except when crossing. Stream channels will not be altered.
- Skidding and harvesting equipment will be kept back from the stream edge at least 50 feet except at stream crossings. Any logs lying closer to the bank than this will be winched away. On slopes over 10%, skidders and harvesting equipment will be kept back 100 feet.
- Trees will not be purposely felled into or across streams. Trees and logging debris will be prevented from falling into stream channels and if any debris does fall into a channel, it will be removed immediately.
- Whenever a logging contractor must cross a classified stream, they will be required to obtain a permit from the DEC Environmental Permits Unit in compliance with Environmental Conservation Law Title 5 of Article 15. Temporary or permanent bridges will be encouraged for all crossings.

F. Cultural Resources

The Department has followed procedures established in concert with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) in determining the presence of cultural resources on this unit. This involved completion of the Structural-Archaeological Assessment Form (SAAF) and reviewing the New York State Archaeological Site Locations Map. OPRHP and the New York State Museum have been consulted in any instance where the Site Locations Map indicated an archaeological or historical site may occur on management unit lands. The SAAF will be updated at the time this plan is updated. The results of the SAAF evaluation indicated that no further cultural resources review is required.

Protection of cemeteries and old house sites will be provided for when planning timber harvests and construction projects. Major emphasis for the protection of stone walls will be placed on those walls that are well preserved. These walls will be protected by limiting damage during felling and skidding. New openings through the walls will occasionally be allowed where necessary.

The five cemeteries located on the Unit are maintained on a semi-annual basis through the use of inmate crews from the Summit Shock Facility. Cemetery maintenance performed by the inmates typically includes cutting grass and other vegetation and removing fallen limbs and debris that collects within the cemeteries.

G. Public Roads

The removal of logs and pulpwood from State land by logging contractors requires the use of trucks and public roads. Some of these roads are gravel roads without an adequate base and can be damaged by vehicular use during certain times of the year. In order to minimize the chance of damage, any active logging operations will be stopped during mud season. In addition, Section 320 of the Highway Law provides that private contractors will be held liable for any damage to public roads as a result of their activities.

H. Public Forest Access Roads

With the exception of the Yatesville Falls Access Road, the primary access roads for the Charleston, Rural Grove, and Lost Valley State Forests are in poor condition. The primary access roads for the Charleston and Rural Grove State Forests include approximately six miles of unmaintained Town of Charleston roads. Although they are used by the public and by the DEC to access these State Forests, they are not classified as

DEC roads because they are still on the Town of Charleston Highway Inventory. All of these roads have major drainage problems that are a result of poor layout, inadequate ditching, and years of little or no maintenance due to lack of resources. Scarcity of resources continues to be a problem and each year the condition of the roads deteriorates further.

The primary access road for the Rural Grove State Forest has been partially rehabilitated by the DEC. The rehabilitation process has to be spread out across multiple years due to monetary and manpower constraints. Gates have been installed on the road to control access until such time that the road can sustain traffic without damage. After the rehabilitation process is complete, the gates will be used to control access during the spring months and other periods of wet weather. Limiting access during these times will greatly reduce rutting and other maintenance issues.

Use of forest access roads by individuals with four wheel drive vehicles compounds the problem of road deterioration. Every time a vehicle drives down a muddy, rutted road, the mud and ruts become deeper and more widespread. Some individuals drive down these roads intentionally seeking out mud holes to drive through. This abuse compounds the drainage problems and further degrades the condition of the roads.

Another problem that arises from the use of these roads is the dumping of garbage and debris on State land. This is a widespread problem that is evident to anyone who has been on State land. The roads that are in poor condition are usually those that are not near any houses or camps. These more remote locations are typically the most popular areas for people to dump their garbage. The DEC equipment time, labor, and the dump fees required to clean up the garbage dumped on State land in this Unit can be more than $2,000 per year.

It is not likely that the significant resources required to repair these roads and make them safe for public travel will become available in the near future. Roads that the DEC has clear jurisdiction over that are determined to be in this condition may be closed using semi-permanent structures such as gates or large rocks. When a road is closed in this manner, signs will be posted indicating that a barrier is ahead and that the roads are closed to public traffic. If resources eventually permit the rehabilitation of these roads, they will be repaired and once again opened to public traffic.

The unmaintained Town roads mentioned above are not under the clear jurisdiction of the Department. The Department will discuss with the Town of Charleston the management options for these roads. In these instances, management options may include closure until such time that the resources to repair the roads become available.

Road rehabilitation projects will be carried out in such a way that the road will meet or exceed the public forest access road standards outlined in DEC's Unpaved Forest Road Handbook, which is available upon request from the Stamford DEC Office at 607-652-7365. Roads that are in the process of being rehabilitated may be temporarily closed while the work is in progress. This will ensure that the road will not sustain damage from vehicle traffic before it is fully rebuilt and able to handle public use.

Much of the damage done to forest roads is caused by vehicles driving on the road during the spring months when the conditions are wet and the frost is coming out of the ground. For this reason, some roads will be closed during the months of April, May, and June. Some roads may also be closed during the rainy season in the fall. Although this will limit vehicular access for hunters, it is a necessary measure to protect the roads and keep them in driveable condition for other users during other seasons.

A road that is temporarily closed will be closed with gates or large rocks as described above. Any public forest access road may be closed at any time if the condition of the road or trail is such that continued public use will degrade the quality of the road or trail and make it unsuitable for the use for which it is intended.

PUBLIC USE AND RECREATION ACTIONS

Public use shall be permitted and regulated according to provisions within 6 NYCRR Part 190, as well as special regulations that apply to forests on this Unit. When possible and desirable, logging activities will be used to increase recreational opportunities on the Unit. For instance, skid roads may be incorporated into the trail system and some landing areas may be used as parking or camping areas after logging is complete.

A. Charleston State Forest Cross Country Ski Trail System

There are approximately 23 miles of designated cross country ski trails on the Charleston State Forest. Portions of this trail system are also designated and maintained snowmobile trails. The trails were designed to be used by cross country skiers during the winter months when the ground is frozen and covered with snow. Although this trail system is frequently used during the warmer months by horseback riders, hikers, and mountain bikers, very little of the trail system is suitable for these uses. Many sections of trail are in areas that are poorly drained. As a result, they are wet and muddy during much of the spring, summer, and fall. When horses, hikers, and mountain bikers pass through these areas, they churn up the soil and create ruts and holes in the trail surface. These ruts and holes hold the water on the trail, thereby compounding the drainage problem. The cross country ski bridges that are on the trails are designed for cross country skiers and therefore cannot be used by people on horseback, so people that ride horses must ford the streams. This causes significant erosion and degradation of the unprotected stream banks.

Many of these drainage and erosion problems can be alleviated by either relocating sections of trail or installing corduroy and surfacing material on the problem areas. The corduroy would allow water to pass under the trail, while the surfacing material would provide stable footing for both horses and humans. Much of this work can be accomplished through volunteer efforts.

There are legal limitations on the use of the designated cross country ski trails. It is illegal to ride a horse on designated cross country ski trails or snowmobile trails when they are covered with ice or snow (6NYCRR 190.8 [n][3]). It is also illegal to ride a snowmobile on a designated cross country ski trail (6 NYCRR 190.8 [d]) unless the trail is also a designated snowmobile trail.

The condition of the trail system is degraded further every year because it is being used for recreational activities for which it was not designed. In order to accommodate the various user groups that currently use the cross country ski trail system and minimize the degradation of the resource, the following changes will be made:

- Approximately ten miles of the existing designated ski trails will also be designated as horse trails. These trails will be multiple use trails used by horseback riders during spring, summer, and fall, and by cross country skiers when there is snow on the ground. As resources permit, these trails will be improved and maintained to accommodate horseback riding. Please see Appendix IX for a map of the proposed designated horse trails. The locations of these trails is dependent on the completion of the work required to make them suitable for use by horses, so the proposed trail locations shown on the map may change. If this effort proves successful, more sections of the existing ski trails may be designated as horse trails and maintained as such.
- The rest of the existing designated ski trails, approximately 13 miles, will also be designated as foot trails. These trails will be used as hiking trails in spring, summer, and fall, and will be used as cross country ski trails when covered with ice or snow. As resources permit, these trails will be improved and maintained to accommodate hiking.
- After the initial ten miles of trail have been improved to sustain multiple uses including horseback riding, additional trail mileage may be improved, dependent upon the availability of the resources required to upgrade a trail from a foot trail to a horse trail.

All of the existing ski trails will be designated either

as foot trails or horse trails, and they will also continue to be designated as cross country ski trails. This will restrict horseback riding solely to those trails that are designated and maintained as horse trails and will significantly reduce the amount of damage done to the trail system on an annual basis.

The eight bridges on the ski trail system will be maintained as resources permit. Where the existing ski trails are also designated as horse trails, stream crossings for the horses will be accomplished by means of fording the stream. The ford may or may not be improved, depending on the soil and streambed conditions at the crossing site. Improvements will be limited in nature and may include geotextile fabric and stone.

B. Other Recreation Trails

Snowmobiling is a popular recreational activity on all of the forests that comprise this Unit. Currently, there are 7.4 miles of designated and maintained snowmobile trails on the Charleston (4.0 miles), Lost Valley (2.0 miles) and Featherstonhaugh (1.4 miles) State Forests. These trails are maintained by local snowmobile clubs through the Adopt-A-Natural Resource Program administered by the DEC (ECL section 9-0113).

The continuity of public snowmobile trails on private land is often compromised when new owners decide that they are unwilling to allow the public to cross their property. Relocating trails to state ownership, and securing long-term agreements such as trail easements are two approaches to addressing this issue. As resources permit, DEC will work with the local snowmobile clubs to improve the future security of the snowmobile trail system. This may require that some trails already designated as foot, horse, or cross country ski trails also be designated as snowmobile trails. It may also require new trail construction. During this process, DEC will take into consideration the needs of the various recreational user groups involved and the area's capacity to host such use.

During the winter months, there are many public forest access roads, haul roads, and access trails on the Charleston Unit that are commonly used by snowmobilers. When this UMP becomes effective, some of these roads and trails will be designated as snowmobile trails. See Appendix IX for maps that show some of these roads and trails. Designated snowmobile trails may be maintained by local snowmobile clubs through the Adopt-A-Natural Resource Program and are open to use by snowmobilers during the winter months, when they may be closed to other uses.

Where bridges are required on a designated recreation trail, they will be designed to carry the expected loads resulting from the designated use. Foot and ski trail bridges will be designed to carry pedestrians. Snowmobile trail bridges will be designed to carry the load of snow groomers and other motorized maintenance equipment.

Additional recreation trails may be designated on the other State Forests that comprise the Charleston Unit. This may require new trail construction. New trail construction will be addressed in more detail by amendment to this Unit Management Plan and will be reviewed by DEC pursuant to the State Environmental Quality Review Act (SEQRA).

Occasionally it will be necessary to use designated recreation trails to access timber sales. When this occurs, the trails may be temporarily closed, re-routed, or shared by recreational users and loggers. Warning signs will be posted indicating that a timber sale is in progress.

C. Other Recreation Management Actions

- Provide informational brochures and maps on the Charleston Management Unit to the public from the Department's website.
- Maintain 64 miles of State Forest boundary line on a 7 year cycle. As resources permit, State Forest signs will be put up on all corners and at 0.1 mile intervals along all public roads and public forest access roads.
- Provide regular patrols by the Forest Rangers to limit unauthorized use of the State Forests.
- Pursue the acquisition from willing sellers private parcels adjacent to the Unit that would reduce boundary line maintenance, increase public access, and resolve title issues.
- Install "No Motor Vehicles Beyond This Point" signs on several unimproved access roads and haul

roads. These roadways will be blocked off if the signs are ignored.

- As resources permit, maintain public forest access roads through annual cleaning of ditches and culverts, mowing, grading, brushing, resurfacing, and replacing culverts as needed.
- Provide the public with an opportunity to view habitat types ranging from open-wetland, seedling-sapling stands, pole and sawtimber stands to wetlands, ponds, and some stream corridors with no harvest operations.
- Top lopping will be done in harvest areas adjacent to public highways or public forest access roads.
- As resources permit, maintain recreation trails annually through mowing, removing downed limbs and trees, and repairing or replacing bridges as necessary.
- Maintain the five cemeteries and their surrounding stone walls through mowing and the removal of downed limbs and debris.
- Where possible, construct or enhance recreational opportunities for people with disabilities. Access trails that are determined to be suitable for use by people with disabilities will be designated as such.
- Encourage various clubs and organized groups with interest in the Unit to participate in the Adopt-A-Natural Resource Program. This will provide people with "hands on" land management experiences while they volunteer to help out with various land management projects on the Unit. Applications for this program are available through the Stamford and Schenectady DEC offices.

WILDLIFE ACTIONS

- Habitat will be managed for diversity, an intermingling of habitats of different ages, sizes and types.
- Small forest openings may be created through group selection cuts (GSCs) of 0.5 to 5 acres.
- Roads and trails are primarily designed to provide access throughout the forest, but their maintenance also acts to create linear forest openings. Where light reaches the forest floor, herbaceaous plant growth occurs and food resources are produced. Where possible, roads and trails will be periodically mowed to maintain their open character.
- Water bodies, such as ponds and freshwater wetlands will be protected and maintained to enhance wildlife diversity. Some wetland types, such as red maple swamp, actually are fairly dry at times of the year. Forested wetlands can produce some timber, and selective cutting of trees in wetlands or wetland buffer areas may occur. In some cases, clear cutting of plantations within the area adjacent to a wetland may occur. In order to minimize any long-term impacts, harvest operations within wetlands will be restricted to the winter or the driest portion of the summer.
- The forest acreage in conifer plantations will be reduced. Most of this reduction will take place through the removal of declining pine plantations. Spruce plantations can be favored by a variety of winter birds, and are also often used by deer, turkeys, and other species for thermal and protective cover during the winter. Natural stands of hemlock, particularly as they occur along stream banks, flood plains and on steep slopes, should be maintained and promoted whenever possible. Hemlock is a favored food for wintering deer, and provides important winter cover. Hemlocks are also commonly used as roost trees by turkeys during the winter and other times throughout the year.
- As resources permit, the acreage of open-grass or brushy cover type on the Unit may be increased. This may be accomplished through permanently maintained forest openings or forest openings that are temporarily in this condition following clear cuts.
- Favor fruit and mast producing trees whenever they are present in timber sale areas or in non-commercial treatment areas when this is consistent with other management objectives.
- Manage and protect wildlife species through enforcement of the Environmental Conservation Law and pertinent Rules and Regulations.
- Manage deer, turkey, grouse, beaver and other furbearer populations through hunting & trapping regulations developed for Wildlife Management Unit 4A.
- As resources permit, install wildlife food plots on portions of land that have been recently cleared, or on previously cleared sites that are conducive to the establishment of food plots. Food plots are small forest openings that have been planted with grasses and clovers favored by wildlife for food.
- As resources permit, clear cut mature stands of

aspen to facilitate sprout regrowth.

- Release and prune apple & pear trees to perpetuate them and stimulate bud and fruit production.
- Periodically cut stands of staghorn sumac to promote growth and wildlife food value.
- Maintain living cavity trees and a minimum of five snag trees/acre in various size classes throughout the forest.
- Where appropriate, install nesting boxes for wood ducks, owls or other wildlife.
- Maintain adequate stands of high-value mast producers such as red oak, hickory, and other nut-bearing trees throughout the forest, and especially in proximity to stream corridors, slopes or plantations used by wintering deer and turkeys.
- Where possible, schedule timber harvest operations during late summer through winter to minimize impacts to nesting birds, amphibians, and bat roosting and/or maternal colonies.
- During the layout of a timber sale, evaluate stands for the presence of raptor nests. If at that time an active nest is identified, a 100' buffer in which the overstory will not be disturbed will be left around the nest tree until the birds have fledged. Disturbance of the overstory in a buffer between 100' and 300' from the nest tree will be limited until the birds have fledged.
- Where possible, maintain buffers along streams and water bodies to provide sufficient shading, and to enhance corridors for wildlife movement.
- Enhance human enjoyment and understanding of wildlife by maintaining the Featherstonhaugh Wildlife Viewing area. As resources permit, establish one additional Watchable Wildlife Area on State forest lands in Montgomery County.
- As resources permit, enhance human enjoyment and understanding of wildlife by establishing or maintaining informational kiosks at each major forest unit. The resources considered to be necessary for this action include not only the installation of the kiosks, but also the extensive maintenance required. Kiosks on State land are almost invariably targets for vandalism and thus require significant funds and labor to maintain.
- Provide and maintain viable access opportunities for traditional hunting and trapping uses, as well as for other uses such as birding, wildlife calling, wildlife tracking, and wildlife photography.
- Evaluate the impacts of timber harvest operations on human use opportunities, particularly hunting opportunities. The presence of large amounts of slash, or the loss of important mast trees, can greatly alter wildlife habits and/or decrease the suitability of key spots for hunting activities.

FISHERIES ACTIONS

A. Featherstonhaugh Lake

- Recruitment must remain adequate to support the warmwater fisheries. Stocking may be required if a catastrophic winter fish kill should occur.
- Adequate public and administrative access should be maintained.

B. Pond and Water Quality

Habitat and water quality in the ponds and streams will be maintained and improved where possible to promote growth, survival, and/or reproduction of desired fish populations. To assure that adverse impacts are avoided or mitigated, any proposed new construction projects on State Forests in the watersheds of these ponds and streams will be reviewed by DEC pursuant to State Environmental Quality Review Act (SEQRA). Projects with the potential to cause the impacts listed below are of particular concern:

- Water temperature increases.
- Reduction of streamflow.
- Reduction in groundwater contribution to streamflows which may be caused by groundwater withdrawals for water supply or other purposes.
- Increases in turbidity or sedimentation which may be caused by land clearing and construction, or other earthwork operations, especially on steep slopes.
- Reduction in dissolved oxygen levels.
- Contravention of any state water quality standard.
- Any decline or change in stream bethos.
- Any addition of nutrients, especially phosphorous.
- Reduction in water transparency.
- Any deterrent to fish spawning.
- Extensive loss of riparian vegetation.
- Stream bed or bank instability.

TIMBER MANAGEMENT ACTIONS

The Timber Management Objectives will be accomplished by using a broad range of silvicultural techniques. These techniques will be applied in an environmentally sound and silviculturally proven manner. As described previously, the two management systems that will be applied are even-aged management and uneven-aged (or all-aged) management.

As previously stated, the percentage of the Unit that is in plantation will be reduced over time from 44% to 25%. While this means that most of the plantations will not be replanted after their final harvest, some acreage will be retained as plantations through the planting of conifer species or, in some cases, through the natural regeneration of Norway spruce. Site preparation will be necessary to reforest some plantation sites and to also achieve desirable regeneration in some natural stands. Site preparation in conifer or natural stands may include prescribed burning, herbicide application, mechanical methods or a combination of these. To maintain the vigor of young plantations, it may be necessary to release them from natural hardwood competition by mechanical means or through the use of herbicides. Use of herbicides will be reviewed by DEC pursuant to State Environmental Quality Review Act (SEQRA).

Natural hardwood and mixed hardwood/conifer stands will be managed to produce and/or maintain an average of a minimum of five snags per acre. A snag is a tree which provides specific wildlife habitat needs for cavity nesting birds and mammals as well as a foraging site for insect eating birds.

Open grassy areas and brushy herbaceous openings increase forage and provide shelter for wildlife. Openings also enhance the opportunity to view wildlife. These areas may be maintained through non-commercial cuttings, mowing, or by prescribed burning. Where appropriate, new haul roads and landings may be planted with grasses and clovers and may be mowed and maintained as grassland.

Wildlife and fisheries concerns are taken into account during the planning of timber management activities. DEC Wildlife and Fisheries Biologists may be consulted prior to planning a timber harvest if it is determined that the area to be harvested has special significance for fish or wildlife.

For maps showing the management direction (even aged, uneven aged, plantation, etc.) of each stand on the Unit, see Appendix XV. For a listing of Management Actions, see Appendix XVI.

DATA COLLECTION ACTIONS

- Inventory of all forest stands of the Unit will be conducted at least once every 10 years as resources permit. In addition, all stands will be reinventoried after silvicultural treatment.
- A survey of the Unit for endangered, rare or threatened plant species and plant communities may be undertaken as resources allow.

TEN YEAR SCHEDULE OF MANAGEMENT ACTIONS

A. Timber Harvesting & Improvement Cuts - See Appendix XVII for a schedule of stands.

B. Boundary Line Maintenance - Please see Table 10 in Appendix II for a schedule of boundary line maintenance.

C. Maintenance of Public Forest Access Roads

Annual road maintenance includes mowing the shoulders of the road, grading and raking the road bed, cleaning out culverts and ditches, replacing culverts, and rebuilding culvert head walls and end walls. Currently, there is approximately one mile of public forest access road that is in good enough condition to perform this maintenance. Due to the poor condition of the other roads on the Unit, the maintenance that can be performed is limited and does not include grading and raking. The following is a list of the public forest access roads to be maintained on the Unit (this list does not include the six miles of unmaintained Town roads in the Town of Charleston):

Montgomery Reforestation Area #2 - 1.0 mile
Montgomery Reforestation Area #3 - 1.2 miles
Montgomery Reforestation Area #4 - 1.0 mile

D. Forest Inventory - Please see Table 11 in Appendix II for a forest inventory schedule.

E. Trail Maintenance

Existing and proposed trails will be cleared and brushed as needed. Signs will be replaced as needed. Existing trails on Schenectady RA #1 may be relocated at multiple locations to avoid wet areas.

F. Parking Maintenance

As resources permit, existing and proposed parking areas will have litter picked up annually and will be rehabilitated as needed.

G. Litter Pickup

Litter will be picked up on an annual basis as resources permit. Some of this work may be accomplished through the efforts of volunteers under the Adopt-A-Natural Resource Program.

H. Construction and Maintenance Projects and Costs

As mentioned previously, almost all of the primary access roads on the Charleston Unit are in need of major repairs. The one exception is the Yatesville Falls Public Forest Access Road, which was rehabilitated in 2001. The road rehabilitation needed for the rest of the DEC roads used by the public to access the Unit, a total length of approximately two miles, will cost the DEC upwards of $230,000. The road rehabilitation needed for the six miles of unmaintained Town road that serve as the primary access for the Charleston and Rural Grove State Forests would cost the DEC approximately $990,000.

The rehabilitation of the roads that access Montgomery RA #2 was begun in 2003 and may continue over the next several years as resources permit. Part of the work required to complete this project is the installation of a pipe arch. The pipe arch is needed to replace two 3' concrete culverts that are currently in place at a stream crossing. These culverts are not suitable for the purpose of crossing a stream. They are continually plugged with debris that washes downstream, causing the stream to overflow the road and wash out the road bed. The culverts should be replaced with a pipe arch designed to carry the weight of a loaded log truck. If the span of this arch is over 20 feet, it will be added to the NYSDOT inspection program.

There are two bridges on the snowmobile trail on Montgomery RA #4. These bridges will eventually need to be replaced. As mentioned previously, these bridges will be designed to carry the load of snow groomers and other mechanized maintenance equipment.

The costs of the projects described above are shown in more detail in Table 12 of Appendix II.

Annual trail maintenance is necessary on the ski trails on the Charleston State Forest. Generally, most of this maintenance is done by the work crews from the Summit Shock Facility and through the efforts of volunteers who have Adopt-A-Natural Resource Agreements with the DEC. DEC provides materials, equipment, and labor when available.

Labor and materials will be necessary to upgrade sections of the cross country ski trails to trails suitable for use by horses. Most of this work will be accomplished through volunteer efforts. This work will be ongoing over the next five to ten years.

Current funding levels allow for approximately $0.64/acre for any rehabilitation and improvement work done by DEC on the State Reforestation Areas in this Unit. With 7,404 total acres in the Charleston Unit, this means that there is approximately $4,739 available annually for all road rehabilitation and maintenance, trail construction and maintenance, emergency repairs to roads damaged by flooding, litter pick-up, forest and habitat improvement projects, and other facility maintenance on the Unit. Manpower and funding levels must be increased in order to accomplish this work. The projects identified in this Unit Management Plan will probably not be accomplished in the next five years due to limited resources.

REFERENCES

Connor, P. 1960. The small mammals of Otsego and Schoharie Counties. NYS Museum and Science Service Bulletin 382. Albany NY.

Farquhar, Kelly - Historian, Montgomery County, interviewed September 27, 2004

F.W. Beers & Co. (1878). *History of Montgomery and Fulton Counties, NY*. Interlaken, NY: Heart of Lakes Publishing.

Gardner, J.E., J.D. Garner and J.E. Hofmann. 1991. Summer roost selection and roosting behavior of Myotis sodalis (Indiana bat) in Illinois. Endangered Species Coordinator, Reg. 3, USFWS, Minneapolis. 56 pp.

Harrod, R. J., Gaines, W.L., Hartl & W.E., Camp, A. 1998. Estimating historical snag density in dry forests east of the Cascade Range. Gen. Tech. Rep. PNR-GTR-428. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 16 p.

Herrick, James - resident, Town of Charleston, interviewed September 21, 2004

Hitchcock, H.B. 1955. A summer colony of the least bat, Myotis subulatus leibii. Canadian Field-Nat. 69(2):47-59.

Marino, Lynda - Historian, Town of Root, interviewed September 21, 2004

Nez Perce National Forest . October 1997. South Fork Clearwater Subbasin, Landscape Assessment, Preliminary report. Grangeville, ID.

NYSDEC Endangered Species Investigation (2002-2003). Project W-166-E. Unpublished report. Albany, NY. 24 pp.

Saunders, D.A. no date. Adirondack Mammals. State Univ. of N.Y., College of Environmental Science and Forestry. Syracuse, NY. 216 pp.

Whitaker, J. O. & W.J. Hamilton, Jr. 1998. Mammals of eastern United States. Cornell University Press. Ithaca, NY. 583 pp.

Whiting, Lorraine - Historian, Town of Charleston, interviewed August 29, 2004

Will, G. B., R.D. Stumvoll, R.F. Gotie & E.S. Smith. 1982. The ecological zones of northern New York. NY Fish and Game Journal. 29(1):1-25.