NEW YORK STATE

DRAFT STRATEGIC PLAN FOR STATE FOREST MANAGEMENT

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Draft Strategic Plan

and

Draft Generic Environmental Impact Statement

for

State Forest Management

2010

Statewide Plan

Prepared by
The New York State Department of
Environmental Conservation

Completed: August 27, 2010

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End of Comment Period: October 29, 2010

Web addresses will be provided in URL format for additional reference. If a DEC URL should become outdated, try the search engine on the Department home page, www.dec.ny.gov.

David Paterson
Governor, State of New York

Alexander Grannis
Commissioner, Department of Environmental Conservation

Robert Davies
New York State Forester

DEC's Mission

"The quality of our environment is fundamental to our concern for the quality of life. It is hereby declared to be the policy of the State of New York to conserve, improve and protect its natural resources and environment, and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state, and their overall economic and social well-being." - Environmental Conservation Law 1-0101(1)

DEC's Organizational Structure

This plan has principally been developed by foresters and other staff within DEC's Division of Lands and Forests, Bureau of State Land Management, which is responsible for the care of State Forests. DEC has 17 divisions and offices and is further organized into bureaus to fulfill the functions and regulations established by Title 6 of New York Codes, Rules and Regulations (6NYCRR). DEC is headed by Commissioner Alexander "Pete" Grannis, who is assisted by executive managers. A detailed organization chart can be viewed on DEC's website at: www.dec.ny.gov/about/255.html

ACKNOWLEDGEMENTS

We gratefully acknowledge the efforts of all who contributed to this plan. Because the plan represents a new, more ecological approach to making management decisions in New York, its development could not have occurred without many diverse contributions. The development of ecological management principles required clarification through lively discussions, debates, critiques and the patient support of too many people to name here. We, the principal editors, thank all who participated in this process.

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Technical Advisors and Authors

Technical Advisors that have considerable experience and expertise in the many aspects of the history and ecology of New York, as well as its laws, policies and regulations affecting State Forest management, contributed significantly to development of specific subject areas. Without their guidance and the sections they authored, this plan would not be as comprehensive as it is today. (Division of Lands and Forests staff unless noted otherwise)

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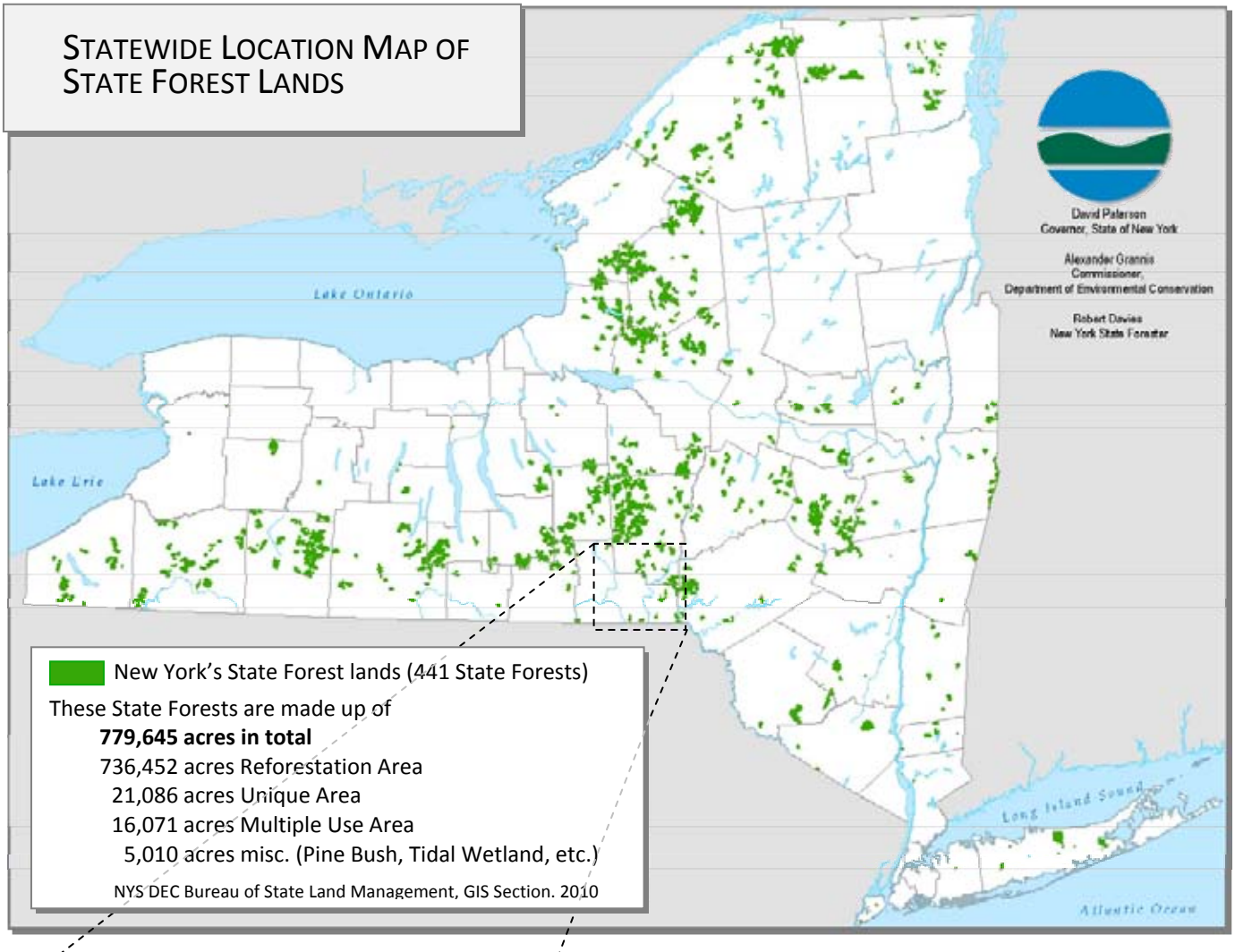
VISION STATEMENT

Waterfall on Sugar Hill State Forest in Schuyler County

State Forests will be managed in a sustainable manner by promoting ecosystem health, enhancing landscape biodiversity, protecting soil productivity and water quality. In addition, State Forests will continue to provide the many recreational, social and economic benefits valued so highly by the people of New York State. DEC will continue the legacy which started 80 years ago, leaving these lands to the next generation in better condition than they are today.

This plan sets the stage for DEC to reach these ambitious goals by applying the latest research and science, with guidance from the public, whose land we have been entrusted to manage.

Statewide Location Map of State Forest Lands



New York's State Forest lands (441 State Forests)

These State Forests are made up of

779,645 acres in total

736,452 acres Reforestation Area

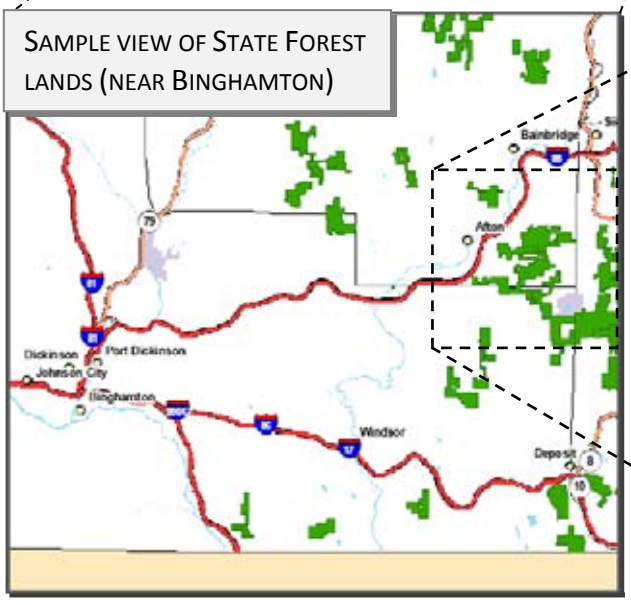
21,086 acres Unique Area

16,071 acres Multiple Use Area

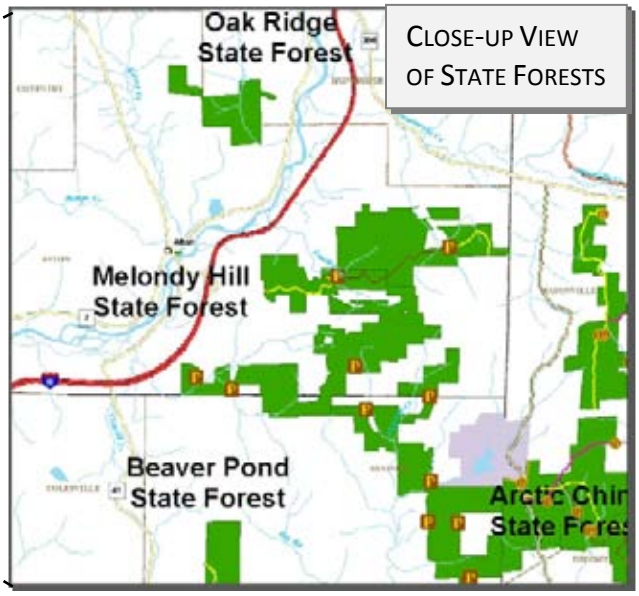
5,010 acres misc. (Pine Bush, Tidal Wetland, etc.)

NYS DEC Bureau of State Land Management, GIS Section. 2010

Sample view of State Forest lands (near Binghamton)



Close-up View of State Forests



Create custom maps with the DEC State Lands Interactive Mapper at www.dec.ny.gov/outdoor/45478.html

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ROBERT K. DAVIES

State Forester, Robert K. Davies

New York began purchasing land for creation of State Forests 80 years ago in response to serious environmental challenges. At that time, 75% of forest land in the state had been cleared for agricultural use. Moreover, a significant portion of the tilled land suffered from poor farming practices, which depleted the soil of essential nutrients and organic content and contributed to soil erosion and stream sedimentation. As a result, many of the early farms failed and in some cases were abandoned. This dire situation sparked one of the largest conservation efforts of the time.

With the passage of the Hewitt Law in 1929, the first State Reforestation Area (State Forest) was purchased in Cortland County. It was too early to refer to this property by the common name it holds today, Hewitt State Forest, as 78% of its acreage consisted of abandoned agricultural fields rather than forest land. The remaining acreage suffered from unsustainable logging practices. The Conservation Department, with assistance from the Civilian Conservation Corps, planted more than one million tree seedlings on the Reforestation Area to reclaim the lands and reestablish forests.

The same restoration process was repeated on Reforestation Areas across the state over the following decade, focusing on the most abused properties in the state. By law, these lands had to be more than 50% open and in need of planting and worth no more than $4.00 per acre. Within the first ten years of the program, more than 485,000 acres had been purchased and 340,000 of those acres had been planted with seedlings from state nurseries, such as the one operated to this day in Saratoga Springs.

Today, thanks to the vision of State Senator Charles Hewitt and the efforts of several generations of DEC foresters, New York State's 786,329 acres of State Forests are now some of the most productive, healthy and valued forests in the state.

Yet our work is still incomplete. The plantations established in the 1930s and 40s are reaching biological maturity and, now that their soils have had time to recover, DEC foresters are working to establish more natural, mixed-hardwood forests in their place where appropriate. As all of our State Forests continue to grow and mature, so does our knowledge and expertise in managing them for public benefit in the most ecologically sound manner possible.

A NOTE FROM OUR STATE FORESTER

Environmental challenges of today, although different, are just as acute as they were 80 years ago. Today, our forests face major threats from invasive species, habitat fragmentation, more frequent severe weather events, and climate change. New programs within DEC now focus on early detection and eradication of introduced species like Asian long-horned beetle, emerald ash borer and oak wilt disease, which are poised to invade our forests. Management strategies strive to make our forests more healthy and diverse in order to enhance their resistance to these threats.

Society still requires and values the traditional benefits these lands can provide, including recreation, watershed protection and forest products. However, we must also manage these lands to enhance their carbon sequestration potential and landscape biodiversity, and increase their resilience to human impacts.

This management plan will guide the future management of our State Forests, blending the proven management techniques applied in the past with the most up-to-date research and strategies available. Fortunately, the science behind our management has matured along with our forests. Multiple-use strategies, which we use to balance the wide diversity of demands placed on forests, are now enhanced by the concepts of ecosystem management and landscape ecology. Paper maps and tally books are being supplemented by Geographic Information System (GIS) mapping, computer databases, and Geographic Positioning System (GPS) enabled field data recorders. Though technological advances such as these enable foresters to work more accurately and efficiently, remaining unchanged is DEC's commitment to leave this precious resource to the next generation in better condition than it was when we started.

Robert K. Davies
New York State Forester
Director, Division of Lands and Forests
New York State Department of Environmental Conservation

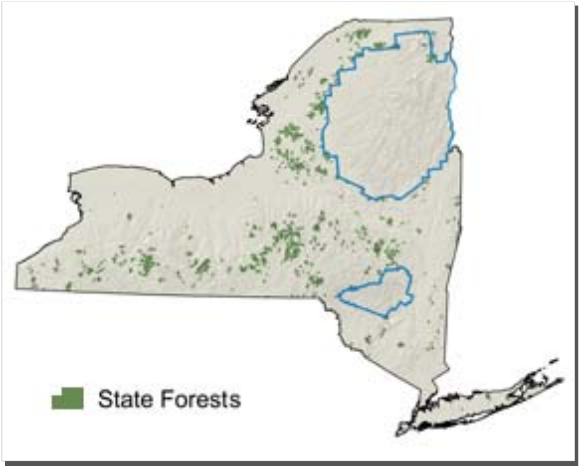
CHAPTER 1

NEW YORK STATE FORESTS

STATE FOREST OVERVIEW

WHAT IS A STATE FOREST?

State Forests are located throughout New York State and include Reforestation Areas, Multiple-Use Areas, Unique Areas and State Nature and Historic Preserves. Wildlife Management Areas, Forest Preserve, Conservation Easements and State Parks are ***not*** State Forests. These state-owned lands are managed by other programs, divisions and agencies, under different legal guidance and strictures, and are not addressed in this management plan.



State Forests play a unique role in New York's landscape because they: are managed under public ownership by professional foresters; allow for the sustainable use of natural resources; are open to **recreational use**; provide watershed protection; and cover large land areas throughout the state. From the beginning, State Forests were set aside to offset widespread trends of agricultural abandonment and deforestation and restore the land's ability to support vegetation.

The Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI) have certified New York's State Forests as being sustainably managed. The methods used in the management of these lands are designed to respond to today's complex issues and ecological threats, such as shifting land use trends, invasive species and climate change.

State Forests provide a positive impact on **water quality** and **ecosystem health**, a proving ground for innovative forestry, an example of good stewardship to private landowners, and a balance to the kind of management driven by short-term goals that sometimes occurs on private lands. Long-term sustainability of the forested landscape requires the sort of steady ownership and consistent management that exists on State Forests.

Sustainably managed State Forests provide forest products along with water quality, habitat, recreation and ecologically healthy forest lands

Timber Management

On most of these lands, timber management is used as a tool to enhance biodiversity, create habitat features that might be lacking in the landscape, and provide a renewable supply of sustainably-harvested forest products. Timber management is adapted and modified to ensure that as many goals as possible are realized.

STATE FOREST OVERVIEW

The **high-quality timber** harvested from State Forests is used by New York businesses and is often sent around the world to international markets. Some examples include: furniture-quality hardwoods, softwoods for log cabins, fiber for paper making, firewood, animal bedding, and biofuels, like wood pellets, and chips burned as fuel for electricity production, or ethanol derived from wood waste. Lower grade timber helps to sustain New York-based and regional businesses that depend on fiber for paper making, fuelwood, and other wood fiber-based products.

A timber harvest on State Forest lands

Harvesting wood products and incorporating them into durable goods such as homes and furniture aids in carbon sequestration as well, reducing the amount of carbon released from decaying wood. In addition, timber harvests provide additional space and resources for the remaining or new trees to use in sequestering additional carbon. Besides being a renewable resource, wood is a much more environmentally friendly building material than most of the potential substitutes such as plastic, steel, aluminum or concrete. Less carbon is emitted, fewer waste products are created and less water is used in the manufacturing process of wood.

Wildlife Habitat

Rock City State Forest in Cattaraugus County

The management of state forests provides a wide variety of habitat conditions that are not often found on private lands. On a landscape scale, state forests offer large, relatively undisturbed areas that are required by many wildlife species for habitat. Open grassy areas may be maintained to provide habitat for grassland bird species. Large areas of early successional forest, containing seedling/sapling size trees, can be found in other areas. These areas can be important habitat for many birds ranging from grouse and woodcock to warblers and sparrows. At the other end of the spectrum of forest conditions, large areas of mature hardwoods and conifers having minimum disturbance offer habitat for birds such as pileated woodpeckers, goshawks, barred owls and red shouldered hawks. Harvesting operations can be tailored to provide benefits to wildlife. Even-aged management systems create early successional habitat, while uneven-aged management systems provide large, unbroken expanses of forest. Such habitat is becoming scarce as private lands are subdivided and habitats are fragmented.

Open Space

Open space for public use and enjoyment is increasingly valued as opportunities for use of private lands decline due to posting, subdivision and development. The current trend of subdivision and development in rural areas is causing long term changes in the landscape. State forests preserve open space and the character of undeveloped areas.

Hiking the Long Path in the Catskill region: Multiple-use trails on State Forests provide part of the ground covered by this long-distance trail that stretches from the George Washington Bridge, to John Boyd Thatcher State Park, outside Albany.

Outdoor Recreation

State Forest lands are also highly valued for recreation. More than 2,446 miles of trails and forest roads are available for camping, hiking, mountain biking, snowmobiling, horse riding, snowshoeing and cross country skiing. State Forests may contain features of special interest such as geological formations, waterfalls, cultural resources and unique natural communities which require careful protection and responsible use. These properties are also enjoyed by hunters and trappers, anglers, wildlife/nature observers, picnickers and boaters, as well as by orienteering and geocaching enthusiasts. Best of all, there is no entrance or user fee charged on State Forests making them available to people of all socioeconomic levels and one of the best recreational values in New York State.

ADDITIONAL INFORMATION

Rules for Using State Forests – Anyone enjoying State Forests must observe the rules which protect both them and the forest environment, and are based on 6 NYCRR Parts 190-199. www.dec.ny.gov/lands/44115.html

Directory of State Forests – A clickable list of DEC (and OPRHP) administered public lands, including maps, information on individual State Forests and contact information can be viewed at www.dec.ny.gov/outdoor/347.html

State Lands Interactive Mapper (SLIM) – An interactive online mapper can be used to create custom maps of recreational trails on DEC lands throughout the state to help people plan outdoor activities. A link to the SLIM is located at DEC's Mapping Gateway: www.dec.ny.gov/pubs/212.html

Google Earth Virtual Globe Data - Some of DEC's map data, including accessible recreation destinations, boat launches, lands coverage, roads and trails can be viewed in Google Maps or Google Earth. A link to Google Earth is also located at DEC's Mapping Gateway.

STATE FOREST OVERVIEW

STATE FOREST FACILITIES, INFRASTRUCTURE AND FEATURES

State Forest Fact Sheet				
State Forest Land Area	Reforestation Areas	743,136 acres	**786,329 acres**	2.5% of New York's total land area. Four times the size of New York City's five boroughs.
	Unique Areas	22,112 acres		
	Multiple Use Areas	16,071 acres		
	Miscellaneous: Natural Resource Management Areas, Pine Bush, Tidal Wetlands, etc.	5,010 acres		
Boundary Lines	Boundary lines run adjacent to private land and often through deep woods. They are maintained, using yellow paint, signs and blazes at least once every seven years to make state land readily identifiable to recreationists and passersby, while reducing unintentional trespass on both State Forests and private land.		**6,520 miles**	Equivalent to a line from New York to the southern tip of South America
Public Forest Access Roads	Public forest access roads (PFARs), including more than 10,000 culverts and bridges, are maintained so the public can safely enter State Forest lands with minimal environmental impact.		**563 miles**	Equivalent to all the city streets in both Albany and Binghamton
Trail-Based Recreation on **Multiple Use Trails** (includes PFARs; does not include municipal roads)	Hiking Trails	1,211 miles	**2,446 miles ***	* When multiple recreational uses overlap on a trail, overlapping sections are counted for each use and added to total trail miles.
	Mountain Biking Trails	803 miles		
	Cross Country Skiing Trails	881 miles		
	Equestrian Trails	762 miles		
	Snowmobile Trails	801 miles		
Recreation Facilities	**Trailheads / Parking Lots**		**705**	State Forest facilities are usually of a more primitive and undeveloped nature, in comparison with most parks and campgrounds.
	Designated Campsites (Backcountry camping is also available across a majority of State Forest lands.)		**156**	
	Boat Launches		**18**	
	Fishing Piers		**6**	
	Accessible Recreation Destinations – areas with facilities that are designed to provide access to nature for people with disabilities		**27**	

State Forest Fact Sheet				
MAPPWD Permit Routes	**Motorized Access Program for People With Disabilities (MAPPWD)** – designated routes that provide a means for permit holders to access recreational programs like hunting and fishing via motor vehicle.		**255 routes** -within- **111 State Forests** (incl. UA, MUA, etc.)	54 of 82 of UMP Units have at least one MAPPWD Route
Mineral Resources	Active well pads		**132**	
	Inactive well pads		**76**	
	Surface Mines (sand, gravel, etc.)		**21**	
Historic & Cultural Resources	Un-inventoried resources, including archaeological sites, fire towers, water holes, stone walls and foundations		**Approx. 2,500**	
Water Resources	Streams by class	Class AA or A	**145 miles**	
		Class B	**50 miles**	
		Class C	**1,449 miles**	
		Class D	**134 miles**	
	Ponds, lakes, wetlands (incomplete inventory)		5,164 features **33,456 acres**	
Sustainable Forest Resources	**Sustainable Harvest Threshold Level** (Growth/year adjusted for mortality)		**116,649 Mbf/year** (Thousand board feet/year)	** 2% of the total value of forest products harvested from public and private lands in New York State each year
	Annual harvesting (average annual rate over a ten year period)	Total	**43,783 Mbf/year**	
		Expressed as a percent of the sustainable harvest threshold level	**37.5%**	
	Economic Contribution (average annual sales 1999-2008)		$5,317,564 **	

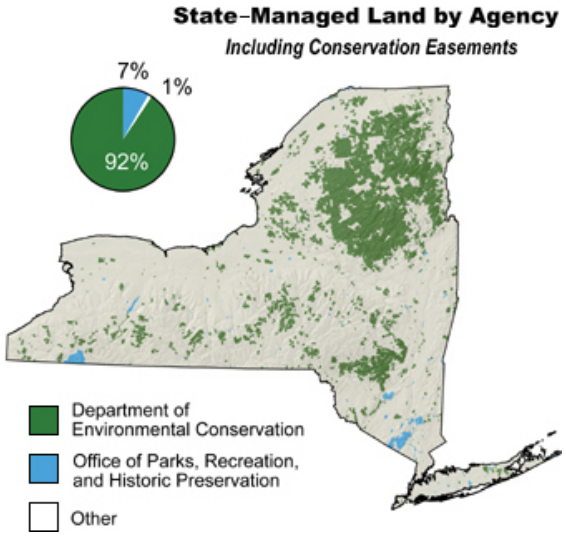
Recreational Use and Demand

As privately owned lands continue to be subdivided and are increasingly closed to general public use, State Forests have become more popular. As explained in greater detail in the Recreation section of this plan, the diversity of recreational uses has grown along with the number of people recreating in State Forests. Over the last few decades, the traditional users of these lands, such as hunters and hikers, have been joined by mountain bikers and people using GPS units for geocaching. Recreational use of State Forests does not wane in tough economic

STATE FOREST OVERVIEW

times, but actually increases, in part because there are no entrance or user fees charged to enjoy these properties.

Commercial activities such as timber harvesting and mineral extraction on State Forests also impact the infrastructure system, due primarily to the use of heavy trucks to move logs and machinery. The effects on roads can be mitigated by requiring contractors to improve and rehabilitate roads so that they can support this use without negative environmental impacts.



Funding and Staffing

DEC's Division of Lands and Forests maintains and manages a combined 4.6 million acres of State Forests, Forest Preserve and Conservation Easements, including the infrastructure associated with these lands. This is an area larger than the entire state of Connecticut and comprising 92% of all publicly owned land in New York State. In 2009, funding for the management of these lands dropped more than 60% from five million to less than two million dollars annually. This is roughly 44 cents per acre to cover maintenance of the more than 1,500 miles of Public Forest Access Roads, 4,000 miles of trails, hundreds of bridges, dams, parking lots, kiosks, outhouses, lean-tos, thousands of culverts and signs, and more than 17,000 miles of boundary lines.

DEC is addressing the shortfall on a case by case basis, closing roads, bridges and trails, and breaching dams when public safety is at risk or the land could suffer excessive damage because facilities cannot be adequately maintained.

Bridges such as the above on Cole Hill State Forest in Albany County require maintenance in order to provide access for hikers, cross country skiers and other recreational users

Staffing has declined recently as well. In 2009, State Forests were managed with a field staff of 35 permanent full time foresters and forestry technicians and 14 seasonal employees. With the current hiring freeze, permanent staff declined by three full time foresters or about 8%. A slightly larger drop is expected in 2010, again due to retirements and the hiring freeze. This presents serious challenges. For instance, there has been no land manager on Long Island for more than two years to manage about 16,000 acres in Nassau and Suffolk counties. These are heavily used recreational areas and include sensitive sites, endangered species, and extensive pine barrens. In DEC Region 9, full-time permanent staff assigned to State Forests was reduced

more than 35% due to retirements in 2009. Under the current hiring freeze, these positions will not be filled. The statewide trend towards lower staffing numbers is expected to continue.

Foresters inspect a timber sale on State Forest land

Lower staffing has a direct effect on New York State's budget because staff losses include personnel who manage timber sales, which provide significant revenues to the state, while enhancing wildlife habitat, improving forest health, and support New York's economy. As identified by a NYS Comptroller's Office 2006 audit of the Bureau of State Land Management, "a forester harvesting timber on a full-time basis generated $4.30 in timber sale revenue for every $1.00 in salary and fringe benefit costs. Thus, even on a half-time basis, the forester generated $2.15 in timber sale revenue for every $1.00 in salary and fringe benefit costs." That same audit recommended that the state hire an additional 17 foresters. However, as of the date when this plan was published, this recommendation has not resulted in an increase in staff.

A 2006 NYS Comptroller's Office audit report estimated that, over the three-year period studied, an increase of 17 foresters would have created a net revenue increase of $3.7 million per year.

Resource Protection by Regulations

State Forests may contain features of unique interest. Unique geological formations, deep woods, waterfalls and cultural resources such as old homesteads, cemeteries and historical sites can draw inquisitive visitors. State Forests can also harbor rare and endangered plant communities and ecosystems. These special habitats add emphasis to the stewardship responsibilities of State Forest management. Regulations protect these valuable resources by prohibiting individuals from taking any tree, flower, shrub, fern, fungi or other plant-like organisms, moss or other plant, rock, soil, fossil or mineral or object of archaeological or paleontological interest found or growing on State land, with the exception that recreationists may collect fungi, fruit or berries for their personal consumption.

DEC may post signs denoting seasonal restrictions, site-specific safety precautions, or other unique rules and regulations to protect special features and resources.

STATE FOREST OVERVIEW

STATE FOREST LAND CLASSIFICATIONS

State Forest land classifications are defined in several pieces of land acquisition legislation. The classifications place different priorities on land uses. For example, classification as a Unique Area places higher priority on the preservation of scenic and natural character compared to other land uses.

The people of the State of New York, in approving a new constitution for the state in 1938, approved a new constitutional provision at Article XIV, Section 3, paragraph 1, which recognizes the importance of state land acquisition to protect and enhance the state's forests and wildlife:

> ". . . Forest and wild life conservation are hereby declared to be policies of the state. For the purpose of carrying out such policies the legislature may appropriate moneys for the acquisition by the state of land, outside of the Adirondack and Catskill parks . . . for the practice of forest or wild life conservation."

Numerous pieces of legislation have implemented this constitutional provision. As discussed below, legislation has been enacted which has resulted in the creation of Reforestation Areas, Multiple Use Areas, Unique Areas, and other land classifications.

Reforestation Areas

The authorizing legislation for the acquisition of Reforestation Areas (ECL 9-0501 (1)) provides that:

> "In order to provide for the acquisition of lands outside of the Adirondack park and the Catskill park . . . which are adapted for reforestation and the establishment and maintenance thereon of forests for watershed protection, the production of timber and other forest products, and for recreation and kindred purposes, the Department may acquire in the name of the state, by gift, purchase or appropriation, reforestation areas which shall consist respectively of not less than five hundred acres of contiguous lands, which shall be forever devoted to the planting, growth and harvesting of such trees as shall be reforested."

Multiple Use Areas

Multiple use areas are parcels of land acquired by the state primarily for outdoor recreation, including public camping, fishing, hunting, boating, winter sports, and, wherever possible, to also serve multiple purposes involving the conservation and development of natural resources, including the preservation of scenic areas, watershed protection, forestry and reforestation. The first legislative authorization for Multiple Use Area, found at Parks, Recreation and Historic Preservation Law, 15.01 (1) (b):] provides:

> ". . . moneys received by the State from the sale of bonds sold pursuant to the park and recreation land acquisition bond act of 1960 and 1962 shall be expended . . . (b) for the acquisition of real property for other than state park or municipal park purposes, to provide additional opportunities for outdoor recreation, including public camping, fishing, hunting, boating, winter sports, and, wherever possible, to also serve multiple purposes involving the conservation and development of natural resources, including the preservation of scenic areas, watershed protection, forestry and reforestation . . ."

A more recent bond act authorizing the acquisition of lands for multiple use purposes is the Environmental Protection Act of 1990. Specifically, ECL 54-0303 authorizes the acquisition of open space land conservation projects listed in the state Open Space Land Acquisition Plan prepared pursuant to ECL Article 49, Title 2. More recently, the 1996 Clean Water/Clean Air Bond Act, at ECL 56-0307, authorized the acquisition of open space land conservation projects which enhance water quality protection and public access to water bodies.

Unique Areas

A Unique Area Preservation Project is defined in ECL 51-0703(4) as "a state project to acquire lands of special natural beauty, wilderness character, geological, ecological or historical significance for the state nature and historical preserve, and similar lands within a forest preserve county outside the Adirondack and Catskill Parks." See also ECL 52-0101(h). Unique Areas are formed by land acquisition or re-designation of existing state land at the discretion of DEC. State Nature and Historic Preserves are also commonly referred to as Unique Areas and are managed by DEC in much the same way.

State Nature and Historic Preserves

State Nature and Historic Preserves are parcels of land acquired by the state to protect biological diversity and provide a field laboratory for observation of plants and animals and education about their relationships in natural communities. These areas may also provide protection for places of historical interest and be used for recreation by the public. The state Nature and Historical Preserve is authorized by Article XIV, Section 4 of the New York State Constitution, providing in part that

> "(t)he legislature shall . . . provide for the acquisition of lands and waters . . . outside the forest preserve counties, and the dedication of properties so acquired or now owned which, because of their natural beauty, wilderness character, or geological, ecological or historical significance, shall be preserved and administered for the use and enjoyment of the people."

This constitutional provision is implemented by ECL Article 45. ECL 45-0117 (3) provides that:

> "(l)ands dedicated to the preserve are declared to be put to their highest, best and most important use and are to be held for one or more of the following purposes:

a. as natural communities for maintaining plants, animals and natural communities;

b. As reservoirs of natural materials and ecological processes that contribute to the state's biological diversity;

c. As field laboratories for scientific research and education in natural sciences, including the fields of biology, conservation, ecology, natural history and paleontology; and

d. As places of natural and historical interest and beauty which provide the public with passive recreational opportunities including, where appropriate, fishing, hunting and trapping, or commercial fishing opportunities that are compatible with protecting the ecological significance, historic features and natural character of the area.

e. As old growth forest to be protected with minimal management or disturbance that only considers passive recreational opportunities with no construction of public amenities."

With the exception of lands acquired for old growth protection, the remaining lands under ECL Article 45, may be actively managed including the use of prescribed burns to perpetuate fire-dependent natural communities, and harvesting trees, provided these activities do not diminish the unique character of the property which prompted its inclusion in the state Nature and Historical Preserve Trust. In these cases, harvesting may be used as a tool to further biodiversity, forest health, resiliency to insects and disease, or public safety.

Miscellaneous

Some state lands have other classifications, such as "pine bush," "sand plains," or "nature preserve." The management of these areas is based on the legislation which authorized their acquisition and the management goals established by DEC for the land. Some state lands, especially in Long Island (DEC Region 1), are referred to as Natural Resource Management Areas and are composed of parcels under a variety of the statutory classifications listed above.

There is also a small amount of State Forest land within the Adirondack Park boundary that is considered by the Adirondack Park Agency to be Wild Forest lands under the Adirondack Park State Land Master Plan. To the extent that it does not impair the "wild forest character" of these lands, timber harvesting is allowed.

STATE FOREST HISTORY

Before the middle of the 19th century, forests had been primarily viewed as an obstacle to civilization; they were something to be cleared out of the way for agriculture, or to be unsustainably cut and exploited for profit. By the 1880s, less than 25% of New York State remained forested.

At the turn of the 20th century, New York State's remaining forests were spread thin and losing stock. The New York Forest, Fish and Game Conservation Commission warned that the state would run out of timber within 50 years. The commission had reason to be alarmed. Timber companies were cutting the remaining trees at an alarming rate, leaving bare hillsides to be stripped of soil by erosion.

Forests in all the northeastern states were disappearing fast, but New York was the first to reverse this seemingly inexorable process by beginning to plant seedlings to replace trees that had been cut. The commission believed in using the latest science: sustainable forestry, the concept of managing forests for long-term productivity rather than short term profitability. Gifford Pinchot, who later founded the U.S. Forest Service, introduced this new forest management concept to the United States in the early part of the 20th century. He had studied forestry in Europe where timber was grown as a renewable resource on carefully managed plantation forests. In 1901, the commission planted the first tree plantation on state land in the Catskills to replace trees that had been logged.

The commission founded New York State's tree nursery system in 1902, the first state tree nurseries in the nation. In their early years, the nurseries supplied seedlings for planting on state land in the Catskills and Adirondacks. Hundreds of millions of seedlings of Norway spruce, white pine, red pine and Scotch pine were planted on State Forests as windbreaks and forest plantations.

In 1911, the Conservation Department, predecessor of today's Department of Environmental Conservation, was created by legislation to consolidate the functions of the Forest, Fish and Game Commission, the Forest Preserve Board, the Water Supply Commission and the Water Power Commission. By combining these commissions into a single department, the state greatly enhanced its ability to protect the environment and respond to new environmental challenges, such as the rapid abandonment of farmland that began in the 1920s. Many of the farms in New York were on marginal land, and as better land became available out west, agriculture began to decline in New York. When the Great Depression hit, many farmers could no longer make a living on their worn out, unproductive land.

The 1929 State Reforestation Act, and the 1931 Hewitt Amendment, authorized the Conservation Department to acquire land outside the Forest Preserve to be used for reforestation. These State Reforestation Areas, 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

STATE FOREST HISTORY

recreation and kindred purposes" (Article 9, Title 5, Environmental Conservation Law). The State Reforestation Areas were the beginning of today's State Forest system. Many of the early reforestation areas were established on some of the least productive land in the state.

A majority were abandoned farm lands with depleted soils and significant erosion issues. The Conservation Department began a massive tree planting program to restore these lands for watershed protection, flood prevention and future timber production. Today, these areas are covered with healthy forests.

NYS Governor Franklin D. Roosevelt on Reforestation Tour at Pleasant Brook and Cherry Valley, Otsego County

State funding for tree planting fell victim to the Depression, but the federal Civilian Conservation Corps (CCC), founded by President Franklin D. Roosevelt in 1933, rescued the tree planting program in New York. Millions of tree seedlings were planted on the barren soil of the new state reforestation areas, work that provided employment for thousands of young men. FDR was especially interested in reforestation work, having begun planting his own estate with seedlings from the state Tree Nursery in 1912. During the war years of 1941-1945, very little was accomplished on the reforestation areas. Plans for further planting, construction, facility maintenance and similar tasks had to be curtailed. After World War II, there was a resurgence of tree planting as more farmland fell vacant. Through postwar funding, conservation projects once again received needed attention.

The Park and Recreation Land Acquisition Act of 1960, as well as the Environmental Quality Bond Acts of 1972 and 1986, provided funds for the acquisition of additional State Forest lands, including inholdings and parcels adjacent to existing State Forests. All of these lands were acquired for the conservation and development of natural resources, including the preservation of scenic areas, watershed protection, forestry and recreation.

Site planted in 1930 near Brasher, NY on pure sand with little fertility

Past land use practices have left a legacy of impacts on the land and soils, which have influenced later forest development. Much of NY forest today is post-agricultural

forest that has grown on former farmland. During the maximum expansion of agriculture, even very poor land was used for farming. When these marginal farms were abandoned, they were sometimes in such poor condition that almost nothing could grow on the ruined soil. After the state acquired these lands, the first step in restoration was to stabilize the eroding soil by planting trees. Early photos of some State Reforestation Areas show expanses of raw blowing sand studded with tiny conifer seedlings. These seedlings were the beginning of the conifer plantations that were to be widely planted on reforestation areas.

Early plantations; brush was scattered among seedlings to hold drifting sand for the first few years after planting

Although these orderly plantations of Red Pine, Norway Spruce or Scotch Pine may look artificial to us today, they represent an era when establishment of conifer plantations was the best and most appropriate management practice. Conifer seedlings were able to grow on the damaged soil of abandoned farms, thriving in conditions too poor to support hardwood forest regeneration. The conifer plantations were literally the fastest way to get forest on the land. They stabilized erosion, improved watershed protection and slowly restored the depleted organic nutrients in the soil with their fallen needles and branches.

Today. the restoration effort continues. The plantations of Red Pine and Scotch Pine are now reaching the end of their natural or biological life. While these were the correct species to use on the former depleted soils, over the years the soils have been replenished and can now support a more natural forest. The old plantations are now being removed in managed stages, to allow natural regeneration of native hardwood and softwood species.

Forest management today is a complex process that involves ecosystem management, habitat enhancement, biodiversity management, landscape ecology, carbon sequestration, ecosystem services, and traditional uses.

GEOLOGIC HISTORY

The topography of New York has been shaped by a complex and turbulent geologic history, including multiple tectonic plate collisions, uplift and erosion of several mountain ranges,

STATE FOREST HISTORY

volcanic activity, earthquakes, igneous intrusions, regional metamorphism, advancing and retreating sea levels, deposition and erosion of huge deltas, and even a huge meteor strike 350 million years ago. Against this changing backdrop, plants and animals evolved, first in the ocean and later on land. New York has one of the world's best fossil records of the Devonian Period (408 to 360 million years ago), with remarkably well preserved marine sequences, and also non-marine fossils that show the transition to land. Most of the bedrock in New York is more than 250 million years old, younger rocks having been almost completely removed by erosion.

Tinker Falls in Labrador Hollow Unique Area occurs over an eastern exposure of the Tully Limestone in Central New York

New York's present landscape is dominated by the impacts of the last ice age. Only a small area of the southwestern part of the state escaped glaciation (the southwest corner of the High Allegany Plateau Ecoregion). Glaciers shaped the high peaks in the Catskills and Adirondacks, changed hydrology, formed huge lakes, and covered much of the state with a layer of glacial till. Where huge glacial lakes once held melt-water, there are now thick sand and clay deposits such as those in the Hudson Valley and parts of Central New York. Remnants of ice age features, such as sand dunes, river sand and gravel deposits, and muck-filled bogs can be found in many parts of the state. But the most ubiquitous material is glacial till, the rough mixture of rocks, sand and clay scraped up and bulldozed by the glacier's ice. This layer of raw debris was left behind as the ice retreated, sometimes in oriented hills called drumlins, more often as an uneven layer over the underlying bedrock. Glaciers erased the existing forests and landforms of New York so thoroughly that there is almost no trace of the pre-glacial ecology.

Glaciation resets the ecosystem clock. Everything has to start over again, beginning with pioneer plant species that colonize the raw rock and sterile mineral debris. New soils began to develop as organic matter accumulated with subsequent plant successions. Tree species, led by spruce about 11,000 years ago, migrated back north from their glacial refuges. As species migrated, they formed many forest types, some of which are no longer found today. Trees migrated as individual species, and moved at different rates depending on successfully they dispersed their seeds. Some of the early trees arriving soon after white spruce included black spruce, elm and black ash. One of the last major species to arrive was chestnut, reaching New York about 2,000 years ago.

State Forests are often on some of the poorest farmland in the state, land that has been little softened by soil since the retreat of the glaciers. For example, some of the sandy soils in northern NY had only a thin organic layer which was quickly destroyed by farming. The result was sand drifts, which can be seen in early photographs of State Forest lands acquired in the

1930s. Hills with very thin rocky soils, sometimes only a few inches above bedrock, also proved to be difficult sites for farming. Today, these sites are forested and slowly regaining organic matter lost to erosion.

Bedrock geology forms the framework for the landscape, influencing the drainage patterns, the elevation, shape and orientation of much of the topography, and also the local climate. For example, some of the topography of New York shows a strong northeast-southwest orientation that is derived from underlying bedrock structures. Bedrock also influences soil and water chemistry. Most of the bedrock in New York, including shale, sandstone and most metamorphic rock, produces acidic soils. Where the bedrock is limestone or marble, soils are high in calcium. The difference between forest types growing on acid and calcareous soils can be dramatic. Where sandstone bedrock is next to limestone bedrock, the change in vegetation is often abrupt. Pitch pines, chestnut oaks, blueberries and other acid-loving plants will not grow on limestone. Other species are more tolerant, notably red cedar which grows well on rocky sites of any type. For red cedar, lack of shade from competition is a more important factor than soil chemistry.

Location and topography is critical for a tree because, unlike an animal, it cannot physically move to another site. Many elements of a site affect a tree, including aspect, elevation, moisture availability, soil thickness and rooting depth, wind exposure, frost effects and soil chemistry. Different species have different site requirements, and the health and vigor of a tree ultimately depends on where it grows. Encouraging the growth of tree species on sites with optimal conditions is one of the important benefits of forest management. For example, sugar maple growing on a south-facing dry slope is likely to be stressed by drought and heat, and more susceptible to insects and disease. However, many oak species would thrive on such a site, since they prefer warm well drained conditions.

Foresters must rely on their knowledge of the site requirements for each tree species and forest community, so their management efforts emulate natural systems as closely as possible, and result in resilient and healthy forests. In the example above, a harvest on a south-facing dry slope would focus on removing species which would be stressed, such as sugar maples, and perpetuating species which do best under those conditions, such as oaks. This purposefully parallels the natural successional changes nature would follow and contributes to the overall ecological health of the area.

MANAGEMENT PLANNING OVERVIEW

STATEWIDE PLAN

This statewide plan has been developed to lead future management of DEC administered State Forests. It establishes statewide management guidelines for DEC staff through a process of public involvement and review. The plan provides a foundation for the development of Unit Management Plans (UMPs), which set forth the specific actions to be undertaken by DEC on individual State Forests. As individual UMPs are developed, this plan will serve as a guide and will be included by reference. This plan will be revised at least once every ten years.

Development of the plan occurs through a **public process** with many steps:

Step 1 - A Draft State Forest Management Plan is written with input from a wide variety of resource experts including biologists, ecologists, foresters, geologists, botanists, and accessibility specialists. The draft plan development relies heavily on existing UMPs and related public input.

Step 2 - The Draft State Forest Management Plan is reviewed by the Department's regional, legal and executive staff with revisions adopted as needed.

Step 3 - The **State Environmental Quality Review Act (SEQRA)** process is initiated by drafting an Environmental Assessment Form.

Step 4 - The Draft State Forest Management Plan is presented to the public for comment. A press release is distributed to news outlets across the State. An e-mail announcing the release of the draft plan is sent to a number of recreational and constituent group leaders. The draft plan is posted on DEC's Public website. Copies of the plan are made available in all DEC field offices, in a number of libraries, and in CD or hard copy form through the mail. Release of the plan and notice of public hearings are posted on the Environmental Notice Bulletin (ENB), a DEC online publication. A press release announcing public hearings and comment opportunities is distributed statewide to all major news outlets. A direct mailing is made to organized user groups. **Public hearings** are held at numerous locations across the State to solicit oral comments. **Written comments** are accepted for 45 days by mail or by e-mail to stateforestplan@gw.dec.state.ny.us.

Step 5 - Comments are reviewed and a **responsiveness document** is then prepared and distributed to all individuals who provide their contact information along with their comments.

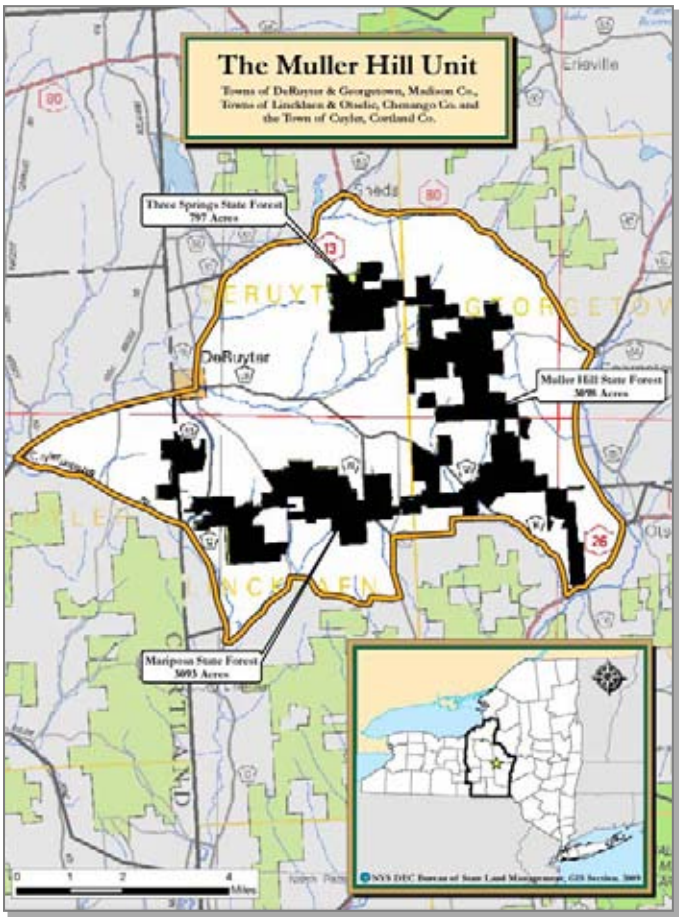
Step 6 - A final State Forest Management Plan is written, with appropriate changes, based on public comments. This plan goes through internal review by DEC executive staff for final approval by the Commissioner. The SEQR process is completed and noticed in the ENB along with adoption of the management plan.

MANAGEMENT PLANNING OVERVIEW

UNIT MANAGEMENT PLANNING

UMPs will establish specific management activities and serve as a vehicle for the implementation of this plan by addressing statewide objectives on the local unit. A **unit**, for the purposes of unit management planning, consists of the state-owned land managed by DEC within a given geographic area. Rather than, develop a UMP for each individual State Forest, DEC staff assemble units, often consisting of multiple State Forests and other DEC administered lands, such as Wildlife Management Areas, that are adjacent and similar to one another.

A UMP contains an assessment of the natural and physical resources on the unit and considers the landscape conditions in the surrounding geographic area. Each UMP supports the ecoregional objectives in this plan. The UMP guides the Department's activities on the unit for a ten-year period, although a number of goals and objectives in the plan focus on a much longer time period. Each plan addresses specific objectives and actions for public use and ecosystem management.



In the development of this plan, the state was divided into 80 UMPs. Based on this reorganization, UMPs have been scheduled to be completed and updated on a 10-year cycle. A statewide map of units and schedule of UMP completion have been developed. A statewide UMP template will be completed to enable timely and more standardized development of UMPs. Reorganization of unit management planning across the state has resulted in a significant reduction in the total number of units and is intended to increase the amount of staff time available for other management activities.

ADDITIONAL RESOURCES

Statewide Map of Units and **UMP Completion Schedule** – A statewide schedule, organized by year of first draft completion, and map delineating the new UMP boundaries can be found at www.dec.ny.gov/lands/64567.html

PUBLIC PARTICIPATION

One of the most valuable and influential aspects of UMP development is public participation. Many diverse public stakeholders help vet potential issues during the planning process. Additionally, public participation gives stakeholders an opportunity to influence the decision making process and know their interests are part of the final plan.

UMP public meetings provide an opportunity for input from concerned citizens, neighbors and user groups

There are a series of steps involved in developing a UMP:

1. Conduct a resource inventory of the State Forests of the unit
2. Solicit written and verbal input from the public
3. Develop a draft UMP
4. Internal review and approval of draft UMP
5. Release draft UMP and conduct public meetings to gather comments on the draft plan
6. Address issues and develop a final UMP
7. DEC Commissioner approves final UMP and implementation begins.

Public Input

Initially, public input is gathered to help begin the process of developing a UMP. People are encouraged to help identify issues that need to be addressed in the plan. Mass mailings, press releases and public meetings may be conducted to obtain input from adjoining landowners, recreation clubs, natural resource organizations and the general public. Initial public input is received in the form of verbal comments, e-mails and letters.

Unit Management Plan Development

Information gathered from the public is incorporated into the draft UMP. After public input is received, Department staff also performs additional fieldwork and conducts in-depth research on topics related to the UMP. All of this information is necessary to provide a sound foundation for decision making. The draft UMP includes a brief local history as it relates to future management, information on the unit, and treatment and project schedules with budgets for the State Forests of the unit.

Draft Unit Management Plan

Once the draft UMP is formally released, timelines and deadlines become less flexible. This is due to the noticing and comment requirements related to the New York State Environmental Quality Review Act (SEQRA) and also due to the need to issue a final UMP and begin implementation. Meetings are held to gather public input on the draft UMP. If individuals are not able to attend a public meeting, comments may also be made in writing, by telephone, fax,

or e-mail up to 30 days after the public meeting. Regardless of the format of public input, all forms of communication with DEC carry equal weight.

Address Issues and Develop Final Unit Management Plan
All comments received are considered, and revisions to the UMP are made as appropriate. A Final UMP is the result, which is reviewed for SEQRA compliance and forwarded to the DEC Commissioner for review and approval.

MANAGEMENT TEAM AND RESPONSIBILITIES

State Forest UMPs are written by DEC's Division of Lands and Forests with input from the Division of Fish, Wildlife, and Marine Resources, the Division of Operations, the Division of Mineral Resources, the Division of Forest Protection and Fire Management, the Division of Public Affairs and Education, and the Office of Invasive Species Coordination. A description of each division's responsibilities is listed below. Additional information can be found on DEC's website at www.dec.ny.gov.

Division of Lands and Forests
Foresters, Forest Technicians and Surveyors in the Division of Lands and Forests are responsible for the stewardship, management, protection, and recreational use of State Forest lands, the care of the people who use these lands and the acquisition of additional lands to conserve unique and significant resources. DEC also provides forestry leadership by providing technical assistance to private forest landowners and the forest products industry.

Division of Fish, Wildlife, and Marine Resources
Biologists, Ecologists and Zoologists in the Division of Fish, Wildlife, and Marine Resources serve the public by using their collective skills to describe, understand, manage, and perpetuate a healthy and diverse assemblage of fish and wildlife populations, and ecosystems.

Within the division, the NY Natural Heritage Program combines thorough field inventories, scientific analyses, expert interpretation, and comprehensive databases to deliver quality information on New York's flora and fauna. The Natural Heritage Program studies the most imperiled species, ecosystems, and high-quality natural areas, enabling management decisions that have significant and lasting effects on the preservation of New York's biodiversity.

Division of Operations
Engineers and field staff in the Division of Operations provide technical services, facilities management, and maintenance of physical assets to insure effective and efficient operation of DEC and safe public use of Department lands and facilities.

Division of Mineral Resources
The Division of Mineral Resources is responsible for ensuring the environmentally sound, economic development of New York's non-renewable energy and mineral resources for the benefit of current and future generations.

Division of Forest Protection and Fire Management

Forest Rangers in the Division of Forest Protection and Fire Management are responsible for the preservation and protection of the state's forest resources, and the safety and well-being of the public using these resources.

Division of Public Affairs and Education

Staff in the Division of Public Affairs and Education communicate with the public; promote citizen participation; train teachers and inform students; operate four environmental education centers and four summer environmental camps for youngsters; publish print materials; produce broadcast and audio-visual communications; develop and manage DEC's web site.

Office of Invasive Species Coordination

The Office of Invasive Species Coordination is responsible for preventing or minimizing the harm caused by invasive species to New York’s environment by collaborating and coordinating efforts with all stakeholders across the state.

SUSTAINABILITY AND FOREST CERTIFICATION

SUSTAINABLE FOREST MANAGEMENT

Sustainable forest management is the practice of meeting the forest resource needs and values of the present without compromising the similar capability of future generations (Helms 1998). On State Forests, this means maintaining their health, productivity, diversity, and overall integrity in the long run in the context of human activity and use. It is a process of informed decision-making that takes into account resource needs, public use objectives, site capabilities, existing regulations, economics and the best information available at any given time (Wisconsin Dept. of Natural Resources 2003).

Those concerned about forest management have long recognized the challenge of balancing social, economic and environmental objectives. They also recognize the complex relationship between forest management practices and the long-term sustainability of the forests.

It is DEC's goal to sustainably manage New York's State Forests and to maintain certification of that management under the most current and applicable standards set forth by the Sustainable Forestry Initiative and Forest Stewardship Council.

Using an integrated approach to the management of diverse resources, preparing comprehensive plans, recommending best practices, and proposing guidelines are not new concepts. However, the following concepts may be considered by some in the field of forest management as new:

- Consolidating integrated management decisions to support the sustainability of many different resources within forest communities
- Recognizing that management decisions should be designed to accommodate a wide range of resource needs, public-use objectives, and site conditions
- Taking a broad-based, collaborative approach that results in user-friendly planning decisions applicable to the entire State Forest system.

FOREST CERTIFICATION

Forest certification by a recognized authority is a way of publicly ensuring that State Forests are sustainably managed. In 2000, the Bureau of State Land Management received Forest Stewardship Council (FSC) certification under an independent audit conducted by the Rainforest Alliance's SmartWood program. This certification included 720,000 acres of State Forests in DEC's regions 3 through 9 that are managed for multiple uses, like water quality protection, recreation, wildlife habitat protection, logging and mining. To get these forests certified, DEC 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.

SUSTAINABILITY and FOREST CERTIFICATION

The certification audit contract with the SmartWood Program expired in2005. Recognizing the value of dual certification, the Bureau of State Land Management sought bids from independent auditing firms to compare the management of the State Forest system against the two most internationally accepted forest certification standards; those of the FSC and the Sustainable Forestry Initiative ® (SFI).

Signing on with auditing firms NSF-International and Scientific Certification Systems (SCS), more than 762,000 acres of state forests managed by DEC in its regions 3 through 9 were again audited; this time for dual certification against FSC and SFI program standards. The audit lasted from May until July of 2007 and dual certification was awarded in January 2008.

ADDITIONAL RESOURCES

The **SCS audit report** (audit vs. FSC standards) and **NSF audit report** (audit vs. SFI standards), are located at www.dec.ny.gov/lands/42947.html

#SCS-FM/COC-00104N

©1996 Forest Stewardship Council FSC certification means that NYSDEC State Forests are managed according to strict environmental, social and economic standards.

#NSF-SFIS-6I741

NYSDEC use of the Sustainable Forestry Initiative® logo indicates that State Forests have been certified by a qualified independent auditor to be in conformance with the SFI standard.

FOREST SUSTAINABILITY AS MEASURED BY THE MONTREAL PROCESS

The Montreal Process is an internationally driven initiative to measure and promote sustainable management of the world's forests. The process was initiated by a United Nations committee at a 1992 meeting in Montreal, Canada. Over the next few years a working group, including representatives from the United States and nine other countries, developed a framework of seven *criteria* and 67 *indicators* for data collection and evaluation and, to the extent possible, standardized reporting of forest management at an international level. As of the date of this plan, 12 countries have signed on to abide by the Montreal Process: Argentina, Australia, Canada, Chile, China, Japan, Mexico, New Zealand, the Russian Federation, South Korea, the United States, and Uruguay.

ADDITIONAL RESOURCES

For more information on the Montreal Process including a full listing of the criteria and 67 indicators, their website can be found at www.rinya.maff.go.jp/mpci/

The seven criteria of the Montreal Process are:

- Conservation of biological diversity
- Maintenance of productive forest ecosystems

- Maintenance of forest ecosystem health and vitality
- Conservation and maintenance of soil and water resources
- Maintenance of forest contribution to global carbon cycles
- Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
- A legal, institutional and economic framework for forest conservation and sustainable management

While this management plan does not directly follow the Montreal Process criteria and indicators, their essence has been adopted in the DEC's management strategies. The following "crosswalk" indicates areas of this plan as they relate to the criteria.

Crosswalk between the Montreal Process and State Forest Management	
Montreal Process Criteria	**State Forest Strategies**
Biological Diversity	Landscape Assessment, Protected Species
Forest Ecosystems	Ecosystem Management Strategy
Ecosystem Health and Vitality	Deer Management, Plantation Management, Forest & Tree Retention, Invasive Species Control, Insect & Disease Control
Soil and Water Resources	Soil Protection and Ecology, Water Ecology, Best Management Practices, Stream Management Zone Rules
Global Carbon Cycles	Carbon Sequestration, Fire Management, Protecting Forest Health, Forest Products
Needs of Society	Supporting Local Communities, Universal Access, Meeting Recreational Needs, Preserving Historical & Cultural Resources
Sustainable Management	Managing on a Sustainable Basis, Green Certification of State Forests

STATEWIDE MANAGEMENT GOALS

The following broad goals shall be used as the basis for State Forest management decisions, in conjunction with the appropriate statutory, regulatory and policy guidance. Objectives in this plan are written primarily with the intent of serving one or more of these goals.

GOAL 1 – PROVIDE HEALTHY AND BIOLOGICALLY DIVERSE ECOSYSTEMS

Ecosystem health is measured in numerous ways. One is by the degree to which natural processes are able to take place. Another is by the amount of naturally occurring species that are present, and the absence of non-native species. No single measure can reveal the overall health of an ecosystem, but each is an important part of the larger picture. DEC will manage State Forests so they are judged to be in a high degree of health as measured by multiple criteria, including the biodiversity that they support, how connected they are to other forests, and their ecological function.

GOAL 2 – MAINTAIN HUMAN-MADE STATE FOREST ASSETS

Human-made assets on State Forests include structures, boundary lines, trails, roads and any other infrastructure or objects that exist because they were put there by people. Many of these items need no more than a periodic check to make sure they are still in working order. Others need regular maintenance to counteract the wear of regular use. It is DEC's intent to ensure that all human-made items on State Forests are adequately maintained to safely perform their intended function.

GOAL 3 – PROVIDE RECREATIONAL OPPORTUNITIES FOR PEOPLE OF ALL AGES AND ABILITIES

State Forests are suitable for a wide variety of outdoor recreational pursuits; some are compatible with one another, while others are best kept apart. Equally varied are the people who undertake these activities, as well as their abilities, and their desire to challenge themselves. While not all people will be able to have the experience they desire on every State Forest, DEC will endeavor to provide recreational opportunities to all who wish to experience the outdoors in a relatively undeveloped setting. This is consistent with DEC's goal of helping citizens maintain a connection with nature.

GOAL 4 – PROVIDE ECONOMIC BENEFITS TO THE PEOPLE OF THE STATE

ECL §1-0101(1) provides in relevant part that "It is hereby declared to be the policy of the State of New York to conserve, improve and protect its natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall **economic** and social well being"

(emphasis added). In considering all proposed actions, DEC will attempt to balance environmental protection with economic benefit.

GOAL 5 – PROVIDE A LEGAL FRAMEWORK FOR FOREST CONSERVATION AND SUSTAINABLE MANAGEMENT OF STATE FORESTS

Staff must have clear and sound guidance to direct their decisions and actions. Likewise, the public must have clear information regarding what they are and are not allowed to do on State Forests. Both functions are provided for by well-written laws, regulations and policies. DEC will work to improve existing legal guidance where it has proved to be inadequate, and create new guidance as needed.

"SM" OBJECTIVES AND ACTIONS

Statewide Management (SM) Objective I – This Strategic Plan for State Forest Management will be implemented through the future development of individual UMPs.

SM Action 1 – Develop a template for future UMPs which incorporates state wide recommendations, by December 2010.

SM Action 2 – Apply SEQR analysis thresholds during UMP development to ensure that proposed actions comply with this GEIS.

SM Action 3 – Engage the people of the state in formal public input into actions on specific State Forests via UMP development.

SM Objective II – DEC will maintain green certification of State Forests.

SM Action 4 – State Forest Management will be annually audited by independent auditors against the standards of the Forest Stewardship Council and Sustainable Forestry Initiative to assess sustainable management. Annual reports will be posted on the DEC public website to provide transparency and document improvements.

SM Action 5 (also AFM 4, SW 2, AR 4) – Provide continuing education opportunities for DEC staff as follows:
2010-11 – identification & management of at-risk species and communities, using PROs
2011-12 – landscape ecology and SPSFM implementation
2012-13 – enhancement of forest matrix blocks and connectivity
2013-14 – climate change adaptation
2014-15 – soil & water protection BMPs
2015-20 – TBA

SM Objective III – Appropriate levels of funding will be secured for the management, protection and maintenance of State Forests.

SM Action 6 – Annually, prepare realistic budget requests for adequate funding to ensure sustainable management and meet the multiple use goals of this plan.

STATE ENVIRONMENTAL QUALITY REVIEW (SEQR)

The SEQR Act requires local and state government agencies to consider environmental factors early in the planning stages of actions they directly undertake, fund or approve. The basic purpose of SEQR is to inform agency decision-making so that proposed actions are modified or conditioned to avoid and mitigate damage to the environment, enhance human and community resources, and enrich understanding of ecological systems. The proposed action to be analyzed in this section is the development and implementation of this Strategic Plan for State Forest Management (SPSFM).

GENERIC ENVIRONMENTAL IMPACT STATEMENT

Because this is a broad-based plan, DEC chose to prepare a generic environmental impact statement (GEIS) to analyze potential environmental impacts that may arise from its implementation. GEISs are commonly used for comprehensive plans that cover a broad geographic area involving common resources such as New York State Forests. Typically, GEISs are conceptual in nature, and establish performance standards or best management practices (BMPs), other plan conditions and impact thresholds.

The GEIS in this plan establishes BMPs for each category of forest management actions included within. These BMPs are designed to ensure that future management actions and UMPs avoid or mitigate detrimental environmental impacts to forests to the maximum extent practical.

Furthermore, this plan establishes the environmental impact thresholds that would trigger future SEQR reviews of management activities requiring a more in-depth or site-specific assessment of potential environmental impacts (see below). However, future management actions that conform with this plan, and do not trigger any thresholds established in it, would not require any additional SEQR review.

Finally, certain categories of management activity may result in adverse environmental impacts; for example herbicide application. In such cases, an analysis of less damaging alternatives is presented within their respective sections. A brief statement regarding the option of not acting on this plan is given at the end of this chapter.

Description of the Proposed Action

Development and implementation of the SPSFM: The SPSFM has been developed to consolidate and standardize the administration of all State Forests by incorporating principles of ecosystem management and landscape ecology. The analyses included in this plan are also based on the experience of more than 25 years of unit management planning across the State. Over that time, public input, fieldwork, inventories and in-depth research on key topics have provided a sound foundation for decision making. The knowledge gained, if acted upon through this statewide plan, can inform future State Forest management decisions. Issues that have

been addressed and will continue to be weighed and balanced as future decisions are made include:

- continued conversion of most plantations to a more natural forest condition
- increased recreational demands and impacts
- decreasing staffing and funding
- demand for domestic energy resources such as natural gas
- protecting species of greatest conservation need
- demand for highly valued forest products
- control of invasive pests
- addressing climate change and carbon sequestration

Environmental Setting

The environmental setting of the State Forest system and surrounding landscapes are discussed in chapters 1 and 2. Chapter 1 includes a map of State Forests throughout New York, a discussion of State Forest units, and a list of infrastructure and resources, along with a general history. Chapter 2 highlights the landscape surrounding State Forests, based on TNC ecoregions and presents a general analysis of the State Forest system by land cover and habitat type.

SEQR Analysis of Specific Management Activities: Environmental Impacts, Mitigation Measures and Alternatives

Each proposed management activity is evaluated for its potential environmental impacts in chapters 4-7. Specific objectives and management actions are listed along with their short-term and long-term impacts, cumulative impacts, mitigation measure and alternatives, and where applicable, thresholds for requiring additional SEQR are established.

The following list identifies issue areas which may be of particular concern to the general public and other interested parties, or which potentially could cause significant environmental impacts:


Off Highway and All Terrain Vehicle Use: *page 213*


Plantation Management: *page 261*


Active Forest Management (including, in limited cases, clearcutting and use of pesticides for control of interfering vegetation and invasive species): *page 81*


Oil and Gas Leasing and Development: *page 227*

Increased Recreational Demand and Use of State Forests: *page 187*

No-Action Alternative

Choosing not to act on the SPSFM will impair the management of State Forests. Without the SPSFM, statewide goals and strategies will not be established to meet the critical forest issues mentioned previously. Additionally, land managers will not have the necessary guidance to make decisions at the forest unit level that take into consideration statewide concerns.

CHAPTER 2

ECOSYSTEM MANAGEMENT

ECOSYSTEM MANAGEMENT

An ecosystem based management strategy will holistically integrate principles of landscape ecology and multiple use management to promote biological diversity, while enhancing the overall health and resiliency of State Forests. In recognition of the fact that forests are dynamic systems, constantly being shaped by the forces of nature, DEC will also apply adaptive management techniques and advanced technology to react to insect and disease epidemics, wind and ice storms.

Ecosystem management is a process that considers the total environment, including all living and non-living components. It requires skillful use of ecological, economic, social, political and managerial and leadership principles to sustain or restore ecosystem integrity, as well as desired forest uses, products, values and services over the long term. Ecosystem management recognizes that people and their social and economic needs are an integral part of ecological systems. (USBLM 1994)

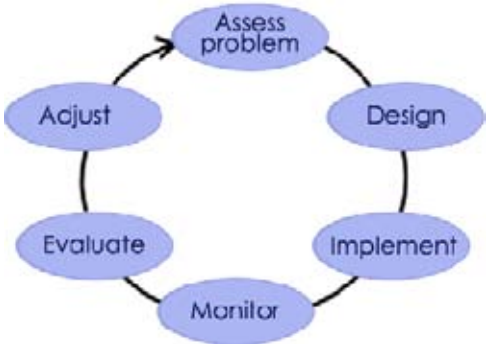
As the ecosystem management concept is applied through the actions recommended in this plan, DEC will strive to strike a balance between human needs and ecosystem health. To achieve this, the plan recommends actions that promote biodiversity at the landscape level, as well as healthy, productive, sustainable forest ecosystems.

Emphasis will be placed on enhancement of carbon sequestration, the protection of rare, endangered and threatened species, and the perpetuation of unique natural communities. The primary focus of management will be to provide a wide diversity of habitats that naturally occur in New York. However, when at-risk species and communities are present, actions will be taken to protect those specific populations or communities.

Ecosystem management – One of the simplest definitions of ecosystem management points out the complexity of understanding and managing an ecosystem. That definition is in the form of a slogan on a United States Forest Service poster promoting ecosystem management. The slogan simply defines ecosystem management as "Considering All Things." This approach asks that management decisions consider all living things from soil micro-organisms to large mammals, including their complex interrelationships and habitat requirements; all non-living components of the ecosystem, including physical, natural, and geological components; and all social, cultural, and economic factors as well.

Adaptive management

- Helps science managers maintain FLEXIBILTY in decisions, knowing that uncertainties exist and they need latitude to change direction
- Will improve UNDERSTANDING of ecological systems to achieve management objectives
- Is about taking ACTION to improve progress towards desired outcomes. (U.S. Department of the Interior 2007)



INTRODUCTION

ECOSYSTEM MANAGEMENT

The cornerstone of ecosystem management is promotion of ecosystem integrity, including a biologically diverse landscape. To accomplish this goal, diversity must be viewed and enhanced on a large scale, which requires us to assess conditions on a statewide and ecoregional scale. Ecosystem integrity cannot be sustained or enhanced without considering land use and cover type diversity beyond the State Forests. For example, important landscape features such as grasslands and forests need to be present in relatively large blocks and be connected to one another by hedgerows, riparian zones, or wetlands to be completely functional. These connections allow animals to move from one habitat to another, as needed when populations fluctuate.

Landscape ecology - "the study of the distribution and abundance of elements within landscapes, the origins of these elements, and their impacts on organisms and processes... [This approach] promotes stability of natural systems, diversity and structural heterogeneity to improve resistance and recovery from disturbances." (Landscape Ecology 2005)

Multiple-use management seeks to simultaneously provide many of the following resource values: fish and wildlife, wood products, recreation, aesthetics, grazing, watershed protection, and historic or scientific values.

BIODIVERSITY

Biodiversity is the variety and abundance of living things, their habitats, and their interdependence in a given area or "landscape." It is by definition greater when many species of plants and animals are present in the landscape. It is further enhanced if each respective population has a wide range of genetic variability and ages. Having many different habitats also contributes to greater biodiversity. Peer reviewed scientific studies strongly suggest that diverse ecosystems are more resilient to environmental stresses, human impacts, and attacks by insects and disease.

This small portion of landscape has many necessary structural elements including hedgerows, riparian zones and forest corridors; however grasslands and large blocks of forest are not present

Diversity within a given unit can be broadly measured and interpreted by assessing the variety of species and the range of land cover types and forest development stages present. A very important attribute of diversity is scale. It must be recognized that some components of diversity must be present in large enough blocks to effectively accommodate and develop their full potential and value to the greater landscape and ecological systems.

INTRODUCTION TO LANDSCAPE ASSESSMENT

What is a Landscape?

The term landscape often conveys different meanings for different people. For the purposes of this assessment, the term is used from a Landscape Ecologist's point of view. Landscape Ecologists use the term "landscape" to refer to the view that one can see from an airplane or a mountain on a clear day; a mixture of land uses and patterns over tens of miles that is consistently repeated (Perlman and Midler 2005). In much of New York State, the landscape can be described as a patchwork quilt. Each patch is a different size, and most of the patches represent forest or fields, which are often connected by streams, rivers, valleys and hedgerows. Outside of the intensely developed urban, suburban and village areas of the state, the landscape is made of repeating patches of forests, hayfields, croplands and water bodies. Within and near developed areas, the patches of fields and forests change in nature and become more fragmented and smaller in size. Large urban areas occupy hundreds of square miles that appear from a plane as a mixture of green and grey patterns; the green – areas dominated by vegetation - is often called green infrastructure and the grey - the buildings, roads and highways - is often called grey infrastructure.

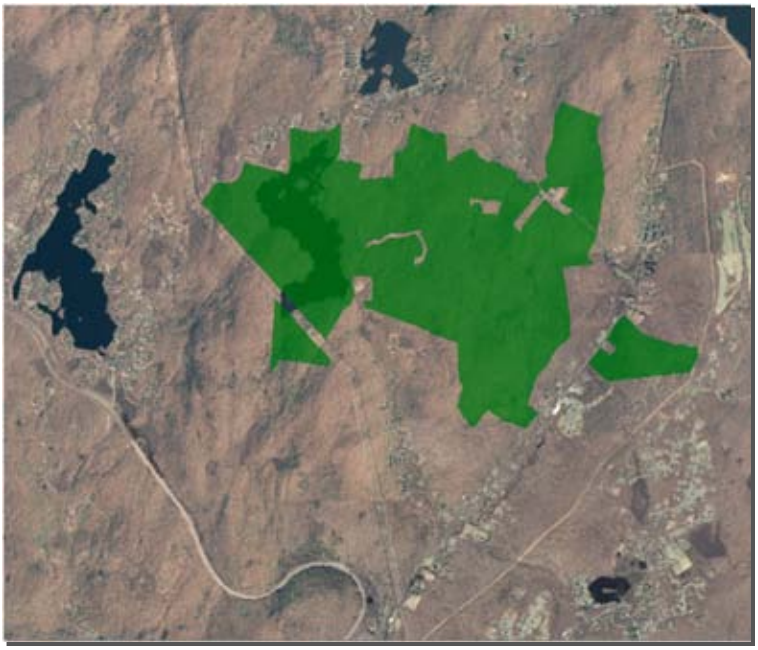
Managing at a Landscape Level

Today's public land managers must consider how the lands they manage fit into and ultimately impact the "bigger picture" or landscape. Ongoing research by universities and conservation organizations and agencies shows that ecosystem health is strongly related to biological diversity. Biodiversity is the term used by conservation biologists to describe the entire diversity of life, encompassing all the species, genes and ecosystems on the Earth (Perlman and Midler 2005). Having a wide range of naturally occurring plant and animal species, land types, and ecosystems in a landscape increases biodiversity and ecosystem resiliency. Despite the great importance of species diversity, it is almost impossible to manage all lands on a species-by-species basis. An ecosystem management strategy requires

managers to consider the thousands of forest-dependent species from soil micro-organisms to larger mammals, fungi to trees and insects to humans. The most effective and attainable strategy is to manage for a wide diversity of habitat types and "communities" of varying ages and structural diversity, with the goal of having ideal conditions available on the landscape for each and every species. Sustainable landscapes, in turn, must also be connected to different land types by natural habitat features at many different scales and have core blocks of minimally fragmented habitat. Managing at the landscape level requires a thorough assessment of the natural and present diversity of the landscape, an understanding of the patterns and processes affecting these dynamic, ever-changing systems, and applying this information to decision-making processes on State Forests.

What can State Forests contribute to the Landscape?

New York's State Forest lands serve as large blocks of open space on the landscape outside of New York's Adirondack and Catskill Forest Preserve that won't be subdivided, developed or converted to grey infrastructure. As the landscape changes over time, these green blocks and patches across the landscape will act as essential ecosystems supporting people, plants and animals, providing needed habitats and ecosystem services such as carbon sequestration, clean water and a sustainable supply of forest products. State Forests, due to their perpetual term of ownership, dedicated purposes and large contiguous acreage, are uniquely able to contribute habitat types and other components of biodiversity which are not normally found or sustained on privately held forest lands. State Forests will be managed, in the context of their surrounding landscape, to increase connectivity and biodiversity, and to enhance the resiliency and sustainability of the greater ecosystem.



Aerial view of California Hill State Forest in Putnam County

Addressing all the biodiversity gaps identified will not be possible, as State Forests represent a small portion of the overall landscape, a portion of the entire picture for biodiversity conservation, and must be managed for a variety of purposes. The size of each habitat component is often as important as the diversity of the components present. A good example is late successional forests. The large blocks of land in the Adirondack and Catskill Forest Preserve are better able to contribute late successional habitat, to the benefit of all its associated life

forms, than an equal acreage of late successional habitat dispersed across the state in smaller blocks. State Forests are, on the other hand, better able to provide those components of diversity that are created through active vegetation manipulation, given their dedication by law to forestry purposes. However, creating late successional habitats in other parts of the state is still a high priority, due to its relative absence on the landscape. Stands of late successional habitat can be grouped into large blocks where possible, instead of being scattered and small.

LANDSCAPE ASSESSMENT PROCESS

To apply principles of landscape ecology and enhance biodiversity, management decisions within State Forest boundaries must be made while considering their impact on the landscape surrounding the State Forest. If the surrounding landscape conditions are not taken into consideration, any efforts to promote biodiversity on a State Forest may not contribute to the diversity and ecological viability of the greater landscape surrounding it. To begin with, a landscape assessment must be conducted to illustrate and analyze landscape conditions.

Specifically, a landscape assessment does the following:

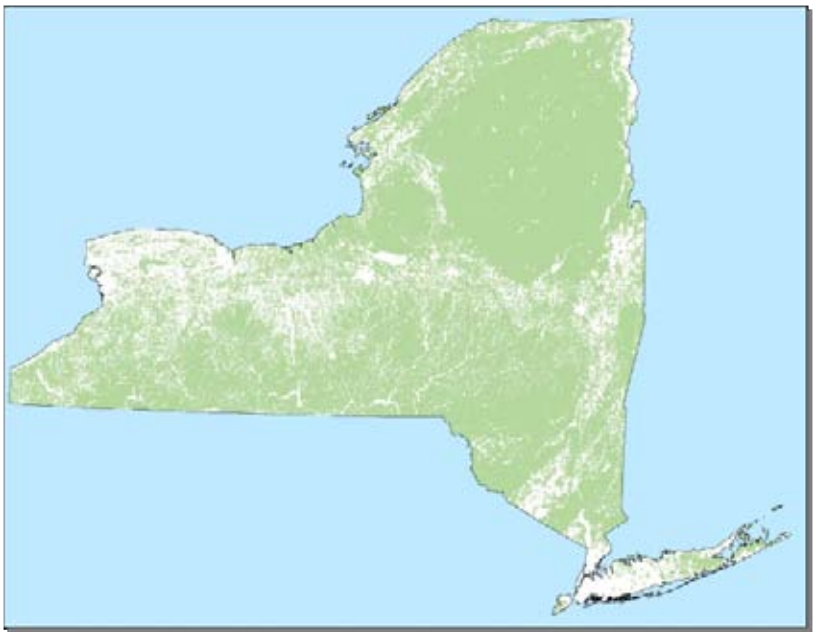
1. Describes the historical background.
2. Defines the existing conditions and ecological functions (i.e. the diversity of habitat types, forest structure and age, location within and relationship to the greater landscape).
3. Identifies natural and human-induced stressors that are exerting influence on natural systems, and the trends that are taking place as a result.
4. Identifies the missing or under-represented components of diversity and other ecological functions most appropriate for the site (gaps).

Landscape conditions must be assessed at multiple scales to fully understand conditions and identify opportunities to promote biodiversity. This chapter contains a statewide landscape assessment, including an assessment of the State Forest system, as well as ecoregional assessments. The planning-unit-level assessment will be conducted in each respective UMP.

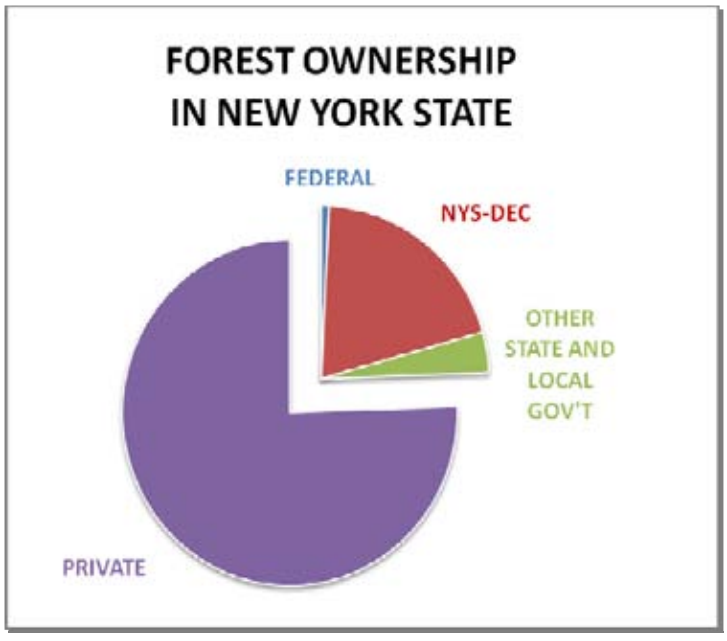
Source Data

To help assess the landscape within and surrounding the State Forest System, land cover data largely generated by satellite imagery from both the **2001 New York GAP Analysis Program (NYGAP)** and **National Land Cover Data (NLCD)** set was used (Multi-Resolution Land Characteristics Consortium (MRLC) 2008). Land cover from these resources was analyzed for the entire State and by (The) Nature Conservancy (TNC) ecoregions.

STATEWIDE LANDSCAPE ASSESSMENT



With an estimated population of 19,490,000 people, New York State covers an area of about 48,440 square miles, or about 31 million acres, with almost 19 million acres of forest cover. Interestingly, New York State has about one acre of forest land per person. Land cover from these resources was analyzed for the entire state and for each Nature Conservancy ecoregion. A map of the ecoregions can be found on *page 65*. According to the 2001 Gap Analysis of New York Final Report (Smith 2001), New York State's landscape is a combination of forest (63%) and cropland or old field/pasture (24%). The satellite image data for the 2001 study was acquired by the Landsat 5 Thematic Mapper during the spring and summer seasons between 1991 and 1993. Newer information collected in a similar fashion from a second generation of satellite imagery produced by the Multi-Resolution Land Characteristics (MRLC) Consortium in 2001 shows a slight change, with forests comprising 61 % of the state's landscape. The difference in forest cover percentage can likely be attributed to statistical variation and differing sampling techniques.



Of New York's approximately 19 million acres of forests, about 14 million acres (82%) are privately owned, and nearly 4 million acres (13%) are owned and managed by the State of New York as Forest Preserve, State Forests, Wildlife Management Areas and State Parks.

The 786,329 acres of State Forests addressed by this management plan represent 2.6% of the state's total land area, and about 4.0% of the state's total forest cover. State

STATEWIDE LANDSCAPE ASSESSMENT

Forests provide relatively large blocks of undeveloped land, and as such provide unique habitat and open space for people, plants and animals. Given the projected urbanization of the state, the importance of State Forests in New York State as protected open space, working demonstration forests, recreational areas and core wildlife habitats, along with the ecosystem services they provide, will undoubtedly continue to grow over time.

HABITAT ASSESSMENT

Early Successional Forest and Shrub Habitat

"Early successional habitat composed of young trees and shrubs, often occupying recently disturbed sites and areas such as abandoned farm fields, provides unique and important habitat for many wildlife species. Some of the tree and shrub species that colonize abandoned agricultural land and disturbed sites include grey birch, dogwood, aspen species, cherry, willow, and alder." (Natural Heritage Elements - Species Level 2003-04). Species that benefit from the presence of early successional habitat include chestnut-sided warbler, golden-winged warbler, yellow warbler, yellow-breasted chat, field sparrow, ruffed grouse, cottontail rabbit, snowshoe hare, woodcock, white-tail deer, and red and gray foxes.

Early successional habitat and many associated species can be found where land has been recently disturbed - Photo credit USDA-NRCS

Historical Background: Based on records from pre-settlement land surveyors, researchers have estimated that between 2 and 6% of the pre-settlement northern hardwood forest was in young forest cover (Lorimer and White 2003). Coastal areas, valleys and transitional hardwood sites in New York's southern tier likely had higher percentages of young forest – typically less than 15%. An even higher amount of early successional habitat is estimated to have been present in coastal areas (including the shores of the Great Lakes and the Atlantic). Due to more frequent disturbances in these areas from hurricanes and greater incidence of burning by Native Americans, especially in coastal oak and pitch pine forest types, 31% of this area is estimated to have been in early successional stages.

To highlight another specific geographic region, consider New York State Museum bulletin no. 484 entitled "Late Eighteenth Century Vegetation of Central and Western New York State on the Basis of Original Land Survey Records," published in 1992. The study was completed using Military Tract survey records from the 1790s to describe the vegetation present at that time in the central Finger Lakes region of New York. In summary, the study concluded that more than

97% of the region was forested prior to widespread European settlement (Marks, Cardescu and Seischab 1992). The remaining 3% of the landscape were openings created by windfall, beaver meadows or former Native American settlements.

Existing Conditions: Analysis of the landscape using satellite-generated land cover from NYGAP and the later National Land Cover Database (NLCD) shows that early successional habitat cover types presently occupy between 2% and 6% of each ecoregion. Statewide, the NYGAP Report estimated about 2% of the state is in early successional cover. The NLCD (which includes emergent herbaceous wetlands) places the statewide average at about 5%. According to the NLCD, between 1 and 3% of State Forests are presently covered by early successional habitat.

Nelson Swamp Unique Area in Madison County currently contains significant early successional cover

Trends: To assess trends in the age of New York's forests (both public and privately owned), the U.S. Forest Service, Forest Inventory Data was consulted. A comparison of the 1980 and 1993 USFS Forest Service Forest Inventory Statistics of forest land outside the Forest Preserve illustrates a dramatic trend: in 1980, 30% of forest land was classified as "seedling/sapling" (which roughly approximates early successional habitat). In 1993 this habitat type dropped almost by a half to 16% of forest land in the state (outside the Forest Preserve). The most recent US Forest Service statistics are online at: http://fiatools.fs.fed.us/fido/standardrpt.html. This survey covered the period from 2003 to 2008, sampled all forest lands in New York State (including the Forest Preserve), and defined the forest by age classes instead of size classes. Under this metric, early successional habitat is best represented by forests ranging from zero to 19 years. Forests in this age range now represent 7% of the total forested acreage in New York State. While it is difficult to directly relate this to the 1980 and 1993 inventory data, it still suggests a continued decline in early successional habitat.

Early successional cover may continue to decrease as time progresses unless steps are taken to deliberately create, enhance and sustain new habitat, particularly on publicly managed lands and private lands such as rod and gun clubs, which are commonly managed to create diverse wildlife habitat. Early successional habitat is especially important in that it supports a high diversity of birds, mammals and reptiles (Perlman and Midler 2005). In fact, New York State's Comprehensive Wildlife Conservation Strategy recognizes the value of this land cover type and identifies early successional birds as a "greatest conservation need" species group. There is no consensus within the scientific community as to what is the optimal percentage of the

landscape occupied by early successional cover. Many bird and mammal species dependent on early successional habitat are declining in population, and would benefit from the creation and maintenance of this habitat type. Decisions concerning the management of this type of habitat must be made in consideration of both current and historic population levels of these species, and within the context of the amount of early successional habitat on other lands in the surrounding landscape.

Mid Successional Forest Habitat Assessment

Historical Background: Most of the forest across New York's landscape originated from heavy cutting and land clearing to establish farms during European settlement. In the late 1800s only 25% of New York State remained forested. Many of the lands cleared for farming proved to be of marginal quality and others failed as a result of poor farming practices depleting the soil. Farm failures peaked in the Great Depression, setting the stage for natural succession and the re-birth of forests.

Mid successional forest with a relatively open understory

Existing conditions: As a result of their similar past history, most of the state's forests are even-aged and are often less than 120 years old. The trees in these mid successional forests have grown larger than those found in early successional forests, but the vertical diversity that typifies late successional forests has not yet developed. Mid successional forests are therefore defined as forests that are pole-sized or larger, with relatively open understories. This "wave" of even-aged forest presents both challenges and opportunities to land managers.

Trends and stressors: While it is possible to classify these forests as middle aged, some of the tree species are reaching and exceeding their biological maturity, especially those classified as early successional and shade intolerant, like aspen, ash and birch. These trees will be more susceptible to insect and disease issues and will naturally be replaced by more shade tolerant species. Over the next 50 to 100 years this "wave" of middle aged forests will continue to mature and develop attributes associated with late successional forest habitats, except in cases where harvesting or natural disturbances "set the clock back" on succession.

Late Successional Forest Habitat Assessment

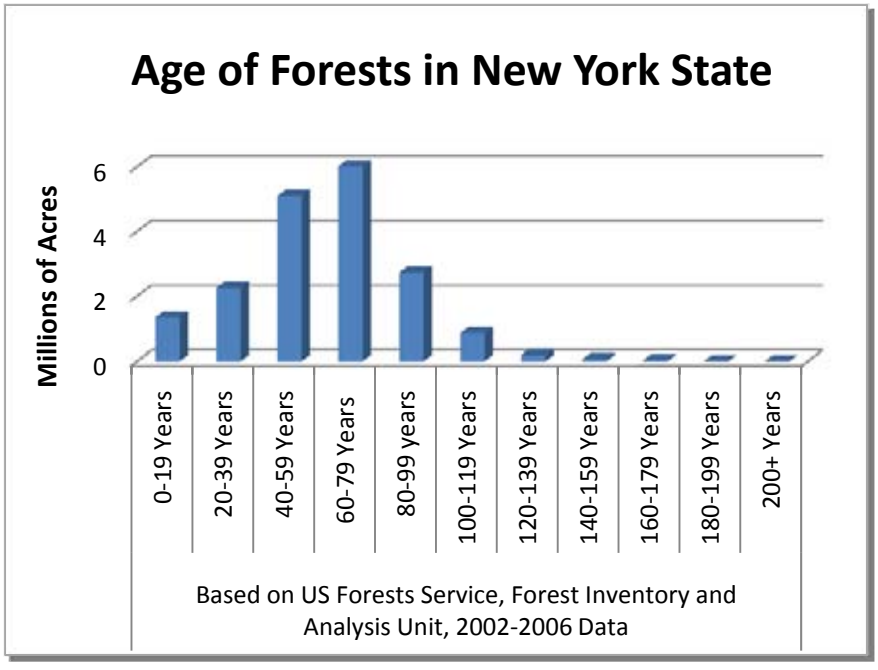
State Forests, parks and preserves provide significant blocks of both actively and minimally managed late successional forest cover. Late successional forest cover provides habitat for animals such as red backed, northern dusky, spotted and marble salamanders; black bear, fisher, bobcat, smokey shrew and northern flying squirrel; wood thrush, Louisiana water thrush, black-throated blue warbler, ovenbird, hermit thrush, eastern wood pewee, golden-crowned

kinglet, least flycatcher, Swanson's thrush, blue headed vireo, yellow bellied sapsucker, veery, red-eyed vireo, scarlet tanager and Cerulean warbler. It is also essential for a wide variety of lichens, mosses, vascular plants and soil micro-organisms.

Historical Background: Early settlement, land clearing for agricultural needs and industrialization of New York State removed much of the state's forest cover. Between 1700 and 1900, approximately 75% of New York's land area was deforested, when deforestation reached 85% or more for some counties (Caslick 1975). Large scale forest disturbance from European settlement and the rapid industrialization of the state that followed was probably the greatest event to impact New York's forest resource since the last glacier retreated and the landscape began to recover some 10,000 years ago. Thus, most of the state's late successional forest cover was lost in a very short period.

Existing Conditions: Today, the vast majority of New York's forests are less than 140 years of age and, by their very nature, often lack late successional habitat components such as large diameter dead standing trees (snags), large diameter deadwood on the ground (coarse woody debris) and large diameter biological legacy trees. Statewide, U.S. Forest Service inventory data show that less than 1% of the state's forest resource is greater than 140 years in age. Most forests and forest ecosystems simply haven't had the time to develop late successional habitat characteristics. As previously mentioned, about 14 million acres, representing about 76% of New York's forests, are owned privately and periodically harvested, often with limited technical assistance from professional foresters. New York's private lands are subject to pressures associated with land development, subdivision, rapid turnover in ownership and financial need.

New York State has more forest land in a "preserve" status (i.e., not permitted to be commercially harvested) than any other state in the Northeastern United States (including the States of CT, DE, ME, MD, MA, NH, NJ, OH, PA, RI, VA, VT and WV). These are lands which, over time have the potential to develop into late successional forests, barring large natural or human-caused disturbances. According to 2008 data from the US Forest Service Forest



Inventory and Analysis Unit, 5% of the Northeast's forests lands are reserved from harvesting. Over 18% of New York State's forests are in this category.

The Adirondack and Catskill Forest Preserve and the State Park System provide nearly 3.1 million acres of mostly forested open space that will continue to provide late successional habitat. The Adirondack and Catskill Forest Preserve are constitutionally protected from harvesting and New York State Parks are protected by policy from commercial tree cutting. Additionally, on the nearly 1 million acres of State Forests and Wildlife Management Areas some forests are managed in a manner that promotes the development of late successional habitat. Further, private land conservation trusts protect about 366,000 acres, which adds to the potential statewide late successional habitat land base (Aldrich and Wyerman 2005). Federal lands in New York add an additional 163,000 acres.

Trends: The great majority of properties within the forest preserve that underwent significant disturbance will continue to progress towards a late successional condition. A small percentage will likely undergo additional natural disturbance, but the amount of late successional habitat within the forest preserve will likely continue to increase. At some point, taking into account the eventual equilibrium between natural disturbance and forest succession, late successional forests in the forest preserve will comprise between 15 and 20 percent of the state's forest land. Forests owned by non-industrial private landowners will contribute to the statewide late successional forest cover on lands protected from harvesting by conservation easements held by land trusts. Portions of State Forest lands will be managed using uneven-aged management systems, allowing them to develop late successional characteristics. It is virtually impossible however, that late successional forests will ever make up as high a percentage of the landscape in other parts of the state as they eventually will within the Adirondack and Catskill blue lines.

Evergreen Forest Cover Habitat Assessment

Evergreen (non-deciduous conifer) forests are important because they moderate temperature extremes, help improve previously eroded and nutrient-depleted soils, and provide valuable winter cover. Mammals that require or benefit from evergreen cover include the red squirrel, fisher, snowshoe hare and white-tailed deer. Evergreen forests and mixed evergreen-hardwood forests provide high quality winter habitats for deer in areas that are prone to heavy snowfall. Non-deciduous conifers also provide habitat preferred by a suite of bird species which includes the magnolia warbler, Blackburnian warbler, pine warbler, yellow-rumped warbler, red-breasted nuthatch and black-throated green warbler. Mature tall conifers also provide nesting habitat for raptors such as the northern goshawk, broad-winged hawk and sharp-shinned hawk.

Historical background: Evergreen cover is an important habitat that has historically been heavily impacted by early colonization and European settlement. The early demand for eastern white pine for ship masts, eastern hemlock for barn siding and beams, and hemlock bark for leather tanning, coupled with the extensive cutting of evergreens for paper pulp during the late 19th and early 20th centuries significantly impacted the state's evergreen resource. Based on

satellite images from the NLCD, about 8% of New York State is covered by evergreen forest. Eastern white pine, eastern hemlock, red spruce, black spruce, northern white cedar and balsam fir are the chief native conifers found in the state.

Existing conditions: From a forest cover standpoint, the State Forest System is especially unique in that it provides a large conifer plantation and evergreen component which is significant on a statewide basis. Much of this component is comprised of plantations, which are largely a legacy of the massive tree planting campaign conducted by the Civilian Conservation Corps during the Great Depression. According to the NYGAP Report, New York State agencies, primarily the DEC, manage about 56% of the evergreen forests, but only 13% of deciduous and 22% of the mixed evergreen/deciduous forests. Both native and non-native evergreen conifers such as Austrian pine, eastern white pine, red pine, pitch pine, jack pine, Scotch pine, balsam fir, eastern hemlock, northern white cedar, Norway spruce, white spruce, and white spruce have historically been planted on State Forest lands. Of these species, Norway spruce, red pine and Scotch pine have arguably been the most successful, in terms of rate of growth and volume of biomass produced per acre.

Stressors and trends: A majority of State Forest plantations were established between 1930 and 1942. Those planted with shorter-lived species like Scotch pine, those planted in poor soils, and those established on sites to which they were not well suited, have passed their biological maturity and are now being harvested and converted to more natural mixed hardwood and mixed softwood/hardwood habitats. This is widely considered the second step of the restoration process for these formerly abused lands. As a result, the evergreen forest cover on State Forests and in the landscape will be dropping over time. Other plantations of longer-lived species like Norway spruce and white pine will remain in softwood cover for a much longer period of time, since it will take longer for these stands to reach the point at which they will be converted or re-generated.

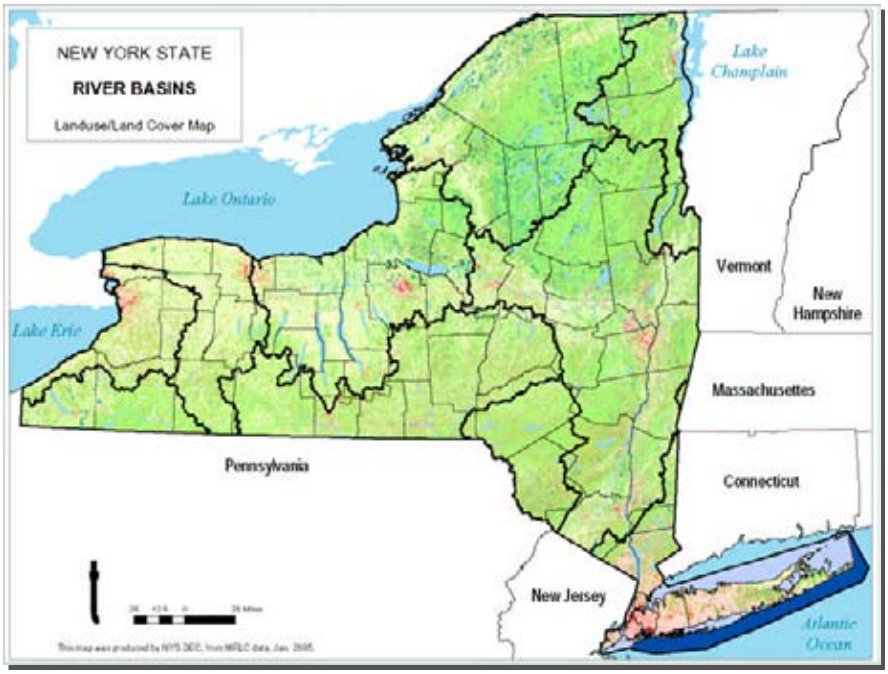
Insect and disease are more prevalent in over-mature plantations or those experiencing other stressors from not being properly thinned or being on poor or inappropriate sites. In the case of Scotch pine, a newly introduced wood wasp, S*irex noctillio*, has spread throughout most of the state and is causing significant mortality loss. Red pine plantations are experiencing a greater incidence of root rot fungi, causing general decline in some plantations. In the worst cases mortality spreads progressively through entire stands. These too will lead to a reduction in the evergreen conifer cover in the landscape.

Wetlands Habitat Assessment

Wetlands filter, clean and store rain and snowmelt, help reduce flooding, and provide

habitat for many forms of wildlife such as geese, ducks, frogs and salamanders. Outside of the Atlantic Coast, Great Lakes and Finger Lakes regions of New York, wetlands often occur in relatively small patches within upland habitats. As such, most local populations of wetland species are small and isolated and thus vulnerable to extinction (Moller and Rordam 1985), (Sjogren 1991). Recent research suggests that the present understanding of how wetland patches and the plants and animals that depend upon them interact across the landscape is limited (Gibbs 2000). The difference in size, shape and spacing patterns of wetlands varies considerably across the landscape and makes sustaining, enhancing and managing wetland habitats challenging.

Historical background: The NYGAP Report summarizes the estimated patterns of long-term changes in different community types across New York State. Based on the work of Noss, Laroe and Scott (1985) and Reschke (1993), about 60% of New York State's wetlands were lost between the 1780s and 1980s.



Intact wetlands provide improved water quality downstream

Current trends: State wetland regulations and policies have significantly slowed wetland loss, but gradual development continues to impact and fragment smaller wetland habitats that fall below the state wetland regulation size threshold. DEC is working with organizations like the Upper Susquehanna Watershed Coalition to create and improve wetlands and habitats on State Forest lands.

Grassland habitat on Long Pond State Forest, Chenango County

Grassland, pine barrens, tidal wetlands and other unique habitat assessment

Historical background: Modern civilizations have long established themselves near water for agricultural, industrial and commercial purposes. As such, early development of New York initially

took place along and near the Atlantic Coast, Staten Island, Long Island and the lower Hudson River Valley. As human population rapidly expanded in these areas, habitats and communities unique to New York State such as freshwater tidal wetland swamps, Coastal plain white cedar swamps, Serpentine barrens, Long Island Coastal heathland, Hempstead Plains grassland and Long Island pine barrens were significantly impacted.

Table 2.1, obtained from the NYGAP Report, lists the estimated patterns and historic changes in different habitat and community types. The authors of the NYGAP report state that "though generally poorly documented, the post-settlement changes in some plant communities most dramatically affected have been those that occupied relatively small land areas in the first place, or plant communities occurring in areas with the longest histories of settlement and development, like Long Island." In addition, "major changes in the species composition of hardwood forests have occurred and continue to occur."

Table 2.1 – Estimated Patterns of Long Term Habitat/Community Type Loss in New York State (Adopted from the 2001 NY GAP Analysis Report)

Habitat / Community Type	Estimated Long Term Loss
Long Island coastal heathland	More than 90% loss since the mid 1800s
Hempstead Plains grassland	More than 99% loss
Long Island pine barrens	60-68% loss
Serpentine barrens, maritime heathland and pitch pine barrens	More than 90% probable loss
Coastal plain Atlantic white cedar swamp, maritime oak-holly forest, maritime red cedar forest, marl fen, marl pond shore and oak openings.	More than 90% probable loss
Alvar grassland, calcareous pavement barrens, coastal plain poor fens, dwarf pine ridges, inland Atlantic white cedar swamp, freshwater tidal swamp, inland salt marsh, mountain spruce-fir forest, patterned peat land, perched peat land, perched bog , pitch pine-pine-blueberry peat swamp, rich sloping fens and riverside ice meadow.	Around 70-90% probable loss
Allegheny oak forest, alpine krummholz, Great Lakes dunes, ice cave talus communities, perched swamp white oak swamp, rich shrub fen and sandstone pavement barrens .	Less than 50% probable loss
Coastal plain ponds and pond shores	Around 50-70% loss
Brackish intertidal mudflats, brackish intertidal shores and coastal streams	Around 50-70% loss

ASSESSMENT OF HUMAN IMPACTS ON THE FORESTS OF NEW YORK (STRESSORS AND TRENDS)

Most decision making on State Forests will consider the functional role role each forest can play with respect to the greater landscape and the state as a whole. This may include opportunities to enhance biodiversity in the landscape by creating and maintaining a wide variety of habitats

with varied structural diversity or opportunities to enhance core forest within a matrix forest block by maintaining forest integrity. DEC will also consider strategies to mitigate the harmful impacts of human activities and to protect rare and endangered species, threatened species, and unique natural communities that exist on State Forests and unique sites capable of supporting rare and endangered species.

Black cherry hardwood forests are becoming less common in New York due to harvesting pressure

Impacts of harvesting

The current rate of harvesting on a statewide basis, on all forest lands, is well below the rate of growth, allowing forests to mature. The 2008 Forest Service Inventory of all New York forests available for harvest showed that average net growth exceeded overall harvesting by a 2.5 to 1 ratio. As forests mature, the species composition will naturally change from being dominated by shade-intolerant trees to being dominated by shade-tolerant species.

Data collected by DEC indicate that higher value species such as sugar maple, black cherry and red oak comprise a larger percentage of timber harvested in New York than lower valued species such as beech, basswood and ash. This is likely a result not only of market demands, but of the availability of each species in the landscape. As a result, species such as red maple and American beech, which are not as valuable financially, have become more plentiful in the forest. Red maple has replaced sugar maple as the leading tree species in the state. Since many life forms including fungi, mosses, insects, and birds depend on specific tree species and their respective ecosystems, the changing composition of trees across the landscape is of concern.

Methods of harvest also have the ability to affect species composition in a forest. Many oak species need exposed mineral soil to become established as a major component in a forest. In Western New York, some of the stands dominated by red oak owe their existence to heavy harvests in the late 1800s. At that time harvesting practices were very disruptive to the soil and the market for all species and sizes of trees led to many clear cuts, favoring oak seedling establishment. Railroads also had an effect on oak dominance. Wildfires were commonly started by sparks from wood- and coal-fired locomotives in the 1800s. These fires could get hot enough to burn away the organic layer of the soil and expose mineral soil, creating conditions that favored the development of oak forests. Oak species are especially relevant from an ecosystem sustainability and health standpoint because many species depend on acorns as an important food source. Harvesting methods have changed, and wildfires are now very uncommon. As a result, the dominance of oak is declining in some areas of the state.

Harvesting methods over a long timeframe can affect the quality of the forest's genetic quality or gene pool. Harvests on private lands in New York State are often conducted using diameter limit cuts, which remove all of the trees on a property larger than a selected size. In some cases, private land harvests focus only on the highest valued trees, leaving behind poorly formed or defective trees. In the most extreme cases, all of the economically valuable trees are removed from a property, leaving behind the poorest and least valued trees. The repeated application of these practices over several harvest cycles will have significant effects on the remaining tree gene pool, future forest composition and forest productivity. On State Forests, where economic goals are balanced with ecological objectives, most harvests incorporate the removal of diseased and defective trees, and those of low ecological value. Taking the lead from "Mother Nature," harvests mimic natural selection and attempt to enhance the gene pool.

Impacts of Introduced Insects, Diseases and Invasive Plants on New York's Forests

The introduction of non-native, invasive species and diseases has historically had a huge impact on New York's forests and has caused the virtual extirpation of some species. Unfortunately, introductions are occurring at an accelerated rate with consequences yet to be realized.

This issue is covered more fully in the Forest Health section on page 275 of this plan.

Impact of Urbanization and Development

Based on past trends, researchers predict that urban expansion will likely increase in the coming decades in New York State (Nowak and Walton 2005). For instance, the amount of urban land in the U.S. is projected to increase from 3.1% in 2000 to 8.1% by the year 2050. If this were to occur, about 151,506 square miles of the land in the U.S. would be converted to urban land, which is an area larger than the state of Montana. In New York State, Nowak and Walton predict that between 1,930 and 2,900 square miles of forest (between 5 and 10 percent) will be lost to urban sprawl by the year 2050. Continued urban sprawl threatens forest sustainability by increasing the risk for exotic pest infestations, by placing greater recreational demands on the remaining forest, and by increasing fragmentation of forest ecosystems and habitats. State Forests, particularly those in close proximity to urban areas, will receive growing pressures and demands, especially for recreational services.

In the long term, suburban sprawl will continue to drive the subdivision and fragmentation of privately held forest cover habitats that connect publicly managed open space. Based on these trends, New York's future forest ecosystems will be less connected across the landscape and will have a higher proportion of stand-alone (isolated) forest, shrub and agricultural patches. Gradually, losses of connections between habitat patches will impact future plant and animal populations. Isolated patches will reduce the movement of plant and animal species and stress ecosystems. Therefore, keeping patches of open space connected by naturally vegetated corridors along such features as wetlands, hedgerows, streams and rivers is an important key to future forest ecosystem sustainability. Fragmentation of existing landscape connections by

large scale electric utility, natural gas pipelines and major highways is also of concern. Large blocks of core forest also play a role by providing 'source' populations of plants and animals that can repopulate these smaller patches after disturbance events.

Climate Change Impacts

The earth's climate has always been in a state of change, which has created the very world that exists today. Fossils in the sedimentary rock record show that the Earth has witnessed at least five large-scale mass extinction events, all thought to be correlated with rapid climate change. Since the last Ice Age, the state has gradually become warmer and species have migrated northward (Pielou 1991). More recently, however, average annual temperature has risen, which most scientists attribute to the burning of fossil fuels and global carbon dioxide emissions. The Union of Concerned Scientists has stated that "if global warming emissions continue to grow unabated, we can expect dramatic changes in climate over the course of this century" (Union of Concerned Scientists 2006).

In a 2007 report entitled Confronting Climate Change in the U.S. Northeast, scientists point out that "average temperatures across the Northeast have risen more than 1.5 degrees Fahrenheit since 1970, with winters warming most rapidly - 4 degrees Fahrenheit between 1970 and 2000." If current global emissions of the greenhouse gases carbon dioxide and methane continue, seasonal average temperatures across the state are projected to rise between 8 to 12 degrees Fahrenheit above historic levels. The character of the Northeast's forests may change dramatically over the coming century, as suitable habitat for most of the region's tree species shifts northward. This shift may be as much as 500 miles by the late 21st century if greenhouse emissions continue to climb unchecked, and as much as 350 miles if steps are taken to reduce global greenhouse gas emissions (Frumhoff 2007).

According to the report, this rapid temperature rise would almost undoubtedly trigger an unprecedented change in forest species composition, especially near the upper forest type limits. For example, northern hardwood forests with a large sugar maple component currently on the fringe of the transitional oak-forest type would likely be stressed and significantly changed. Forest ecosystems that require cool and moist conditions such as spruce-fir forests that cover the higher elevations of Adirondacks would change and diminish in scope. Throughout the state, populations of tree species such as eastern white pine and eastern hemlock, and the ecosystems that depend upon them, could significantly shrink.

In fact, some scientists believe that suitable habitat for eastern hemlock could shrink by as much as 50 percent if greenhouse gas emissions continue to rise rapidly over the next century. Eastern hemlock is often called a keystone species because it is a species that strongly influences the functioning of an entire ecosystem. Hemlock provides cover and habitat for species such as turkey, deer and brook trout. 96 bird species and 47 mammal species are known to be associated with the hemlock type in the northeastern United States (Yamasaki, DeGraff and Lanier 1999). Ruffed grouse, yellow-bellied sapsucker, great horned owl, northern

goshawk, red squirrel, black-throated green warbler, Blackburnian warbler, pine siskin, evening grosbeak, winter wren and red-breasted nuthatch have all been associated with hemlock habitat. Given these facts, it seems almost certain that tree species which require relatively cool and moist conditions such as sugar maple, yellow birch, eastern white pine and eastern hemlock will be replaced with those that tolerate warmer conditions, such as red maple, northern red oak and tulip poplar.

STATEWIDE GAPS

The assessment on the following pages identifies major forest related habitat gaps that exist at the statewide landscape level. In essence, biodiversity would be enhanced in New York State by:

- Developing late successional, early successional, and evergreen forest cover habitats in order to promote habitat diversity (The state currently has an abundance of middle aged forests that have grown and aged on former agricultural land).
- Maintaining forests on a wide variety of landforms to ensure the proper environmental conditions exist for all species as the climate continues to change and other stressors appear in the landscape.
- Maintaining and enhancing habitat connectivity. Keeping existing patches of these habitats physically connected over the coming centuries will be a significant challenge. Connectivity is also needed to allow species to adapt to climate change. A number of research projects in New York State have used computer modeling to define and identify corridors based on potential to provide connectivity. These “least cost path” (LCP) corridors connect naturally forested and minimally developed areas. Protection and enhancement of LCP corridors will require extensive and consistent cooperation, collaboration, communication, leadership, vision and financial support at state and local levels.
- As development and subdivision of privately held forests continues in New York, large contiguous blocks of unbroken forest are becoming more scarce. New York State can be proud of its conservation record in the protection of the Adirondack and Catskill Forest Preserve. However, there are other parts of the state containing different ecosystems and forest types that should be protected from permanent conversion to non-forest uses. NYNHP has identified priority areas where large blocks of forests exist and can be further augmented. These areas are referred to as matrix forests.
- Preserving open space. The New York State 2009 Open Space Conservation Plan, a collaborative effort between DEC, the Office of Parks, Recreation and Historic Preservation, the Department of State and potentially affected stakeholders and organizations, outlines strategies to keep important habitats connected across the New York landscape. In fact, the plan frequently references the need to enhance greenways and connectivity for recreation, protection of water quality, to meet ecological goals,

and address climate change. The projects are too numerous to list here, but the following quote from the 2009 Open Space Plan illustrates this concept well:

ADDITIONAL RESOURCES

New York's 2009 Open Space Conservation Plan – www.dec.ny.gov/lands/47990.html

"Protection of sufficient variety of habitat and migration corridors, including managed, and wild, and riparian areas, to ensure the long-term existence of the native plant and animal species in the Region by providing connectivity among suitable habitat allowing species to migrate when climate or other external forces degrade their existing range."

- Employing management strategies to mitigate human impacts, impacts of deer, impacts of invasive species and to protect and enhance rare and endangered species and unique natural communities.

ASSESSMENT OF THE STATE FOREST SYSTEM

The diversity of the ecosystem will also be considered at the level of the many lands that make up the State Forest system. Table 2.7 illustrates the composition of New York's State Forests.

Table 2.7 – New York GAP Cover Type (2001), Summary: Lands Managed by the Bureau of State Land Management

LAND COVER	NUMBER OF FEATURES	ESTIMATED ACRES	PERCENTAGE
Forest Matrix			
Evergreen-northern hardwood	9,820	283,983	36.7
Sugar maple mesic	12,280	204,812	26.5
Oak	3,432	64,346	8.3
Successional hardwoods	6,892	64,336	8.3
Evergreen Plantation	1,432	33,419	4.3
Spruce-fir	1,055	15,131	2.0
Deciduous wetland	1,476	14,229	1.8
Pitch pine-oak	126	8,970	1.2
Evergreen Wetland	795	7,354	1.0
Appalachian oak-pine	519	4,567	0.6
Sub-total	***37,827***	***701,147***	***90.7***

Table 2.7, cont. – New York GAP Cover Type (2001), Summary: Lands Managed by the Bureau of State Land Management

LAND COVER	NUMBER OF FEATURES	ESTIMATED ACRES	PERCENTAGE
Early Successional Shrub Matrix			
Successional shrub	734	3,829	0.5
Shrub swamp	383	2,100	0.3
Sub-total	***1,117***	***5,929***	***0.8***
Water Resources Matrix			
Open water	3,698	21,246	2.7
Mixed wetland	1,075	9,692	1.3
Emergent marsh/open fen/wet meadow	390	2,518	0.3
Dwarf shrub bog	1	0	0.0
Sub-total	***5,164***	***33,456***	***4.3***
Agricultural Matrix			
Cropland	3,126	15,340	2.0
Old field/pasture	1,359	7,909	1.0
Orchard/vineyard	1	50	0.0
Sub-total	***4,486***	***22,299***	***3.0***
Developed Open Space Matrix			
Suburban	12	7	0.0
Golf course/park/lawn	5	2	0.0
Sub-total	***17***	***9***	***0.0***
Grey Infrastructure Matrix			
Roads	479	655	0.1
Urban	105	641	0.1
Sub-total	***584***	***1,296***	***0.2***

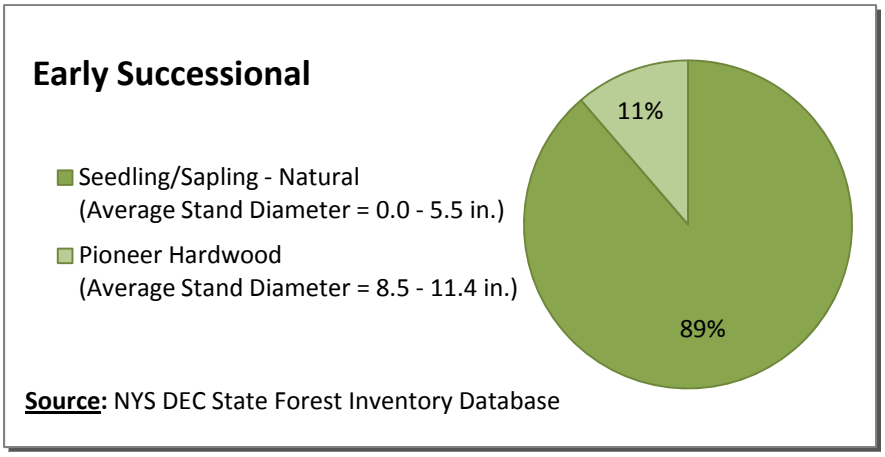
Table 2.7, cont. – New York GAP Cover Type (2001), Summary: Lands Managed by the Bureau of State Land Management

LAND COVER	NUMBER OF FEATURES	ESTIMATED ACRES	PERCENTAGE
Other			
Sand flats/slope	6	32	0.0
Barren	21	12	0.0
Clouds and Shadows	387	8,757	1.2
Sub-total	***414***	***8,801***	***1.2***
Total	**49,609**	**773,937**	**100.0**

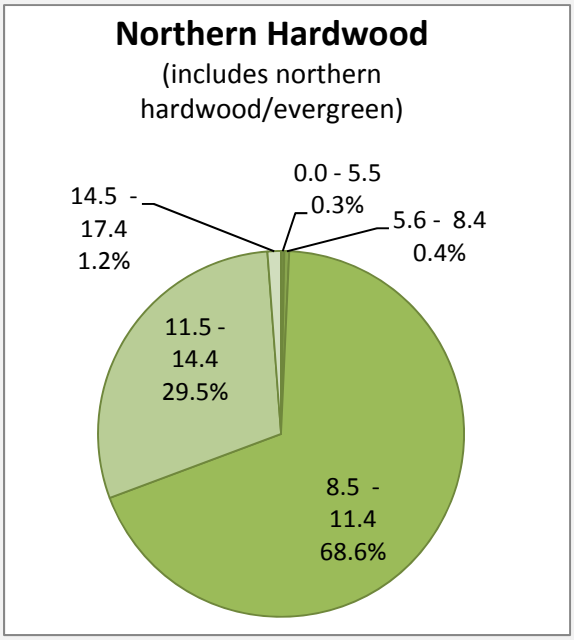
Notes: Satellite sensors have limitations in distinguishing between evergreen plantations and natural evergreens as well as differentiating fields, pasture and cropland. State land acreage based on the current polygon data in the DEC's MHDB.

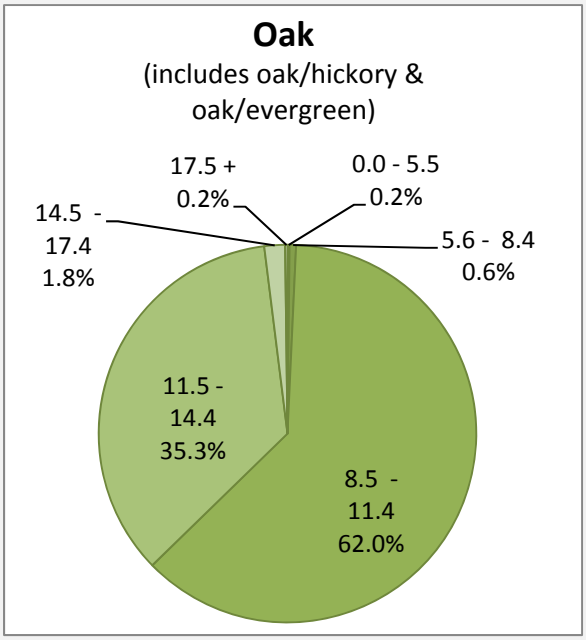
State Forest Size Classes

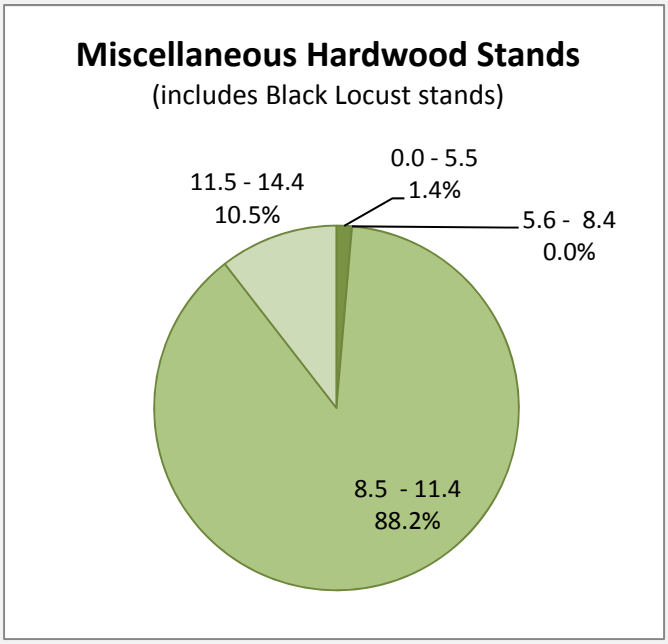
The following charts display the percentage of acreage found in various size classes in early successional, natural hardwood, natural conifer and plantation stands on State Forests. The vast majority of stands have an average stand diameter between 8.5 and 14.4 inches. This data was collected from DEC's State Forest Inventory database. Approximately 30% of the data was collected under updated inventory protocols, within the years 2006 to 2010. The remaining data was collected between 1978 and 2005 using less standardized techniques. Data was collected by separating stands according to "forest type", sorting each forest type into size classes by average stand diameter, totaling the acreage for each size class within each forest type, and calculating the percentage composed of each size class.



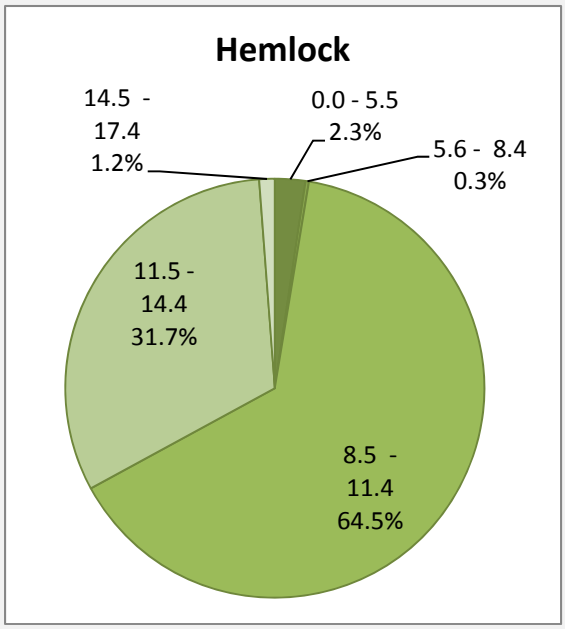
Size Classification of Natural Hardwoods – Percentage of stands in each size class, by SFID forest type. Stand size is characterized by mean stand diameter in inches. **Source:** NYS DEC State Forest Inventory Database

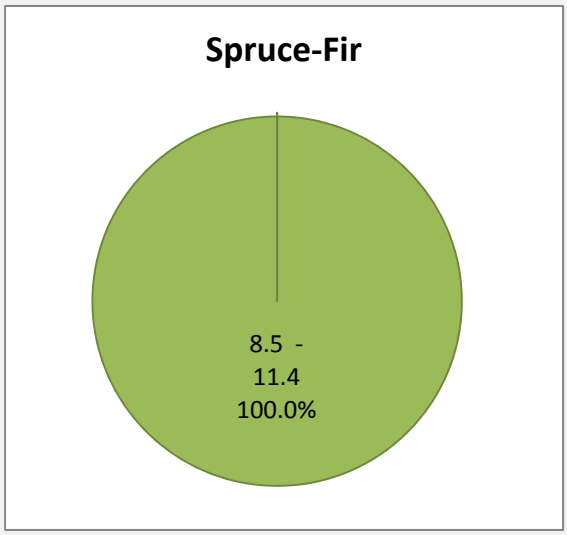


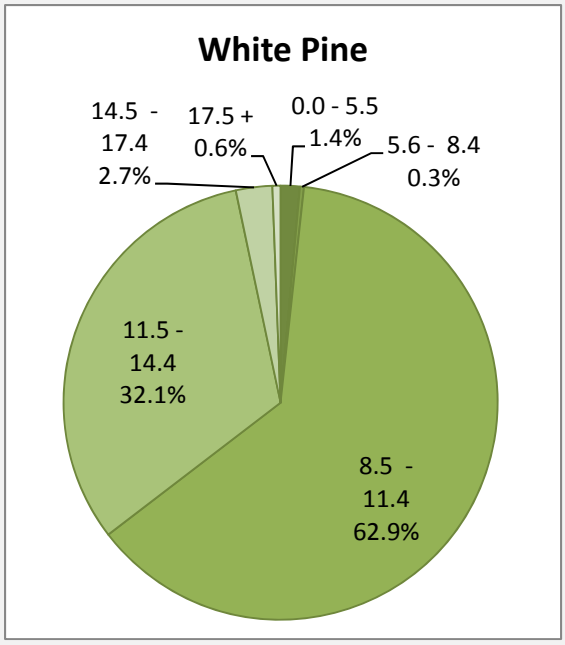


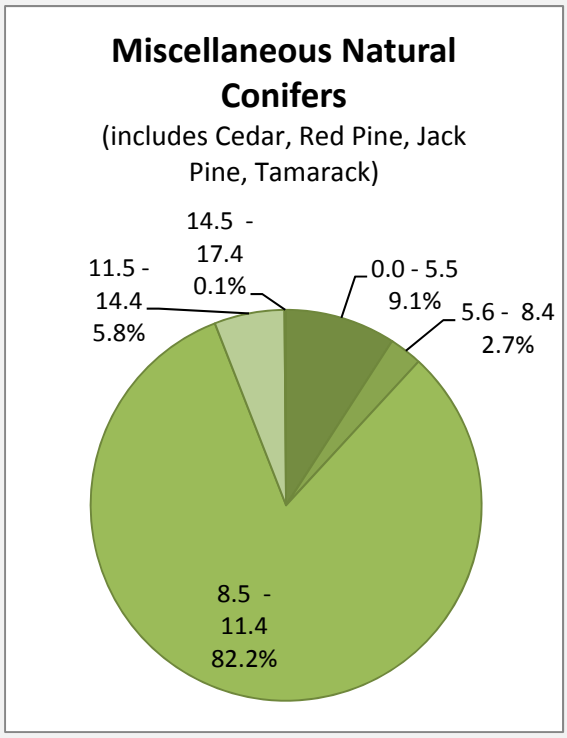


Size Classification of Natural Conifers – Percentage of stands in each size class, by SFID forest type. Stand size is characterized by mean stand diameter (inches). **Source:** NYS DEC State Forest Inventory Database



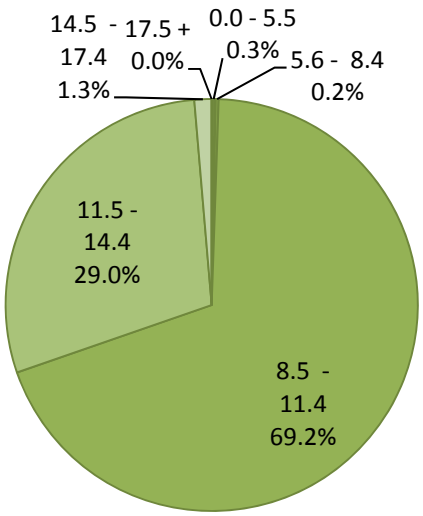




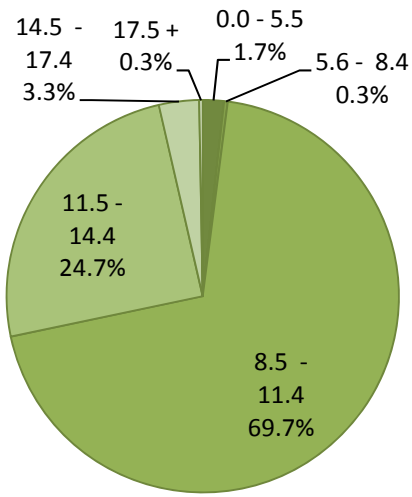


Size Classification of Plantations – Percentage of stands in each size class, by SFID forest type. Stand size is characterized by mean stand diameter (inches). **Source:** NYS DEC State Forest Inventory Database

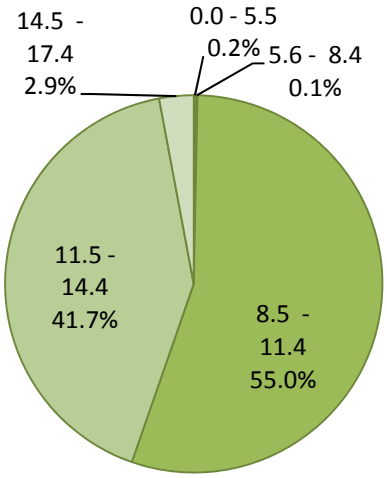
Plantation Pine
(includes White Pine, Scotch Pine and Red Pine)



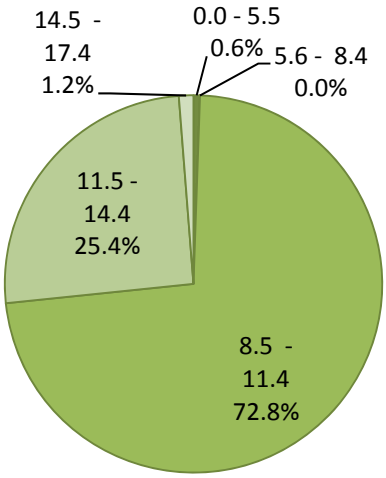
Plantation Spruce and Fir
(includes Norway Spruce, White Spruce, Douglas Fir and Balsam Fir)



Mixed Plantation
(includes pine, spruce and larch in mixed plantation stands)



Plantation Larch
(includes European and Japanese larch)



ECOREGIONAL LANDSCAPE ASSESSMENT

This segment of the assessment will take a closer look at the landscape based on "ecoregions" as defined by The Nature Conservancy. Ecoregions are areas of ecological homogeneity, which are defined by similarities in soil, physiography, climate, hydrology, geology and vegetation. The following ecoregional analysis was completed using the resources of the NY GAP, the National Land Cover Types website, the U.S. Forest Service, the State University of New York College of Environmental Science and Forestry, the Multi-Resolution Land Characteristics Consortium (MRLC), and analysis of DEC GIS data layers with ArcGIS v. 9.3.

ECOREGIONS IN NEW YORK STATE

This section will present an analysis of the landscape conditions on each of the seven Ecoregions in New York State, as defined by The Nature Conservancy.

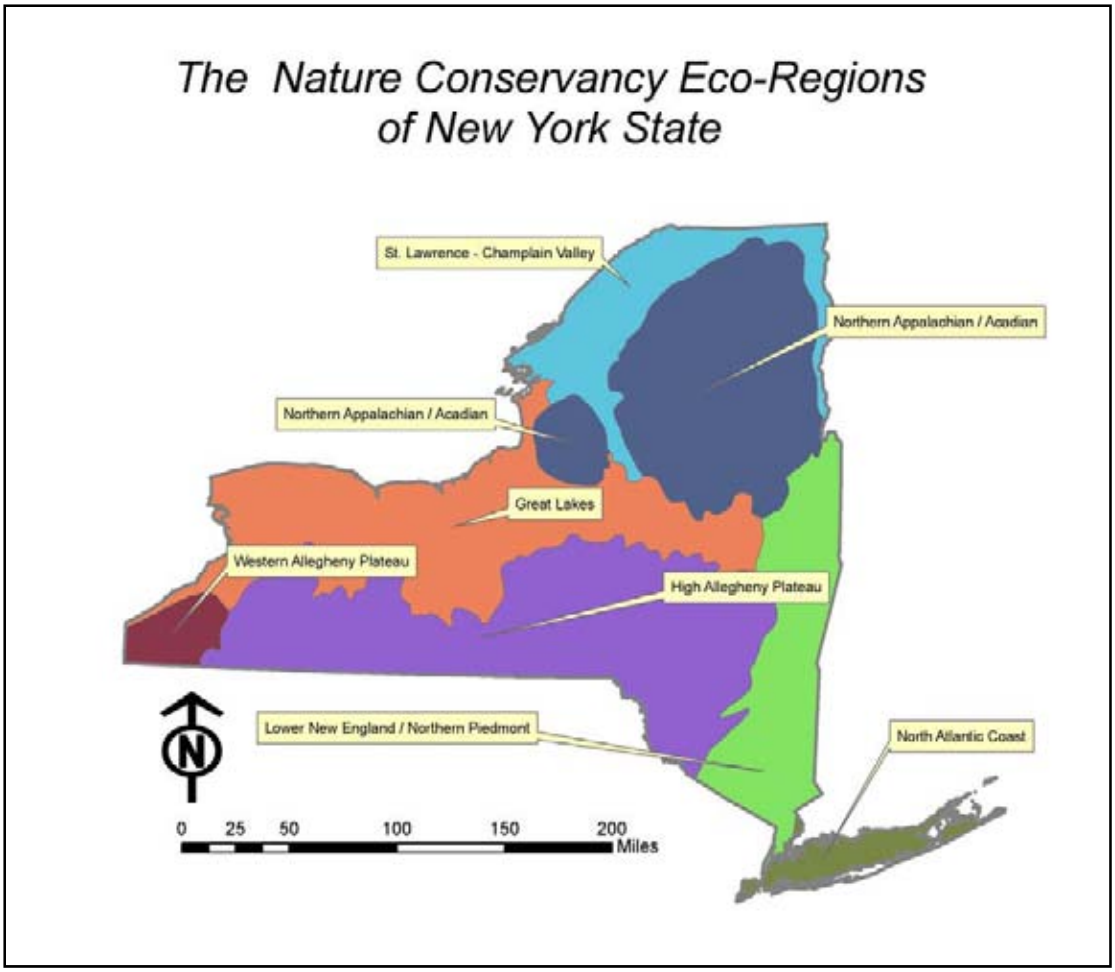


Table 2.2 – TNC Ecoregions of New York State (NYS)			
Ecoregion	**Acres**	**Percentage**	
		State	**SFS***
St. Lawrence/Champlain Valley (SL-CV)	2,845,196	9	12
Northern Appalachian/Acadian (NAP)	6,684,854	22	22
Great Lakes (GL)	7,393,893	24	6
Western Allegheny Plateau (WAP)	743,861	2	2
New York High Allegheny Plateau (HAP)	8,709,864	28	53
Lower New England/Northern Piedmont (LNE-NP)	3,796,070	12	4
North Atlantic Coast (NAC)	945,667	3	1
Totals	**31,119,405**	**100**	**100**

** Percentage of State Forest System (SFS) in each respective ecoregion.*

The following summaries are based on The Nature Conservancy's assessments, and describe the present character of New York's ecoregions.

St. Lawrence - Champlain Valley Ecoregion

The St. Lawrence – Champlain Valley (SL-CV) Ecoregion includes vast stretches of fertile land, rich woodlands, vibrant wetlands, dramatic cliffs, one of the continent's largest rivers, the St. Lawrence, and the continent's sixth largest lake, Lake Champlain (Thompson 2002). The ecoregion hosts a number of endemic species as well as more widespread species at the edges of their ranges. It provides critical habitat for migratory birds, breeding grassland birds, and wintering raptors.

Because of its fertile soils, relatively mild climate, and stunning scenery, the ecoregion has been used by humans for at least 10,000 years, and very heavily for the last 300. Some of the species that once occurred in the ecoregion have been extirpated, either throughout the east or in the ecoregion alone. Others are in decline or otherwise vulnerable. The upland and wetland natural communities of the region have been reduced in many cases to small, isolated fragments that harbor exotic species and have lost much of their integrity. The lakes, ponds, rivers, and streams that define this ecoregion are compromised by pollution and damming. Conservation of this region's biological diversity will be a challenge.

Several key threats to the biological diversity of the ecoregion were identified. These threats include water flow manipulation, landscape fragmentation, invasive exotic species, intensive agriculture, intensive forestry, a weak conservation ethic in the human population overall, and pollution of all kinds. Abating these threats will require creative approaches and hard work. Restoration of ecological systems and their component species will be vital to success in conserving both the uplands and the aquatic features of the ecoregion. Influencing public policy in the areas of water management, agriculture, forestry, and transportation will be crucial.

Deep and committed partnerships in all these endeavors will be more important than ever to be successful in achieving the goals for the SL-CV.

Northern Appalachian – Acadian Ecoregion

The Northern Appalachian – Acadian (NAP) Ecoregion extends over large ecological gradients from the boreal forest to the north and deciduous forest to the south (The Nature Conservancy n.d.). The Gaspé Peninsula and higher elevations support taiga elements. At lower elevations and latitudes, there is a gradual shift toward higher proportions of northern hardwood mixed-wood species which marks the transition into the Acadian forest. It also supports local endemic species, as well as rare, disjunct, and peripheral populations of arctic, alpine, Alleghenian and coastal plain species that are more common elsewhere. In New York, the primary portion of the NAP Ecoregion consists of the Adirondack Forest Preserve and Tug Hill Plateau.

The forest is a heterogeneous landscape containing varying proportions of upland hardwood and spruce-fir types. It is characterized by long-lived, shade-tolerant conifer and deciduous species, such as red spruce, balsam fir, yellow birch, sugar maple, red oak, red maple, and American beech, while red and eastern white pine and eastern hemlock occur to a lesser but significant degree.

There has been a historical shift away from the uneven-aged and multi-generational “old growth” forest toward even-aged and early successional forest types due to human activities. This mirrors the historical trends toward mechanization and industrialization within the forest resource sector over the past century and shift from harvesting large dimension lumber to smaller dimension pulpwood.

For vertebrate diversity, the NAP ecoregion is among the 20 richest ecoregions in the continental United States and Canada, and is the second-richest ecoregion within the temperate broadleaf and mixed forest types. The forests also contain 14 species of confers, more than any other ecoregion within this major habitat type, with the exception of the Southern Appalachian-Blue Ridge Forests and the Southeastern Mixed Forest.

Characteristic mammals include moose, black bear, red fox, snowshoe hare, porcupine, fisher, beaver, bobcat, lynx, marten, muskrat, and raccoon, although some of these species are less common in the southern parts of the ecoregion. White-tailed deer have expanded northward in the ecoregion, displacing (or replacing) the woodland caribou from the northern realms where the latter were extirpated in the late 1800s by hunting. Coyotes have recently replaced wolves, which were eradicated from this ecoregion in historical times, along with the eastern cougar.

A diversity of aquatic, wetland, riparian, and coastal ecosystems are interspersed between forest and woodland habitats, including floodplains, marshes, estuaries, bogs, fens and peatlands. The ecoregion has many fast-flowing, cold water rocky rivers with highly fluctuating water levels that support rare species and assemblages.

Great Lakes Ecoregion

The Great Lakes (GL) Ecoregion encompasses 234,000 square miles in parts of eight Midwestern states and one Canadian province (The Nature Conservancy, Great Lakes Ecoregional Planning Team 1999). The ecoregion extends from northeastern Minnesota across to north central New York, and south to northern Indiana and Ohio. The entire landscape was glaciated during the last Ice Age, and is characterized by level lake plains, level to gently rolling lowlands, and hillier upland areas. Elevation across the ecoregion ranges from 300 to over 2,000 feet. Michigan's Porcupine and Huron Mountains and Minnesota's North Shore are some of the areas with higher elevations, while the southern shores of Lakes Michigan, Erie and Ontario have lower elevations and less relief.

In New York, the Great Lakes Ecoregion represents the watersheds of the Finger Lakes, Lake Ontario and Lake Erie, including the Mohawk River Valley. Historically, the northern part of the ecoregion was dominated by northern hardwood forests, pine forests, and spruce-fir forests. The vast majority of these forests was cut over by 1910, and is now in second growth; some areas are even in third growth. Much of the Great Lakes Ecoregion in New York was dominated by tallgrass prairies and savannas, with some beech-maple and other hardwood forests mixed in. This area has been almost completely converted to agricultural and urban or residential uses. The primary disturbance events that helped to shape these ecosystems were fire, blow-downs, and insect and disease outbreaks in the forested parts of the ecoregion, and fire in the grasslands and savannas.

Western Allegheny Plateau Ecoregion

The Western Allegheny Plateau (WAP) Ecoregion has its most northerly tip beginning in the southwestern nose of New York and runs south through western Pennsylvania and West Virginia and eastern Ohio. It includes a small portion of its southern tip just entering northeastern Kentucky.

The WAP ecoregion consists mainly of the upper Allegheny River Basin, or the watershed of the upper reaches of the Allegheny River within both New York and Pennsylvania. The New York portion of the WAP includes approximately 743,325 acres and has an approximate population of 110,000 residents (2000 Census).

This portion of the WAP supports the most diverse fish assemblages in New York State and also harbors a variety of mussels, including several rare species like the endangered clubshell mussel and the wavy-rayed lampmussel. This northwestern portion of the Allegheny River Basin also contains portions of the only unglaciated (Wisconsinan) section of New York, which is reflected in the rich plant and amphibian life found here.

The natural resources of the WAP are generally in good to excellent condition. Although agricultural pursuits, residential uses, and light industrial development pressures have long since removed forests from the fertile flat valleys, the region remains ecologically sound and

aquatic systems that have diverse fish assemblages and several species of rare freshwater mussels.

High Allegheny Plateau Ecoregion

The High Allegheny Plateau (HAP) Ecoregion is located along the southern tier of New York and the northern tier of Pennsylvania (Zaremba and Anderson et. al. 2003). It includes a small portion of New Jersey. Well known features in HAP include the Catskills, The Shawangunks, The Kittatinny Ridge, The Poconos, Allegany State Park, Allegheny National Forest, and a large mass of Pennsylvania state-owned land.

The HAP ecoregion is defined by high elevation features at the northern end of the Appalachian Plateau. Most of the ecoregion is above 1200 feet. The general land form of the area is mid-elevation hills separated by numerous narrow stream-cut valleys.

One of the main features of the ecoregion is an abundance of rivers and streams. The Delaware, Susquehanna, and Allegheny Rivers and their many tributaries cover the entire ecoregion. The Delaware River drains into Delaware Bay; the Susquehanna flows into the Chesapeake Bay; the Allegheny flows into the Ohio and eventually into the Mississippi. These three different drainages contribute to the high overall aquatic diversity in the ecoregion.

The northern and eastern portions of the ecoregion were glaciated; the southwest portion was not. Many northern species and communities reach their southern limit in HAP, while many southern species extend into the ecoregion but not beyond. Species and communities associated with glaciated landforms occur in the north and east; biodiversity associated with older substrate and deeper erosional soils occurs in the southwest.

Another prominent feature of the ecoregion is its currently low population density, although major population centers are nearby. There are 1.7 million people living in the 16.9 million acres of HAP (2000 census data). The largest city is Binghamton, New York at 47,000. Only 250,000 people in HAP live in cities over 10,000. The overall population trend in HAP indicates that people are moving out of the ecoregion with the notable exception of the areas within reach of New York City by major highways.

There are large and significant managed areas in HAP, including three large intact forested areas: the Catskills, the Allegheny National Forest/Allegany State Park complex, and the Pennsylvania state land in central PA.

Lower New England – Northern Piedmont Ecoregion

The Lower New England – Northern Piedmont (LNE-NP) Ecoregion includes portions of 12 states and the District of Columbia (Barbour et al. 2000). The Lower New England ecoregion extends from southern Maine and New Hampshire with their formerly glaciated, low mountain and lake studded landscape through the limestone valleys of western Massachusetts and Connecticut, Vermont

and eastern New York. Rhode Island, eastern Massachusetts and Connecticut are distinctive in that the communities are more fire adapted including pitch pine and oak dominated forests on glacially deposited sandy till that forms a broad plain with many ponds. In New York, the LNE-NP Ecoregion consists primarily of the Hudson Valley region, from below Lake George, south to New York City.

Large portions of the Appalachian Mountains lie within the ecoregion including the Palisades in New York and New Jersey, the Taconics and the Berkshires in Massachusetts, New York, Vermont, and Connecticut, and the widely strewn Monadnocks of southern New Hampshire. Large rivers originating in the Appalachians cut across the Atlantic slope lowlands generally from north or west to east emptying into the Atlantic Ocean. The Potomac, Susquehanna, Delaware, Hudson, Housatonic, Connecticut, Merrimack, and Saco Rivers provide a diversity of high- and low-energy aquatic habitats. The natural character of the ecoregion in New York is perhaps best seen currently within existing protected lands, primarily state-held, found in Palisades Park in New York and New Jersey.

The LNE-NP ecoregion remains one of the most highly populated in the country with many cities including Nashua and Manchester, NH, Springfield and Worcester, MA, Hartford, CT, Albany, NY and New York City, Baltimore, MD, York and Lancaster, PA, and Washington, D.C. Added to these metropolis areas are the suburbs for the cities of Boston, Providence, RI, New Haven, CT, New York, and Philadelphia. The great forest expanses are now being increasingly fragmented by first and second home development. While the mountainous areas of the ecoregion are lightly settled, the valleys have long been developed for agriculture, and both are rapidly succumbing to development pressures.

North Atlantic Coast Ecoregion

The North Atlantic Coast (NAC) Ecoregion represents a 13 million acre area forming a narrow coastal strip covering parts of nine states (M. e. Anderson 2006). It has a straight line distance of 475 miles but encompasses almost 5,000 miles of irregular shoreline habitat. Rocky shores, sandy beaches and tidal marshes are all characteristic. Once mostly wooded, it is now primarily residential.

This ecoregion consists of glaciated irregular plain composed of sandy till and modified by coastal processes in New Jersey, Delaware, New York, Rhode Island, Connecticut, Massachusetts, New Hampshire, Maine and a tiny piece of Pennsylvania. Kames, kettle holes, drumlins and reworked terminal moraines are typical features. Entirely below 600 ft., the region boasts extensive marine and estuarine habitats including salt marshes, beach dune and barrier island systems, fresh and brackish tidal marshes. Inland forest types include coastal pine-oak forests, and oak-beech-holly forest.

New York represents 952,372 acres or just fewer than 13% of the NAC ecoregion. Most of these acres include the entire area of Long Island. Of these acres, 33% are in their natural state, 10%

are in agricultural development, and 58% are in urban, industrial, commercial or residential development.

HABITAT ASSESSMENT OF FOREST LAND AT AN ECOREGIONAL LEVEL

Present Conditions: The present conditions of each of the seven TNC defined Ecoregions are presented in the Table 2.3:

Table 2.3 – National Land Cover Database (NLCD) Summary 2001 from the Multi-Resolution Land Characteristics Consortium (MRLC)

LAND COVER	ECOREGIONS														ENTIRE STATE	
	SL-CV St. Lawrence/ Champlain Valley		NAP Northern Appalachian/ Acadian		GL Great Lakes		WAP Western Allegheny Plateau		HAP New York High Allegheny Plateau		LN-NP Lower New England/ Northern Piedmont		NAC North Atlantic Coast			
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Deciduous Forest	875,608	30.8	3,218,690	48.1	1,539,261	20.8	335,375	45.1	4,093,324	47.0	1,321,869	34.8	109,537	11.6	11,493,666	36.9
Pasture/Hay	493,191	17.3	95,350	1.4	1,720,859	23.3	121,349	16.3	1,321,454	15.2	549,501	14.5	27,087	2.9	4,328,792	13.9
Cultivated Crops	198,229	7.0	44,230	0.7	1,424,790	19.3	102,658	13.8	603,624	6.9	248,866	6.6	27,579	2.9	2,649,976	8.5
Evergreen Forest	251,588	8.8	1,309,952	19.6	221,248	3.0	29,922	4.0	591,826	6.8	186,920	4.9	45,178	4.8	2,636,634	8.5
Woody Wetlands	380,176	13.4	762,347	11.4	590,541	8.0	35,768	4.8	253,798	2.9	350,613	9.2	20,573	2.2	2,393,816	7.7
Mixed Forest	73,156	2.6	613,926	9.2	317,985	4.3	18,689	2.5	1,058,257	12.2	235,895	6.2	20,843	2.2	2,338,751	7.5
Developed, Open Space	83,125	2.9	85,505	1.3	453,374	6.1	29,970	4.0	310,609	3.6	359,870	9.5	183,867	19.5	1,506,320	4.8
Open Water	200,862	7.1	293,962	4.4	267,601	3.6	15,608	2.1	91,564	1.1	130,085	3.4	10,262	1.1	1,009,944	3.2
Shrub/Scrub	114,856	4.0	160,737	2.4	349,117	4.7	24,848	3.3	186,258	2.1	84,171	2.2	9,220	1.0	929,207	3.0
Developed, Low Intensity	38,555	1.4	13,051	0.2	244,070	3.3	6,986	0.9	68,885	0.8	162,106	4.3	170,832	18.1	704,485	2.3
Developed, Medium Intensity	11,373	0.4	2,552	0.0	90,195	1.2	2,091	0.3	21,641	0.2	89,319	2.4	166,947	17.7	384,118	1.2
Grassland/Herbaceous	88,279	3.1	36,468	0.5	75,101	1.0	15,918	2.1	72,418	0.8	9,017	0.2	6,818	0.7	304,019	1.0
Emergent Herbaceous Wetlands	29,173	1.0	41,917	0.6	44,431	0.6	3,730	0.5	19,066	0.2	17,215	0.5	34,953	3.7	190,485	0.6
Developed, High Intensity	3,296	0.1	516	0.0	37,062	0.5	378	0.1	5,126	0.1	44,012	1.2	95,240	10.1	185,630	0.6
Barren Land (Rock/Sand/Clay)	3,028	0.1	5,623	0.1	17,196	0.2	495	0.1	11,559	0.1	6,200	0.2	14,343	1.5	58,444	0.2
SUM	**2,844,495**	**100**	**6,684,826**	**100**	**7,392,831**	**100**	**743,785**	**100**	**8,709,409**	**100**	**3,795,659**	**100**	**943,279**	**100**	**31,114,290**	**100**

ECOREGIONAL TRENDS

To further put the challenge of managing the state's landscape and habitats into perspective, a spreadsheet has been developed that allows the user to conduct scenario-based planning based on each major land use type. Table 2.4 (above) shows the result of this scenario-based planning. Each ecoregion was separately evaluated based on the current land cover and overall trends in the landscape. Also, despite the above-mentioned needs of various land cover and habitat types, realistic assumptions were applied in developing Table 2.4. These assumptions are as follows:

First, it was assumed that at best, the acres of wetland and grassland types in each ecoregion will remain stable, and in some instances slightly decrease.

Second, it was assumed that 1 to 8% of the landscape would be lost to development over the next 20 years, depending on the existing level of development in each ecoregion, demographic trends and land use development trends in the literature. Currently, about 9% of New York State is considered developed; of this about 5% of this is considered *developed* open space. Based on the assumptions made by ecoregion, an additional 2% or an estimated 683,355 acres of habitat would be lost to development or significantly altered in the next twenty years. As previously mentioned, U.S. Forest Service researchers Nowak and Walton estimate that New York State will lose between 5 and 10% of its forest by the year 2050, or between one and two million acres (an area equal to or greater than the State Forest and Wildlife Management Area system combined) (Nowak and Walton 2005). Thus, the total habitat loss portrayed in Table 2.4 falls within the range predicted by Nowak and Walton, but the habitat and land cover loss comes more from lands currently classified as pasture/hay and cultivated crops and less from forest cover.

Third, it was assumed that managed state lands present the best opportunities to manage evergreen habitats on a large scale. Evergreen habitats are arguably needed, but require significant resources to deliberately maintain and create. Slight habitat shifts on a percentage basis can translate to significant acreage. Based on the assumptions previously discussed, creating about 1% of new evergreen land cover/habitat at the state level would require 371,722 acres of tree planting or natural regeneration over a 20 year period. Using an 8' X 8' spacing, this equates to about 253 million tree seedlings, or about 13 million seedlings per year over a twenty year period. To slightly increase the amount of early successional habitat statewide by about three quarters of a percent, 228,222 acres of habitat would have to be created, or about 11,400 acres a year.

ADDITIONAL RESOURCES

National Land Cover Website – data used in this analysis can be found at www.mrlc.gov/nlcd.php

Table 2.4 – 20 Year Forecast of Habitat Trends (*Predicted Change in Acreage by Land Cover Types)*

LAND COVER	ECOREGIONS							ENTIRE STATE	
	SL-CV St. Lawrence/ Champlain Valley	NAP Northern Appalachian/Acadian	GL Great Lakes	WAP Western Allegheny Plateau	HAP New York High Allegheny Plateau	LNE-NP Lower New England/ Northern Piedmont	NAC North Atlantic Coast	Change in Acres	Percent Change
Forests									
Deciduous Forest	17,563	143,777	146,304	10,485	-8,611	-12,367	-44,451	252,702	0.81%
Evergreen Forest	-9,806	-173,532	-36,427	-3,890	-8,296	-16,115	-7,447	-255,512	-0.82%
Woody Wetlands	986	6,408	885	-66	-1,225	9,975	179	17,142	0.06%
Mixed Forest	-30,489	-12,292	-93	-11,251	73,966	-65,090	-11,410	-56,659	-0.18%
Agriculture									
Pasture/Hay	-66,517	-28,502	-316,221	-9,781	-189,231	-37,087	-8,221	-655,560	-2.11%
Cultivated Crops	-27,559	-10,806	-94,080	-13,404	-124,607	-59,083	-8,713	-338,252	-1.09%
Early Successional, Grasslands and Wetlands									
Shrub/Scrub	13,146	39,808	20,525	7,135	75,024	67,655	4,929	228,222	0.73%
Grassland/ Herbaceous	-2,944	-3,044	72,756	-1,042	14,676	2,370	2,615	85,386	0.27%
Emergent Herbaceous Wetlands	-728	-1,808	-74	-11	-1,647	1,763	-52	-2,557	-0.01%
Developed									
Developed, Open Space	19,277	14,767	71,517	3,500	37,767	19,696	23,654	190,179	0.61%
Developed, Low Intensity	18,335	7,003	51,643	4,171	18,209	27,677	17,824	144,862	0.47%
Developed, Medium Intensity	39,828	4,133	42,876	1,628	65,453	24,551	21,709	200,177	0.64%
Developed, High Intensity	25,149	6,169	36,866	1,110	38,421	31,901	8,521	148,137	0.48%
Open									
Open Water	1,097	170	-1,459	11	4,239	-1,033	114	3,141	0.01%
Barren Land (Rock/Sand/Clay)	2,661	7,747	4,982	11,406	5,860	5,187	749	38,592	0.12%

ECOREGIONAL HABITAT GAPS

The following narrative addresses conditions and gaps at an ecoregional level.

Grassland
On a historic basis, grasslands have not been distributed evenly across the state. There are specific areas of the state where grasslands naturally occur, such as the Great Lakes, North Atlantic Coast and St. Lawrence / Champlain Valley ecoregions. In these areas, active agriculture and development have over the last century reduced the abundance of naturally occurring grasslands. On State Forests in these ecoregions, existing rare grassland communities will be protected and will contribute to ecoregional habitat. However, forests will not be cleared to create grassland habitat.

Early Successional Shrub
The amount of early successional shrub cover in New York State varies greatly between ecoregions, both presently and historiucally. This habitat gap is discussed in great detail in the statewide landscape assessment on *page 46* above. Goals established in this plan for the conversion of plantations, along with natural disturbances and abandonment of agricultural lands outside State Forests will create a steady supply of new early successional habitat. In many ecoregions, this will provide a level somewhere between pre-settlement and mid-20th century levels. DEC also recognizes recreational demands from hunters and bird watchers for early successional habitat and its associated species, which have been declining from the mid-20th century's historically high levels. (These demands and needs will be accommodated in UMP planning along with consideration of other multiple use goals).

In the Great Lakes, North Atlantic Coast and St. Lawrence / Champlain Valley ecoregions, land development and current agricultural land uses have reduced the quantity of high-quality, naturally occurring early successional shrub/scrub cover to below pre-settlement levels. In these three eco-regions, this natural community type is considered a biodiversity gap. State Forest management and future acquisition in these ecoregions will consider and address this gap in the UMP planning process as appropriate. This will focus on developing or maintaining early successional habitat on areas where it has naturally occurred

Mid Successional
The past history of land clearing in New York State is relatively consistent across all Ecoregions with approximately 50% of all forests being between 40 and 140 years old and in a mid successional stage. This habitat type is more than adequately represented across the state.

Late Successional
Late successional cover types with trees greater than 140 years of age will be most prevalent on blocks of publicly owned lands 500 acres or greater in size. This habitat type will gradually increase from the current coverage of 1% and will become more prevalent as time progresses.

This plan establishes strategies for the establishment, maintenance and enhancement of forest matrix blocks to be implemented in future UMPs to address this gap. This habitat type is sufficiently represented in the Northern Appalachian/Acadian ecoregion and the eastern portion of the High Allegheny Plateau (although there may be locations within these ecoregions where State Forest UMPs can address fragmentation of this habitat type).

Evergreen
Based on the landscape analysis, evergreen forest is most lacking in the Great Lakes, Lower New England/Lower Piedmont, North Atlantic Coast and Western Allegheny Plateau. Mixed forest, a mixture of hardwoods and evergreens, is also lacking in these regions. Stressors such as climate change, the hemlock woolly adelgid (an introduced invasive insect that kills hemlock) and the gradual loss of maturing evergreen forests on State Forests will gradually reduce the evergreen land cover in the remaining ecoregions. Evergreen cover is important to wildlife and attempts should be made to conserve, enhance and sustain it when possible.

Deciduous Forest
Deciduous forest cover outside of the most developed ecoregions will remain relatively stable with slight decreases in prevalence over time. Deciduous forest cover is needed, especially to help conserve, protect and enhance habitat connectivity in the North Atlantic Coast and Great Lakes ecoregions, areas where forests are less dominant because of development, subdivision and continued agricultural land use.

Wooded Wetlands
Wooded wetlands are also needed in several ecoregions including the New York High Allegheny Plateau, Western Allegheny Plateau and particularly those with greater development such as the North Atlantic Coast and Lower New England/Lower Piedmont ecoregions. Depending on the perspective one takes, and based on the extensive loss of wetland habitat in the past, more wetlands would be desirable in every part of the state, but the ability to create or restore them on a large enough scale is very limited.

Emergent Herbaceous Wetlands
Emergent Herbaceous Wetlands are needed or potentially needed in all ecoregions.

LAND COVER GAPS

Beyond the process of assessing gaps in habitat types, land management decisions will also take into account the relative abundance or scarcity of forest cover types in each ecoregion as illustrated in Table 2.6.

Table 2.6 – New York GAP Percentage Land Cover by TNC Ecoregion and Statewide

LAND COVER	ECOREGIONS							STATE WIDE
	SL-CV St. Lawrence/ Champlain Valley	NAP Northern Appalachian/Acadian	GL Great Lakes	WAP Western Allegheny Plateau	HAP New York High Allegheny Plateau	LNE-NP Lower New England/ Northern Piedmont	NAC North Atlantic Coast	
Forest Matrix								
Sugar maple mesic	13.2	39.6	15.7	6.1	29.3	30.3	0.2	25.5
Evergreen-northern hardwood	9.0	26.4	7.9	14.4	19.3	12.5	0.0	15.7
Successional hardwoods	16.1	1.9	11.3	32.3	7.8	0.3	2.2	7.7
Oak	0.1	0.0	0.8	2.5	9.9	22.6	5.8	6.0
Appalachian oak-pine	0.0	0.0	0.1	0.0	0.7	3.8	0.1	0.7
Evergreen plantation	0.3	0.2	0.3	0.3	0.8	0.2	0.0	0.4
Pitch pine-oak	0.0	0.0	0.0	0.0	0.3	0.1	17.9	0.6
Deciduous wetland	6.0	0.6	2.3	0.2	0.6	2.3	0.1	1.7
Evergreen wetland	0.5	3.7	0.1	0.0	0.1	0.0	0.0	0.9
Spruce-fir	1.0	15.9	0.0	0.0	0.0	0.0	0.0	3.6
Sub-total	***46.2***	***88.3***	***38.5***	***55.8***	***68.8***	***72.1***	***26.3***	***62.8***
Agricultural Matrix								
Cropland	19.1	2.0	37.0	33.0	19.7	10.6	6.0	18.8
Old field/pasture	18.7	0.8	7.3	4.8	4.1	1.4	7.3	5.3
Orchard/vineyard	0.0	0.0	0.5	0.1	0.0	0.2	0.0	0.2
Sub-total	***37.8***	***2.8***	***44.8***	***37.9***	***23.8***	***12.2***	***13.3***	***24.3***
Early Successional Shrub Matrix								
Successional shrub	0.5	0.2	2.9	0.4	1.3	0.1	1.7	1.2
Shrub swamp	0.6	1.1	0.5	0.3	0.2	0.2	0.1	0.5
Salt shrub/maritime shrub land	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Sub-total	***1.1***	***1.3***	***3.4***	***0.7***	***1.5***	***0.3***	***2.2***	***1.7***

Table 2.6, cont. – New York GAP Percentage Land Cover by TNC Ecoregion and Statewide

LAND COVER	ECOREGIONS							STATE WIDE
	SL-CV St. Lawrence/ Champlain Valley	NAP Northern Appalachian/Acadian	GL Great Lakes	WAP Western Allegheny Plateau	HAP New York High Allegheny Plateau	LNE-NP Lower New England/ Northern Piedmont	NAC North Atlantic Coast	
Grey Infrastructure Matrix								
Roads	0.7	0.3	1.1	0.4	0.7	1.4	1.2	0.8
Urban	0.7	0.1	4.0	0.9	0.6	7.2	46.7	3.5
Sub-total	***1.4***	***0.4***	***5.1***	***1.3***	***1.3***	***8.6***	***47.9***	***4.3***
Developed Open Space Matrix								
Suburban residential	0.0	0.0	0.1	0.0	0.1	0.5	0.9	0.1
Golf course/park/lawn	0.1	0.0	0.2	0.1	0.1	0.1	0.4	0.1
Sub-total	***0.1***	***0.0***	***0.3***	***0.1***	***0.2***	***0.6***	***1.3***	***0.2***
Water Resources Matrix								
Open water	8.8	6.6	6.6	4.1	3.5	5.8	3.2	5.2
Mixed wetland	0.5	0.1	0.4	0.1	0.3	0.0	0.0	0.3
Salt marsh	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.1
Emergent marsh/open fen/wet meadow	0.6	0.3	0.6	0.0	0.3	0.4	0.2	0.4
Dwarf shrub bog (less than 1% statewide)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-total	***9.9***	***7.0***	***7.6***	***4.2***	***4.1***	***6.2***	***5.5***	***6.0***
Other								
Sand flats/slope	0.1	0.0	0.1	0.0	0.0	0.0	1.5	0.1
Barren	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.1
Clouds and Shadows	3.4	0.2	0.1	0.0	0.3	0.0	0.3	0.5
Sub-total	***3.5***	***0.2***	***0.2***	***0.0***	***0.3***	***0.0***	***3.5***	***0.7***
Total	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***

Please note: Figures have been rounded to the nearest 10th of a percentage point.

IMPACTS OF HUMANS ON AN ECOREGIONAL LEVEL (STRESSORS AND TRENDS)

Urbanization and Fragmentation

Overall, the highest habitat needs are in the areas with the greatest population and land development. The North Atlantic Coast, the Lower New England/Lower Piedmont, and the Great Lakes ecoregions have the highest levels of development. Excluding the National Land Cover Database category of *developed open space*, an estimated 46%, 8% and 5% of these ecoregions, respectively are developed. Forest loss due to development will likely be greatest in these three ecoregions.

ACTIVE FOREST MANAGEMENT

Ecosystem management can be achieved through actively managing the forest using various strategies to meet landscape gaps and other desired outcomes, while applying protective measures to mitigate impacts. Foresters employ active management strategies, including various silvicultural systems and integrated pest management which in some cases involves pesticide and herbicide application. Protective measures include designation of matrix forest blocks and connectivity corridors at a landscape level, natural and protection areas at the forest level, buffers around those areas and various forms of green tree retention.

The decision as to which strategy is used must be based on multiple goals and objectives, some of which may be in conflict with one another. No single goal or objective can take precedence over all others all of the time. Local public opinion may indicate that certain habitats are desired by some for wildlife observation or hunting, while other constituents may express interest in maintaining certain aesthetic qualities. Fiscal responsibility also requires that the economic return, or lack thereof, produced by a certain management strategy be considered in the decision making process. And, looming over all of these is the goal of maintaining a high level of biodiversity. This is the classic land manager's dilemma; not all goals can be achieved on every acre of land.

SILVICULTURE

"Silviculture" is defined as "the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis." (Helms 1998). When actively managing forest ecosystems to promote biodiversity and produce forest products, foresters use two silvicultural systems which mimic natural disturbance patterns and help promote biodiversity. The two systems are referred to as even-aged and uneven-aged management.

Openings in the forest create room for new pioneer trees that need full sunlight, like the white pines that stand in this photo.

The Establishment of an Even-Aged Forest

Each tree species that grows in New York has a set of conditions under which it grows best. Many trees prefer exposed soils (leaf litter and organic matter removed) and full sun on the forest floor to regenerate. These types of trees are generally called either pioneer trees (the first trees to establish themselves on a disturbed site) or shade-intolerant trees (trees preferring full sun to regenerate a site). Some examples of these trees found in

New York include pin cherry, black cherry, aspens, red oak and white pine. Many pioneer trees, like pin cherry and most aspens, grow fast and are relatively short-lived, surviving on average between 35 and 65 years. Others, like red oak and white pine, may live for 120 to 350 years.

Large scale disturbances can create conditions of exposed soils and full sunlight reaching the forest floor. Natural disturbances include forest fires (killing the existing forest and burning the leaf litter and exposing the soils), severe weather events that knock down the forest from either strong winds or heavy ice and snow (killing the existing forest and exposing soils from uprooted trees), and major insect or disease outbreaks that may kill off the forest. Human disturbances that can create similar conditions include large scale farming (and abandonment of farm fields), establishment or re-establishment of tree plantations, and other active forest management activities.

Soon after the disturbance, the "new" forest of shade-intolerant pioneer trees begins to establish itself within a short amount of time (anywhere from one to 20 years following the disturbance). The shade-intolerant trees are not the only beneficiaries of this disturbance. Many plants and wildlife prefer early successional forest and the many shade-intolerant pioneer trees for their mast (fruit, such as acorns from oaks). The trees of this newly established forest are considered by foresters to be about the same age, or *even-aged*.

As the forest matures, the trees compete with each other for limited resources (sunlight, nutrients from the soil, and water). Some trees will be out-competed and die while others dominate the site. One day a new disturbance may come and destroy this maturing forest and start the process over again - continuing the cycle of an even-aged forest.

Even-Aged Silvicultural Systems

As discussed earlier, many shade-intolerant trees have ecological values as mast producers and may also have significant value as timber. Foresters can apply different management techniques that mimic disturbances to perpetuate an even-aged forest. These harvest techniques, like the natural events they attempt to mimic, tend to be very intense and can be drastic in appearance. Although many may not like the appearance, when these harvesting techniques are applied correctly, the forest quickly rebounds and many plants and animals benefit from the new habitat type.

These trees have fallen due to heavy winds; this natural disturbance can be imitated by a shelterwood cut.

Foresters have three options (silvicultural systems) to choose from when establishing an even-age structure in a forest:

- **Clearcutting** (one harvest)
- **Seed Tree** (two harvests)
- **Shelterwood** (two or more harvests)

All three even-aged silvicultural systems remove the entire* mature forest and allow new forest to establish (regenerate) either naturally or by planting when there is insufficient seed after the cut. For this reason, these harvests are called *regeneration cuts*. As the new forest grows, foresters may decide to conduct intermediate thinnings to weed out unwanted trees and other competing vegetation. These intermediate thinnings are called *tending cuts*.

* DEC practices **tree retention** in all silvicultural systems. *To learn more about forest and tree retention, refer to page 85.*

The Life Cycle of an Uneven-Aged Forest

Uneven-aged forests tend to be very different from even-aged forests in that, as the name implies, they will have a distribution of trees ranging from young seedlings to old, mature trees and everything in between. A forest with this variation of **age classes** will look very different from the uniform nature of an even-aged forest. Typically, an uneven-aged forest will have three or more age classes.

Uneven aged management creates minimal openings in the forest canopy, layers of vegetation and a moist forest floor, among other conditions

Uneven-aged forests are, in many instances, indicative of a forest free from significant natural or man-made disturbances over many years—possibly hundreds of years. As you can imagine, this lack of disturbance also tends to attract an entirely different host of trees, plants and animals. Where trees of even-aged forests may be faster growing and shade-intolerant; trees of uneven-aged forests are more **shade-tolerant** (can regenerate and grow in the shade of other trees) and tend to be slower growing. Some examples in New York are sugar maple, American beech, yellow birch and eastern hemlock.

Just as in an even-aged forest, individual trees compete for limited resources (sunlight, nutrients from the soil, and water) as an uneven-aged forest matures. Once again, some trees will be out-competed or grow old and die, while others will dominate the site and fill in gaps created from the dead. If, after many years (again, possibly 100 years or more), the forest is not significantly disturbed, shade-tolerant trees will begin to emerge as the dominant species.

The multiple age classes that develop in uneven aged stands create a diverse **vertical structure** that offers a visual impression that is distinctly different than that which is seen in even aged stands. Since there are few younger trees to impede one's view in an even aged forest, it is possible to see quite a distance into the woods. In contrast, a mature uneven-aged forest has large, mature trees well distributed throughout, and younger trees of various ages with **crowns** (leaves and branches) at different levels down to the forest floor where ground vegetation of shade-tolerant plants and tree seedlings intermingle. Foresters commonly call the vertical structure in an uneven-aged forest the "green wall" due to the appearance of this forest from the side (say, from a forest opening or road) which can appear thick and impenetrable with vegetation from top to bottom.

Uneven-Aged Silvicultural Systems

While even-aged silvicultural systems are preferred when meeting early successional and mid-successional habitat needs, uneven-aged silvicultural systems are preferred over even-aged methods when trying to address the need for large blocks of late successional habitat. As discussed earlier, treatments for even-aged forests usually include one to four tending cuts with a final regeneration cut when the forest matures. For uneven-aged management, foresters enter the stand at regular intervals to conduct both tending and regeneration cuts at the same time. The intervals may be as short as 15 years and as long as 50 years or more.

These techniques are gradual and occur in many steps as the forest begins to establish uneven-aged characteristics. During each entry into the stand the forester will designate either clumps of trees (group selection), individual trees (single tree selection) or a combination to thin saplings and pole-sized trees (tending) and harvesting a few of the mature trees to allow for new trees to grow (regenerating). Foresters have two options (silvicultural systems) to choose from when maintaining the uneven-age structure in a forest:

- **Group Selection:** Trees are removed in an area commonly spanning about twice the height of surrounding mature trees and new age classes are established in small groups within that area. Smaller openings provide microenvironments suitable for shade-tolerant regeneration and larger openings provide conditions suitable for more shade-intolerant regeneration. The management unit or stand in which regeneration, growth and yield are regulated consists of an aggregation of groups. (Helms 1998)
- **Single Tree Selection:** Individual trees of all size classes are removed more or less uniformly throughout the stand, to promote growth of remaining trees and to provide space for regeneration (Helms 1998).

More than 75% of state forests are comprised of even-aged stands as a result of European settlement and historical clearing of forests for agriculture. Today, much of these forests are mature and ready to be either regenerated – maintaining their even-age structure - or slowly managed to develop uneven-age characteristics. Converting to uneven-aged structure occurs by applying single tree and group selection silviculture to the management of the forest. The

process of conversion typically takes well over 100 years. Success with any conversion of even-aged stands depends upon freedom from intense herbivory, lack of interference by undesirable woody or herbaceous plants, and protection against destructive agents like fire and drought (R. D. Nyland 2003). UMPs should consider recommending stands to be converted to an uneven-aged structure where forest conditions are suitable and other objectives are not compromised. Stands that are good candidates for long term uneven-aged management are typically located on productive ground that is capable of growing shade tolerant, long-lived tree species - chiefly sugar maple, American beech, and eastern hemlock.

Applying the strategy of converting even- to uneven-aged in certain forest types will lead to minimizing openings two acres or larger within these stands and thereby helping to establish and retain a relatively continuous and semi-permanent closed forest canopy condition. Landscapes with continuous closed forests canopies that are 500 acres or greater in size are environmentally significant, as they provide effective wildlife travel corridors between adjacent habitats on public and private lands.

Bear tracks; black bear is one of many species that prefer large blocks of continuous closed forests

A well developed uneven-aged forest may be characterized by larger diameter trees, greater amounts of coarse woody material on the forest floor, and greater numbers of living or dead hollow trees. In many ways, uneven-aged silviculture mimics the natural process by which older trees grow to maturity, die, and are gradually replaced by young seedlings and saplings.

PROTECTIVE MEASURES (FOREST MATRIX BLOCKS, CONNECTIVITY, RETENTION AND BUFFERS)

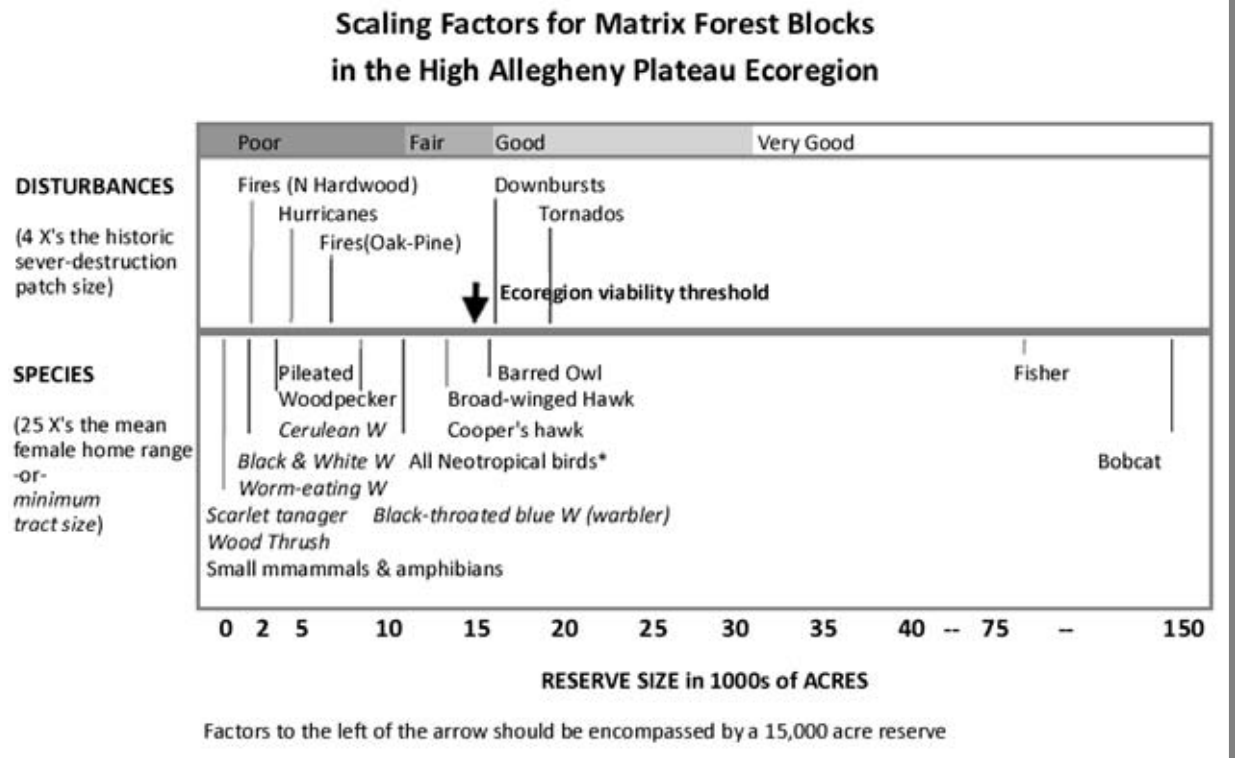
In the course of practicing active management, it is important to identify areas on the land that are reserved from management activity or where activity is conducted in such a manner as to provide direct protection of wildlife, biodiversity, successional features and water quality.

Forest Matrix Blocks

The identification of large, unfragmented forested areas, also called matrix forest blocks, is an important component of biodiversity conservation and forest ecosystem protection. Changes in both land use and climate will stimulate the alteration of movement patterns and range shifts for many species as they respond to changes in habitat availability and configuration along with changes in temperature, precipitation and the distribution of other species. Research that combines data from natural, dynamic disturbance processes (e.g., fires, tornados, downbursts, icestorms, etc.) with the habitat needs of forest dwelling species in the Northeast U.S. has

generated suggestions for how large forest blocks need to be in order to provide adequate space for maintaining viable populations of a number of species (Fig. 1). The two principal factors used to assess and recommend an appropriate size for proposed conservation areas of forested ecosystems, within a given ecoregion, are the home range of wide-ranging animal species and historical patch sizes that result from natural disturbance events within the landscape. Based on these assessments, a set of priority matrix forest blocks have been identified within the four following terrestrial ecoregions within New York.

- St. Lawrence/Champlain Valley (SL-CV) (Thompson 2002)
- Northern Appalachian/Acadian (NAP) (The Nature Conservancy n.d.)
- New York High Allegheny Plateau (HAP) (Zaremba and Anderson et. al. 2003)
- Lower New England/Northern Piedmont (LNE-NP) (Barbour et al. 2000)



***Neotropical species richness point based on** (Robbins, Dawson and Dowell 1989)**,** (Askins and Philbrick 1987)

This chart is excerpted with permission from (Anderson and Bernstein, Planning methods for ecoregional targets: Matrix-forming ecosystems 2003). Note: fisher and bobcat are included in the figure for context; they were not considered to be interior-forest-requiring species.

In this figure, disturbance is defined as four times the patch size of the most severely disturbed patch based on historic data. Home range estimate is based on area needed to accommodate a viable population of each species. In the High Allegheny Ecoregion, the minimum size for forested conservation areas (large vertical down arrow) was set at approximately 15,000 acres. (Adapted from (Groves, et al. 2002)and (M. G. Anderson, Viability and spatial assessment of ecological communities in the Northern Appalachian ecoregion 1999).

A total of 223,801 acres of State Forest fall within 49 of New York's 107 identified matrix forest blocks. This includes acreage on 117 state forests in 30 of the state's 84 UMPs. An analysis will be conducted to determine those areas that present the best opportunities to maintain and enhance the ecological function of these forest blocks.

During the Unit Management Planning process, maintaining or enhancing matrix forest blocks must be balanced against the entire array of goals, objectives and demands that are placed on a particular State Forest. Where matrix forest block maintenance and enhancement is chosen as a priority for a given property, management actions and decisions should emphasize closed canopy and interior forest conditions. More specifically, the following should be considered:

- Minimize or avoid management actions that create large and persistent artificial openings in the forest canopy or abrupt transitions from closed to open canopy area known as "edges." Examples of such actions include building of roads (of a size and extent comparable to PFARs), forest openings from 0.25 to 1 acre or larger (depending upon the forest type) or high densities of even-aged management actions (Roe and Ruesink undated), or the siting of oil and gas wells and their related infrastructure.
- Manage closed canopy areas to increase the amount of forest area supporting both late successional forests and their characteristics by incorporating harvest rotations beyond economic maturity. Specific practices employed might include: increased basal area and density of large diameter trees (in size classes >18" and >27.5" dbh); standing dead trees (snags) and coarse woody debris with dbh of >11.8"; the formation of natural canopy gaps, a well developed vertical structure of tree layers and continuous canopy area of 80% cover or higher (Goodell and Faber-Langendoen 2007) (Keeton 2006).
- Progressively convert embedded pine or spruce plantations within matrix forest blocks to natural forest types, allowing the compatible introduction of larger areas of seedling – sapling aged natural forest cover.
- Refrain from salvaging damaged stands or trees following natural disturbance events. Large and small patches of standing dead or down trees facilitate the development of late successional structural characteristics including higher densities of standing and down course woody debris, a desirable feature of interior forest habitat (Foster and Orwig 2006).

These management options should be viewed as the 'ideal' means of managing matrix forest blocks. Recognizing the extremely wide array of users and stakeholders involved, management choices may need to be made that do not serve the forest block as well as they could, but serve it better than others. For example, if a stand within the forest block is scheduled for harvest, and truck access is needed to implement the harvest, the choice might be made to construct a haul road, instead of a public forest access road (PFAR). Since haul roads are narrower than PFARs, the effect of the haul road on the forest canopy would be less than that of a PFAR.

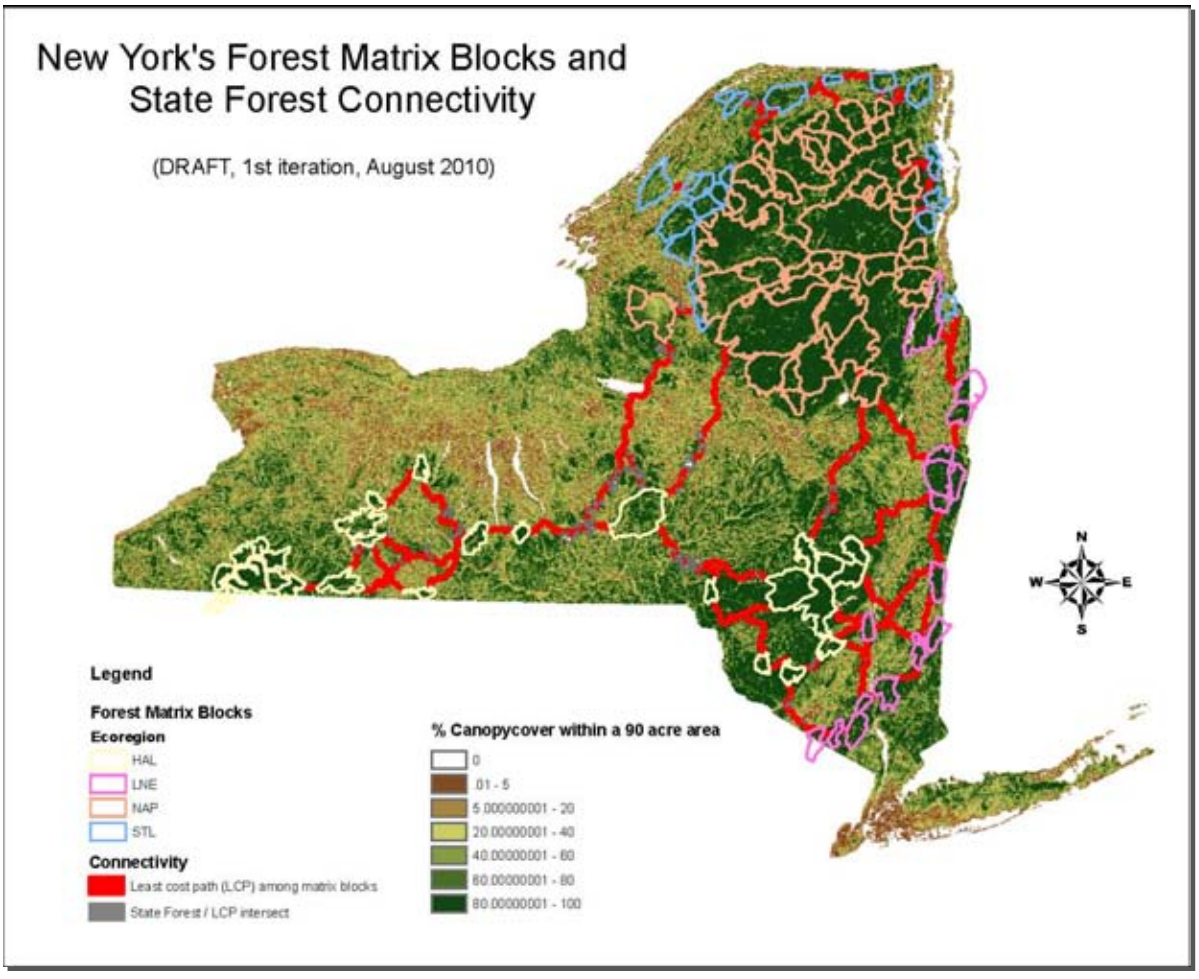
Forest Landscape Connectivity

Securing connections between major forested landscapes and their imbedded matrix forest blocks is important for the maintenance of viable populations of species, especially wide-ranging and highly mobile species, and ecological processes such as dispersal and pollination over the long term. Identifying, maintaining, and enhancing these connections represents a critical adaptation strategy if species are to shift their ranges in response to climate change and other landscape changes. Various nonprofit, state, and federally funded connectivity modeling efforts have been completed or are underway around New York State (e.g., (Quinby, et al. 1999), (Schlesinger and Howard 2010)). These projects target the identification of linkages between the large forested landscapes within New York and the broader region of eastern North America, including southern Canada and the Appalachian region to the northeast and south. As a part of this effort, least cost path (LCP) corridors between identified matrix forest blocks have been predicted. A LCP corridor represents the most favorable

ADDITIONAL RESOURCES

Forest Matrix Blocks and Connectivity Map (full size) –

www.dec.ny.gov/lands/64567.html



dispersal path for forest species based on a combination of distance traveled and the percent natural forest cover within a defined area. Thus, as species that live in forests generally prefer to travel through a landscape with less human development as well as in a relatively direct line, the predicted routes depict a balance of these sometimes opposing needs.

Based on connectivity modeling for LCP corridors between matrix forest blocks found in New York, there are over 80 State Forests intersected by a predicted LCP corridor or less than a mile from a LCP. Lands that are bisected by or within one mile of an LCP, including State Forests, should be managed to create, maintain and enhance their forest cover characteristics that are most beneficial to the priority species that may use them.

Management Considerations:
Looking statewide at LCPs, it is obvious that the greatest restrictions to species movement along these corridors are paved and gravel public highways, agricultural fields and permanent fragmentation created by subdivisions and development. DEC and not-for-profit partners in land conservation should adopt strategies to provide greater forest continuity along LCPs through the acquisition of conservation easements along with fee purchases.

In comparison, State Forests do not provide significant limiting factors to species movement along LCPs, however the quality of these corridors on State Forests can still be enhanced. Many of the management strategies and goals in this plan will increase the quality of LCPs on State Forests as these lands continue to be restored to more natural conditions. The implementation of the new policy for management of plantations will, over time, convert many planted softwood monotypes to more natural hardwood forests. New standards for the retention of snags, den and legacy trees along with Special Management Zone buffer requirements along streams wetlands and vernal pools will also enhance connectivity in LCPs.

The connectivity analysis depicted in this section uses graph theory to assess connections and their relevance in conservation planning, as put forth by Dean Urban and colleagues (e.g. (Urban and Keitt 2001), (Minor and Urban 2007), (Minor and Urban, A graph-theory framework for evaluating landscape connectivity and conservation planning 2008)). The methods used here are an extension of those developed by Ben Best (see (Urban, et al. 2009) and http://www.nicholas.duke.edu/geospatial/software). Here, NYNHP staff used the percentage of natural land cover derived from the land use dataset developed by the NOAA Coastal Change Analysis Program (CCAP: http://www.csc.noaa.gov) to represent the resistance to travel for forest species. Thus, for each location on the ground (GRID cell) they calculated the percentage of natural land within 300 meters in any direction and scored those cells with more natural land as places where forest dwelling animals would be more likely to travel. The connectivity analysis then takes this scoring into account and finds the 'least cost path' between each forest block based on distance and the preference to travel through areas with natural land cover. A similar application using an earlier version of the same software was completed at a coarser scale for the entire northeast by (Goetz, Jantz and Jantz 2009).

IMPLEMENTATION

ACTIVE FOREST MANAGEMENT

UMPs for State Forests bisected by LCPs will also consider adaptive management to provide enhanced connectivity including the following strategies:

- Favoring uneven aged management over even aged management.
- Where even aged management will be employed, final harvests can be conducted with smaller patch sizes and cuts within a stand spread out over a longer time period.
- Enhancing the level of snag, cavity and legacy tree retention as guided by Retention Standards.
- Design any new roads to limit canopy gaps. Where feasible and in line with other goals, build roads to Haul road standards instead of PFAR standards.
- Cease mowing of PFARs shoulders, allowing them to grow back into a wooded canopy.
- In non-forested areas, maintain or restore linkages between these continuous forest canopy areas via the retention or restoration of contiguous natural cover.
- Where possible, emphasize forest canopy conditions preferred by highly mobile species.

Forest and Tree Retention

Forest retention is a strategy for conserving biodiversity in stands managed for timber production. Retention and recruitment of snags, cavity trees, coarse woody debris (CWD) and other features will advance the structural and compositional complexity necessary for conserving biodiversity and maintaining long term ecosystem productivity. The purpose of this chapter is to provide guidance on the quantity and distribution of live and dead trees to be retained during stand treatments and through at least the next rotation.

This cavity tree may provide a home for many species, from insects to birds or small mammals

Foresters have long recognized the importance of “wildlife trees” - snags, cavity trees, retained live trees and coarse woody debris as necessary components of a healthy, diverse forest. Retention of live and dead trees to enhance or provide wildlife habitat has been the subject of much research going back decades (Evans and Conner 1979) (DeGraff and Shigo, Managing Cavity Trees for Wildlife in the Northeast 1985) (Tubbs, et al. 1987).

DeGraff and Yamasaki documented over 50 wildlife species dependent upon cavity trees for feeding, roosting, or nesting/denning sites (DeGraff, Yamasaki, et al. 1992). In addition to vertebrate

wildlife species, numerous invertebrate species such as wasps, spiders and honeybees depend upon cavities for habitat. Providing an abundance of trees suitable to maintain cavity nesting bird populations maintains avian species diversity while also directly benefitting the forest. Most cavity nesting birds are insectivorous. Researchers have demonstrated the increased growth of forests when insectivorous birds are present to control populations of leaf eating insects (Marquis and Whelan 1994).

DeGraff and Yamasaki also document 39 wildlife species (esp. small mammals and amphibians) that use dead and down woody material for foraging or shelter and 65 species that use overstory inclusions (pockets of hardwood trees within conifer stands or groups of conifers within hardwood areas) for feeding, nesting or winter shelter (DeGraff, Yamasaki, et al. 1992). The retention of dead and down trees also provides habitat for many invertebrates, vascular plants, lichens, fungi, mosses and microorganisms. Coarse woody debris and fine woody material are also essential for nutrient cycling and provide a seedbed for the establishment of some tree species (Harmon, et al. 1986). Much of New York's State Forests are gradually recovering from the complete loss of dead wood material as a result of agricultural clearing. On many of these areas, there is still a lack of any large coarse woody debris (logs) even up to 70 years after reforestation.

In the 1990s, scientists incorporated the retention of "wildlife trees" into the larger concept of biological legacies. Biological legacies are defined as: "the organisms, or a biologically derived structure or pattern inherited from a previous ecosystem – note biological legacies often include large trees, snags, and down logs left after harvesting…" (Helms 1998). Biological legacies also include other ecological features that are vulnerable to timber harvesting such as vernal pools, small forest wetlands and patches of rare or unusual plant species. In addition to the obvious function of providing habitat for wildlife species as described above, biological legacies are valued for their "lifeboating" function after a period of heavy disturbance. Examples of such function include:

- Perpetuating plant species that would otherwise be lost as a result of the disturbance.
- Perpetuating living organisms by providing nutrients, habitat and modifying microclimatic conditions.
- Providing habitat for recolonizing species by structurally enriching the new stand and providing protective cover in the disturbed area (Franklin, Mitchell and Palik 2007).

The function of "lifeboating" is most pertinent after a large disturbance such as an even-aged regeneration harvest. Lifeboating is believed to be most effective at protecting those species with limited dispersal capabilities such as herbaceous plants, lichens, mosses, invertebrates and terrestrial amphibians. Bellemare et al. documents the difficulty many forest herbs have at recolonizing secondary forests, many decades after the sites have been reforested, and that such herbs are often present on sites that escaped the extermination effects of forest clearing

and plowing such as bedrock outcrops, rocky slopes and along hedgerows. Sites such as these would be examples of desirable locations for retention (Bellemare, Motzkin and Foster 2002).

If biological legacies are to be deliberately left, they must first be recognized and incorporated into harvest prescriptions. This practice is known as the variable retention harvest system and is defined as: "an approach to harvesting based on the retention of structural elements or biological legacies (trees, snags, logs, etc.) from the harvested stand into the new stand to achieve various ecological objectives. Major variables are types, densities and spatial arrangements of retained structures." (Helms 1998) (Franklin, Mitchell and Palik 2007). Variable retention harvests can be incorporated into traditional regeneration harvest systems (clearcut, seed tree, shelterwood or selection) to enable managers to protect a wider array of site characteristics for conservation of biodiversity while still establishing conditions for desirable tree regeneration. This practices or components are collectively referred to as reserves.

There is also recognition that traditional silviculture has the potential to reduce or largely eliminate cavity and snag trees, as well as coarse woody debris. Kenefic and Nyland reported that managers need to deliberately incorporate cavity tree retention as part of their marking strategy to maintain cavity trees in stands where the focus of management is on growing high-value trees (Kenefic and Nyland 2007).

As mentioned above, retention components provide benefits to a majority of the life forms dependent upon forests. These benefits include important habitat attributes, cover, shelter and nesting sites, nutrient recycling for soils, and general support for life forms at the foundation of the food chain. Unfortunately, some of these same attributes, especially fine woody debris (downed treetops) are viewed negatively by many human forest visitors who prefer a park-like, open landscape and the ease of walking and hunting in an "uncluttered" forest. The positive benefits of retention outweigh the human-related impacts, which are often satisfied or mitigated through education and a better understanding of the forest system.

Retention of dead and decaying trees is also important for aquatic species, as these trees eventually fall and can provide important habitat in streams. Large woody debris (LWD) provides important trout habitat in streams.

There are limited economic impacts associated with practicing retention in State Forest timber sales. In some cases, the retention of saleable trees translates to loss of income, however the ecological value of the retained trees takes precedence.

Retention Standards

The Bureau of State Land Management has developed standards for retention on State Forests and proposed a program policy to

ADDITIONAL RESOURCES

Program Policy: Retention on State Forests
Developed by the Bureau of State Land Management. Can be accessed at www.dec.ny.gov/lands/64567.html

that end. In the development of these standards, existing research results and similar standards or guidelines of other states were reviewed including those of Wisconsin, Michigan, Pennsylvania, Minnesota, New Hampshire and Maine. While the requirements inevitably vary somewhat among states, there is broad consensus on the need for such standards to assist managers in maintaining diverse, healthy and productive forests.

Special Management Zones

DEC Special Management Zone (SMZ) Guidelines (Buffer Guidelines) provide continuous over-story shading of riparian areas and adjacent waters, by retaining sufficient tree cover to maintain acceptable aquatic habitat and protect riparian areas from soil compaction and other impacts. DEC's buffer guidelines also maintain corridors for movement and migration of all wildlife species, both terrestrial and aquatic. Buffers are required within SMZs extending from wetland boundaries, high-water marks on perennial and intermittent streams, vernal pool depression, spring seeps, ponds and lakes, recreational trails, campsites and other land features requiring special consideration. These guidelines are discussed in the soil and water protection section of this plan; DEC's special management zones are summarized in the table on *page 108*.

ADDITIONAL RESOURCES

Rules for Establishment of Special Management Zones on State Forests – June 2008, establishes the Bureau of State Land Management's buffer guidelines and can be found at www.dec.ny.gov/lands/64567.html

Upland/aquatic habitat on Texas Hollow State Forest in Schuyler County, typical of an area where Special Management Zones are applied

ACTIVE MANAGEMENT GUIDELINES (SALVAGE, CLEARCUTTING AND PESTICIDE/HERBICIDE USE)

There are some tools used in State Forest management which are important and essential for reaching ecosystem management goals but which must be used carefully and judiciously. The following provides limitations and guidance for use of these tools to prevent and mitigate potential impacts.

Salvage

Extreme weather or outbreaks of insect activity can cause significant damage to State Forests. Salvage of severely damaged forest stands has traditionally been a very high priority for DEC.

Natural disasters, including windstorms, ice storms, and insect infestations routinely impact State Forests. In recent history, the 1995 blowdown and 1998 ice storm created a major impact on State Forests in northern New York. More recently, a major outbreak of the forest tent caterpillar has caused significant defoliation in Central New York from Lake Erie to the Massachusetts border, roughly between 2000 and 2010. The 1998 ice storm alone impacted over 100,000 acres of State Forests in Jefferson, St. Lawrence, Clinton and Franklin counties. Approximately 4,500 acres of the most severely impacted areas were salvaged under 247 separate timber sales, netting $1.8 million.

There are several reasons to prioritize salvage over other management activities. At the time the damage occurs, there is a narrow window of time in which salvageable timber can be retrieved before succumbing to natural decay. Such timber has been grown and tended on State Forests, usually for decades. The value of this investment in time and labor as well as the monetary value of the timber itself is of great importance to the State of New York and to local businesses and communities that rely on timber harvesting. In addition, damaged stands can become a danger to neighboring forests and landowners. These stands may harbor and support forest insect and disease outbreaks. They also contain significant fuel loads that, especially in softwood stands, can be a wildfire hazard.

There are also numerous reasons not to salvage dead or dying trees. The economic importance of salvage must be balanced with these other important concerns. DEC must consider the ecological value of dead and dying trees. These trees will return nutrients to forest soils and provide biodiversity and structural diversity that is needed by a variety of forest-dependent life forms. (Foster and Orwig 2006) In addition, the value of conducting salvage must be balanced against the value of other scheduled harvests, the importance of maintaining a regular harvesting schedule, and the availability of staff and other resources.

The decision of whether or not to salvage must be made on a case by case basis, considering all these factors. At a minimum, the economic value of salvaged timber must be greater than the revenue lost by deferring other scheduled harvests, and harvests scheduled in approved UMPs must not be delayed more than five years.

Clearcutting

Clearcutting in particular is sometimes cited as an activity that State Forest users would prefer not to see. Most often, the reasons behind such dislike for the practice are based on aesthetics. Despite the visual appearance of a new clearcut, there are few other options that will accomplish certain goals as effectively. Timber production can be most effectively maximized by using even-aged management systems, of which clearcutting is one type. Native shade intolerant species such as black cherry and red oak reproduce best under conditions of full sunlight. It is highly desirable that the presence of these trees be maintained in the New York landscape. Also, there are myriad animal species that depend on young stands of seedlings and

saplings. Clearcutting is an effective means of creating such habitat, so that these animals remain a part of our ecosystems. As the photos at right illustrate, this habitat is present for approximately 20 years following a clearcut before forested habitat begins to reestablish itself.

A clearcut stand immediately after harvest

Staff conversations with members of the public often reveal that opposition to clearcutting stems from an incomplete knowledge of the reasons for using even-aged management systems, and the benefits derived from them. When they learn of these benefits, their opposition commonly changes to acceptance of the practice. Following a clearcut, stands may be replanted with selected tree species or, if sufficient regeneration or seed stock is present, allowed to develop into natural forest cover. The photos at right, collected from various clearcut stands in Delaware and Schoharie counties, represent the successional progress of reforestation that typically occurs following a clearcut that is not replanted, but allowed to develop into a natural forest stand.

A clearcut stand that has been allowed to naturally regenerate, five years after harvest

The Division of Lands and Forests is developing policy which will address the visual and ecological impacts of clearcutting, and set guidelines for use of the practice on State Forests. This policy will build upon mitigations that are currently in place on State Forests and additional proposed policies discussed in this plan. All clearcutting on State Forests incorporates SMZ's (discussed above) which buffer and protect water resources and associated wildlife. In addition, the proposed retention policy (discussed above) establishes guidelines for ensuring that timber harvesting, including clearcutting, works around and does not remove features on the land that provide

A clearcut stand that has been allowed to naturally regenerate, 19 years after harvest

the structural and compositional complexity necessary for conserving biodiversity and maintaining long term ecosystem productivity. In addition, the plantation section of this plan establishes guidelines for the management of plantations, including use of clearcutting. The plantation policy sets the stage for the gradual conversion of most plantations to more natural forest cover. (*refer to page 271*).

ADDITIONAL RESOURCES

Program Policy: Clearcutting on State Forests – Establishes the Bureau of State Land Management's practices for the use of clearcutting and other forest regeneration methods. Available at www.dec.ny.gov/lands/64567.html

Pesticide/Herbicide Use

Foresters apply principles of Integrated Pest Management (IPM), the science of silviculture and best management practices as the preferred methods of promoting forest health and providing for forest regeneration. However, in limited cases it is necessary to use pesticides to accomplish broader management objectives. Pesticides may be necessary to control invasive species, to protect rare and endangered plants from competition, or to control vegetation interfering with forest regeneration. Pesticides are used only as a last resort, where other "minimum tools" are not effective. For further discussion of invasive species and control of interfering vegetation, including IPM, and the "minimum tool" approach, *refer to the Forest Health section on page 283 of this plan.*

Pesticides are currently used effectively in limited situations on State Forests. Specific pesticides are carefully chosen, after researching their chemical components for their ability to bio-degrade in the environment, their resistance to leaching into the ground water and their effectiveness in controlling the target pest with minimal impact to other flora and fauna. Only those pesticides approved for use in New York State are considered. Additionally, no chemical not approved by the Forest Stewardship Council and Sustainable Forestry Initiative's forest certification standards is allowed. The latest research and in some cases partners such as TNC and the SUNY ESF are consulted to determine the best control methods. All applications are made under the direct supervision of a New York State Certified Pesticide Applicator using the most conservative application methods.

The term "pesticides" refers to both herbicides and insecticides. The New York State Department of Environmental Conservation is the agency in New York State designated to regulate pesticides. The Division of Solid & Hazardous Materials regulates pesticide applications in New York State and is responsible for compliance assistance, public outreach activities and enforcement of state pesticide laws, Article 33 and parts of Article 15 of the Environmental Conservation Law, and regulations, Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York Parts 320-329.

Under Sections 33-0301 and -0303 of the Environmental Conservation Law (ECL), the DEC has jurisdiction in all matters pertaining to the distribution, sale, use and transportation of pesticides. DEC also regulates the registration, commercial use, purchase and custom application of pesticides.

For compliance and enforcement purposes, DEC promulgates regulations pursuant to state laws, and issues policies as a part of compliance assistance.

Use of Pesticides to Control Insects on State Forests

There have not been any instances over the past decade where pesticides have been used on State Forests to control insect populations. IPM is applied to limit the need for pesticide use, including the promotion of health and biodiversity to maintain a resilient forest. Natural population cycles have been permitted to occur even though moderate to heavy defoliations sometimes cause significant tree mortality. However, the use of pesticides will not be ruled out, as the future will bring introductions of non-native invasive pests which could cause significant, wide-spread and permanent disruptions to forest ecology. The opportunity to control a new introduction before it has the ability to alter the ecosystem might, after careful consideration, warrant the use of a pesticide. While this option will not be considered lightly, it is wise to keep it available for limited use, when no other options are feasible. Any future use will conform to the guidelines established in this section, including SEQR analysis thresholds for pesticide application.

Use of Herbicides to Control Plants on State Forests

Examples of situations where herbicides may be used on State Forests when all other options are not viable, effective or economically feasible include protection of rare and endangered species, controlling exotic invasive plants, habitat restoration and ensuring adequate forest regeneration.

Controlling exotic invasive plants

Herbicides are sometimes used on State Forests to control non-native invasive plants. Targeted exotic plants include but are not limited to Japanese knotweed, mile-a-minute, honeysuckle, ailanthus, non-native Phragmites, pale and black swallow-wort, giant hogweed and multi-flora rose. The goal is to control small introductions prior to their ability to colonize an area and disrupt natural processes. Herbicides are only used in situations where other options such as mechanical control (usually hand-pulling individual plants out of the ground) have been proven to be ineffective. Historically, an average of less than twenty acres of invasive species control is conducted annually on State Forests.

Rare and endangered species protection

Herbicides are also used in limited situations to protect rare and endangered species. An example is the hart's tongue fern, federally listed as threatened. This is one of only a few plants

listed in the Endangered Species Act. According to New York's Natural Heritage Program, 90% of the heart's tongue fern global populations are located in New York and a significant number of these populations are being seriously impacted by invasive plants. On a steep, rocky limestone bedrock site managed by DEC in Onondaga County, the Bureau is working with TNC and the State University of New York College of Environmental Sciences and Forestry (SUNY ESF) to save a rapidly declining population of Hart's tongue fern from being out-competed by the exotic, invasive vine called pale swallow-wort. Hand pulling swallow-wort is not an option at this site due to the thin soils and roots intertwined hart's tongue fern plants. After a thorough literature search and consultations with TNC and SUNY ESF the decision was made that the only viable option is to apply herbicide using a cut-stem application method. Using the cut-stem application method the applicator directly applies a drop of herbicide to each cut stem of pale swallow-wort, significantly reducing the amount of chemical used and the area treated, while protecting the ferns.

Habitat Improvement and Control of Interfering Vegetation

The remaining instance of herbicide use relates to forested areas which cannot be adequately regenerated due to interfering vegetation. The Bureau performs silvicultural treatments on approximately 8,000 acres annually. One of the basic tenets of silviculture is to ensure forests have adequate regeneration (seedling growth). In most cases, favorable conditions are created on the forest floor to stimulate seedling growth through either natural regeneration or by planting. Efforts to establish regeneration in a forest are incorporated into all active forest management activities. In cases where these efforts are unsuccessful, it may be necessary to judiciously use herbicides to reduce the abundance of interfering vegetation to create favorable conditions for the establishment of regeneration or to provide proper conditions for planting tree seedlings.

Herbicide use is limited to a few state approved herbicides that are effective at controlling interfering vegetation and have minimal short and long-term negative impacts on the environment when applied by a New York State Certified Pesticide Applicator according to the label instructions. Using herbicides to control interfering vegetation can have targeted results if the herbicide is applied to individual plants either by stem injection or foliar application. Broadcast spraying from the ground (either by backpack sprayer or tank sprayer attached to a vehicle) may be more appropriate in specific applications where larger areas need treatment in a more cost effective and efficient manner. When correctly and appropriately used, herbicide applications can be more cost efficient and effective at controlling interfering vegetation compared to other options. Herbicide is used only after all other options are considered. With this approach, herbicides are typically used in less than 3% of silvicultural treatments annually (less than 250 acres a year). Herbicide use is further reduced by the application methods employed – typically hand application, specifically applied where and when possible only on the interfering vegetation.

State Forest Pesticide Application Guidelines

Use of pesticides/herbicides shall comply with label directions and restrictions, including but not limited to: proper mixing, storage and disposal, personal safety equipment, application methods and rates, and minimizing effects on non-target vegetation and wildlife. No chemical not approved for use in New York State and no chemical not approved by the Forest Stewardship Council and Sustainable Forestry Initiative's forest certification standards will be used. The general public will be restricted from areas where herbicide is being applied. Overall impact will be minimized by using application methods that minimize the amount of herbicide being applied to the lowest level feasible. When practical, methods such as individual plant or tree stem injection, basal stem applications, cut stump treatment or backpack spraying will be employed.

Specifications

Pesticide application will be conducted according to conditions described in a Pesticide Application Plan written for each specific instance of application. To ensure protection of water resources and improve the effectiveness of foliar applications, pesticide spraying shall only take place when foliage is dry. Pesticide spraying shall not take place when rainfall is expected within 12 hours after application or during times when winds are gusty or exceed 10 miles per hour. The pesticide spraying shall be done in a manner, such that drifted pesticide does not impact adjacent areas or private land. No pesticide application may take place when the Palmer Drought Index drops below negative two (-2).

Pesticide application to control interfering vegetation will occur within the dates and times according the product label and as further described in the Pesticide Application Plan. A second application the following year may be required if the contractor does not meet the success rate standard specified in the Notice of Sale and Pesticide Application Plan. Equipment used in the application of pesticide or otherwise contaminated with pesticide shall not be used to draw water. Water mixed into pesticides will be brought to the site and will not be drawn from any water body adjacent to or located on State Forests.

Notices of pesticide application will be posted at the entrance to the treated area and on the State Forest boundary line adjacent to the treated area.

Pesticides will not be applied within defined protection buffers along water bodies or within the boundaries of designated wetlands, seeps, springs and vernal pools as described in the "DEC Division of Lands and Forests Management Rules for Establishment of Special Management Zones on State Forests" version June 2008 or later.

A New York State Certified Applicator will apply the pesticides following label instructions and safety precautions. This will minimize impact to both the environment and the public. Application personnel will be equipped with safety equipment as described on the label of the pesticide product being used.

IMPLEMENTATION

ACTIVE FOREST MANAGEMENT

"AFM" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Active Forest Management (AFM) Objective I – DEC will practice active forest management, applying sound silvicultural practices, including the use of timber harvesting and limited use of pesticides to reach statewide, ecoregional and unit-level ecosystem management goals.

> **AFM Action 1** – Develop and propose a clearcutting policy to provide guidance to regional staff, to be adopted by 2012. Conduct all clearcutting according to guidelines established in this plan unless superseded by policy.

AFM Objective II –Timber sales will be used to enhance forest health and the diversity of species, habitats and structure and thereby improve the resiliency of ecological systems and forest sustainability. Harvests will be planned in such a way as to develop a wider range of forest successional stages. To accomplish this objective, UMPs will contain harvesting plans and schedules. Occasionally unplanned salvage cuts may be necessary.

> **AFM Action 2 (also FP 2)** – Re-establish a statewide system of permanent sample plots on State Forests to ensure sustainability and to quantify long-term carbon storage and forest growth, mortality and removals (harvests) and other forest characteristics, following the same protocol and methodology as used to develop the forest statistics for New York's forests by the US Forest Service Forest Inventory and Analysis Unit. Plots are to be established by 2013.

> **AFM Action 3** – Approach SUNY ESF to develop climate change adaptation strategies, using State Forests as a living laboratory and model. Strategies could include studies with varied planting stock and species redistribution (assisted migration).

AFM Objective III – Opportunities will be identified in all new UMPs to address ecoregional gaps, creating missing habitat types and diversity components to maintain and enhance landscape-level biodiversity. While there is not enough acreage within each unit to fill all landscape gaps, each UMP will address the gaps each State Forest is best suited to fill.

AFM Objective IV – Adaptive management strategies will be considered to provide enhanced connectivity on State Forests bisected by LCPs. Also, management actions and decisions that emphasize closed canopy and interior forest conditions to maintain and enhance pre-identified matrix forest blocks will be considered within each respective UMP.

> **AFM Action 4 (also SM 5)** –Conduct training for forestry staff on the enhancement of forest matrix blocks and connectivity by 2013.

AFM Objective V – Forest and tree retention will be applied to preserve biodiversity in stands managed for timber on State Forests.

> **AFM Action 5** – Adopt proposed Program Policy "ONR-DLF-2 Retention on State Forests" to provide guidance to regional staff by 2011.

Active Forest Management (AFM) SEQR Alternatives Analysis and Thresholds

Following the **no-action alternative**, DEC will continue to employ the same silvicultural tools that have been proven effective to reach the desired conditions established in this plan and in UMPs. These tools emulate natural disturbances and processes to reach desired future conditions. However, we must recognize that this plan establishes many new landscape ecology and ecosystem management approaches that have not been consistently applied throughout the State Forest system. Using established tools to reach these new goals has been selected as the **preferred alternative** on acreage identified in UMPs as open to active management. This preferred alternative includes the application of protective measures, including uniform application of retention standards on areas of State Forests which are open to active forest management. Under this policy, other areas will be set aside to protect sensitive sites, rare and endangered species or to meet other ecological goals.

The alternative of removing all State Forests from active management has not been selected due to the following:

- State Forests are legislatively dedicated to the production of forest products
- Active management is used as a tool to promote forest health and biodiversity
- Timber harvests support local economies and offset the cost of administering and maintaining State Forests
- Timber sale contracts include requirements for the development and upkeep of forest access roads, parking lots and some multi-use trails.

The alternative of precluding pesticide use has not been selected because, there are instances in which small outbreaks of invasive species cannot be controlled by other methods and must be eradicated to prevent disastrous consequences. There are also instances in which ecological and silvicultural goals cannot be realized without the use of pesticides.

SEQR analysis of the direct impacts of timber harvesting are also addressed in the Forest Products section of this plan.

SEQR Analysis Threshold
The use of any active forest management on acreage occupied by protected species ranked S1, S2, G1, G2 or G3 will first require site-specific SEQR analysis.

In consideration of public concern over the potential impacts of clearcutting, a 40-acre threshold has been established. Any clearcut of a contiguous area 40 acres or larger will require additional site-specific SEQR.

The use of pesticides to control invasive species or interfering vegetation on State Forests shall conform to Pesticide Application Guidelines delineated above. Compliance with these

guidelines will avoid and minimize potential impacts resulting from pesticide application to the maximum extent practicable and no further SEQRA review will be conducted for pesticide application to State Forests as discussed in this chapter.

However, any pesticide application described below will require additional SEQR analysis.

- aerial spraying (application by airplane or helicopter)
- applications adjacent to rare and endangered plants ranked S1, S2, G1, G2 or G3
- applications exceeding 40 acres

All selection harvesting (uneven aged management) conducted in accordance with this plan will not require additional SEQR analysis.

CHAPTER 3

RESOURCE PROTECTION

SOIL AND WATER PROTECTION

SOIL PROTECTION AND ECOLOGY

The Importance of Forest Soils

"Aldo Leopold suggests that the first rule of intelligent tinkering is to save all the pieces. We would recast this idea and say that the first rule of intelligent forest management is to take care of the soil. Taking care of the soil requires many important insights into the chemistry, physics and biology of soils, which together comprise soil ecology." (Fisher and Binkley 2000).

Soils provide the foundation, both figuratively and literally, of forested ecosystems. They support an immense number of microorganisms, fungi, mosses, insects, herpetofauna and small mammals which form the base of the food chain. They filter and store water and also provide and recycle nutrients essential for all plant life. "More than 99% of the diversity of life in forest ecosystems resides in soils, where amazingly small, numerous and important organisms make the rest of the ecosystem (such as trees and mammals) possible." (Fisher and Binkley 2000). The value of forest soils extends well past the boundaries of the forest, not only in providing high quality water, but also as important "sinks" for the sequestration of carbon.

Impacts on soil affect wildlife, starting at the base of the food chain

Unfortunately, soils are vulnerable to human impacts. State Forests are a testimony to this fact as past agricultural practices, prior to state ownership, depleted soils on these lands of nutrients and organic materials as well as impairing their structure. In some cases, soils were even lost to unchecked erosion. While reforestation efforts of the 1930s and 1940s have contributed to a replenishment of the soils and carbon stocks, the process is still far from complete. High quality forest soils are the product of thousands of years of development, a process for which there are no shortcuts.

Filtration is the process of absorbing and filtering rainwater and runoff. It is highly dependent on combined vegetative cover, humus and soil type.

Compaction of forest soils reduces aeration; which reduces their ability to absorb and filter water, support healthy root systems and support the full range of life forms dependent on healthy, well-aerated soils.

Erosion is the removal of vegetation, organic matter and soil, leaving the remaining soil prone to further damage. Erosion is caused by runoff, which occurs wherever the volume of water exceeds the ground's capacity for filtration. It increases exponentially as a function of increased water velocity.

Soil Management

Sustainable forest management dictates the protection of forest soils. Human activity can potentially have negative impacts on soils and the many life forms

resident in soil ecosystems. Management activities must be modified to limit these impacts. DEC staff will strive to minimize and mitigate soil impacts, erosion and compaction, to the fullest extent practical during the process of planning, working and contracting on State Forests.

To reduce impacts, including erosion and compaction, DEC:

- Designs and constructs recreational trails, roads and access trails to minimize running slope, which in turn minimizes the velocity of water that travels over them;
- Minimizes the overall impact of its activities by directing heavy use, such as recreational use, toward formal trail systems and designated campsites, which are designed to accommodate such use— heavy-duty harvesting equipment will often be limited to designated skid trails and restricted from areas where impacts would be excessive;

While this photo was not taken on State Forest lands, it illustrates that erosion problems can compound quickly when major storm events occur over exposed

- Closes poorly designed or badly damaged facilities and restores and maintains existing facilities to prevent damage from occurring;
- Applies best management practices (BMPs) and bureau guidelines.

Not all soils are created equal. Some are able to withstand heavier use than others. Impacts can be minimized by concentrating a particular use in soils which are better able to support that use. Another strategy is to avoid impacting some soils altogether. Where the filtration value of soil is highest, on the edge of streams, wetlands, vernal pools and spring seeps, a buffer zone will be created around water features and heavy equipment will be excluded, except at carefully selected and designed crossings.

Nutrient Depletion

Intensive management of forests, like intensive management of agricultural land, has the potential of depleting nutrients from the soil. This is more of a risk with plantations in the southern United States, where a “crop rotation” ending in a clearcut could happen every 20 to 25 years. At the present rate on State Forests in New York, less than 1/100th of the total area is cut every year, with the vast majority of those harvests being intermediate thinnings. This is far from being intense enough to deplete soils, as shown by the fact that State Forest soils are actually much richer on average in 2010, than they were when the state first acquired these lands. Still, the demand for forest products, as a biomass fuel source for combustion, or as a raw material for the production of cellulosic ethanol, stands to increase significantly.

The Bureau of State Land Management has proactively developed policies on forest and tree retention *(refer to page 85)* and plantation management *(refer to page 261)* which establish standards and procedures to protect forest soils from nutrient depletion and protect the ecological goals outlined in this plan. Buffer guidelines (discussed below in the context of water quality) also help prevent nutrient depletion.

WATER ECOLOGY

The important role forests play in producing high quality fresh water cannot be overstated. Forests serve as nature's water filters and regulate water flow by storing rainfall and releasing it into streams at a more even rate. Water is essential for almost all terrestrial life forms, as well organisms that spend at least part of their life cycle in water, or are aquatic-based, like some insects and salamanders. As with soils, the state's waters support an immense variety of organisms which serve as the foundation for the food chain and the core of biodiversity.

Water quality—the ecological health of streams, ponds, lakes and wetlands—is directly and inextricably intertwined with soil protection. DEC's actions to protect soils and terrestrial vegetation directly and indirectly protect water quality by: maintaining the filtering capacity of soil; reducing soil erosion to protect stream habitat from sedimentation; stabilizing water chemistry; controlling water temperatures; buffering high water events to reduce damage from flooding; and storing water between rain events.

Water Quality Classifications

All waters of the state are provided a class and standard designation based on the *best usage* (for drinking, fishing, etc.) of each water or waterway segment. The following list shows waterway classifications and mileage found on State Forest lands.

- 145 miles of Class AA or A, assigned to waters used as a source of drinking water.
- 50 miles of Class B, indicating a best usage for swimming and other contact recreation, but not for drinking water.
- 1,449 miles of Class C, for waters supporting fish propagation and survival.
- 134 miles of Class D, for waters supporting fish survival, but not propagation.

East Branch Fish Creek State Forest in the Tug Hill Plateau, Lewis County

Waters with classifications A, B, and C may also have a standard of (T), indicating that they may support a trout population, or (TS), indicating that it may support trout spawning (TS). Special

requirements apply to sustain waters that support these valuable and sensitive fisheries. Small ponds and lakes with a surface area of 10 acres or less, located within the course of a stream, are considered to be part of a stream and are subject to regulation under the stream protection category of the Protection of Waters regulations.

Certain waters of the state are protected on the basis of their classification. Streams, or small water bodies located in the course of a stream, designated as C(T) or higher (i.e., C(TS), B or A) are collectively referred to as "protected streams," and are subject to the stream protection provisions of the Protection of Waters regulations. Special protective measures are used when protected waters are crossed, or have the potential to be impacted in the course of conducting management activities. When harvesting, for instance, portable temporary bridges are required in many cases to protect streams and their banks from damage and sedimentation. Additional protective measures are discussed on DEC's public website at www.dec.ny.gov/permits/49060.html and www.dec.ny.gov/permits/49066html.

State Forests are included in DEC's Routine Statewide Monitoring Program which is responsible for the monitoring of the waters of the state to allow for the determination of the overall quality of waters, trends in water quality, and identification of water quality problems and issues. The program includes lake assessments, stream biomonitoring and rotating integrated basin studies. More information is found at www.dec.ny.gov/chemical/23848.html.

BEST MANAGEMENT PRACTICES AND GUIDELINES

To protect soils and water quality, the following BMPs and guidelines are being, and will continue to be, used in all projects undertaken on State Forest lands. The BMPs, in particular, describe appropriate actions that should be taken with very few exceptions.

Soil and Water Guidelines

- Apply **DEC Special Management Zone (SMZ) Guidelines**, which provide continuous over-story shading of riparian areas and adjacent waters, by retaining sufficient tree cover to maintain acceptable aquatic habitat and protect riparian areas from soil compaction and other impacts. DEC's buffer guidelines also maintain corridors for movement and migration of all wildlife species, both terrestrial and aquatic. Buffers are required within SMZs extending from wetland boundaries, high-water marks on perennial and intermittent streams, vernal pool depression, spring seeps, ponds and lakes, recreational trails, campsites and other land features requiring special consideration. DEC's special management zones are summarized in the table below.

ADDITIONAL RESOURCES

Rules for Establishment of Special Management Zones on State Forests – June 2008, establishes the Bureau of State Land Management's buffer guidelines and can be found at www.dec.ny.gov/lands/64567.html

DEC Special Management Zone Guidelines (Summary of Guidelines for Streams, Wetlands, Ponds, Lakes & Spring Seeps)	
Activity	**Guidelines**
Mineral Exploration and Development	• Mineral Exploration: Refer to *Guidelines for Seismic Testing on DEC Administered State Land* Draft 12/20/07 • Development Surface disturbance prohibited within 250'.
Silviculture	• Spring Seeps and DEC Classified, Federally Classified, and Unclassified Wetlands[6]: No timber harvesting equipment allowed in any wetland or spring seep. Any trees cut within any wetland or spring seep must be winched out. Maintain at least 75% of pre-harvest basal area evenly spread throughout both the wetland or spring seep and a 100' **Special Management Zone**[4] surrounding wetland or spring seep. • Ponds & Lakes: 50' **Protection Buffer**[3]* next to water body & additional 100' **Special Management Zone** retaining at least 75% of pre-harvest basal area. • Perennial Streams[2]: 100' **Special Management Zone** on each side of stream. First 50' next to stream is a **Protection Buffer***. The next 50' - maintain at least 75% of pre-harvest basal area. • Intermittent Streams[1]: 100' **Special Management Zone** on each side of naturally occurring intermittent streams. Maintain at least 75% of pre-harvest basal area within **Special Management Zone**.
Skid Trails	• Keep skid trails at least 100' from wetlands and water bodies and at least 150' away when adjoining slopes are greater than 10%. • No skidding through spring seep origin. Where roads & trails must cross spring seeps, locate them as far from the origin as possible and ensure that crossings are at right angles to the spring seep. • Must follow guidelines presented in *New York State Forestry BMPs for Water Quality Field Guide* (BMP Field Guide) and stream crossing permit procedures.
Haul Roads**	• Avoid construction within 250' of wetlands. Must follow BMP Field Guide.
Log decks and Landings	• Must follow BMP Field Guide. • Keep log decks and landings at least 250' from all wetlands, streams and ponds.

General BMPs
(Refer to page 157 for additional construction guidelines.)

- Limit the size of improvements to the minimum necessary to meet the intended use.
- Minimize tree cutting associated with construction projects.
- Minimize the use of equipment in streams.
- Locate improvements to minimize cut and fill.
- Locate improvements away from streams, wetlands, and unstable slopes.
- Plan projects to avoid hydric and highly erodible soils. Where these soils must be traversed consider: construction in dry periods, seasonal closure, use limitations or the use of gravel and fabric.
- Use properly placed drainage devices such as water bars and broad-based dips.
- Locate trails to minimize grade.
- Use bridges instead of culverts or fords whenever possible.
- Design stream crossings (fords) where there are low, stable banks, a firm stream bottom and gentle approach slopes.
- Construct stream crossings perpendicular to the stream flow.
- Limit stream crossing construction to periods of low or normal flow.

ADDITIONAL RESOURCES

Recommendations for Stream Crossings can be found online at www.dec.ny.gov/permits/49060.html and www.dec.ny.gov/permits/49066.html

- Avoid disrupting or preventing movement of fish and other aquatic species.
- Stabilize bridge approaches with aggregate or other suitable material.
- Use soil stabilization practices on exposed soil around construction areas, especially bridges, immediately after construction.
- Construct stream crossings which maintain a continuous natural streambed by using bridges, “D” shaped culverts, or oversize round culverts placed deep enough to provide this attribute.
- Restrict the size and type of equipment used, in order to minimize adverse impacts.

Recreational BMPs
(Refer to page 208 for additional recreational guidelines.)

Trails BMPs

- Wherever possible and appropriate, lay out trails on existing old roads or clear or partially cleared areas;

- Where stream bank stabilizing structures are needed, use natural materials such as rock or wooden timbers;
- Construct new trails on low or moderate side slopes to facilitate effective drainage;
- Avoid flat topography where ponding could develop and drainage could be problematic should the trail surface erode or become compacted to a level below the surrounding area.

Trailheads and Parking Areas BMPs

- Locate parking lots on flat, stable, well-drained sites;
- Use gravel or other appropriate materials to avoid runoff and erosion problems;
- Limit construction to periods of low or normal rainfall;
- Limit the size of the parking lot to the minimum necessary to address the intended use.

Lean-tos and Campsites BMPs

- Use drainage structures on trails leading to lean-to sites and campsites, to prevent water flowing into them;
- Locate lean-tos and campsites on flat, stable, well-drained sites that are properly buffered from streams, wetlands and waterbodies;
- Limit construction to periods of low or normal rainfall.

Timber Harvesting Guidelines
(Refer to page 249 for related information.)

Timber Harvests are conducted under a contract developed by DEC. Special terms and conditions are included in contracts to limit impacts on soil and water resources. A bond is required in any contract written for over $500, to ensure compliance with all requirements.

- Harvesting is often prohibited in spring and in periods when soils are saturated and unable to support harvesting activities.
- Skid trails are located by DEC to avoid sensitive soils and limit impacts on water resources.
- Contractors are required to have oil spill containment devices.
- Soils and water quality are protected during harvesting and construction operations by implementing best management

ADDITIONAL RESOURCES

New York State Forestry, Best Management Practices for Water Quality, BMP Field Guide – 2007. Developed by the Division of Lands and Forests.
www.dec.ny.gov/lands/37845.html

Rutting Guidelines for Timber Harvests and TRPs on State Forests – May 2008, developed by the Bureau of State Land Management.
www.dec.ny.gov/lands/64567.html

practices as outlined in DEC's "BMP Field Guide" and "Rutting Guidelines for Timber Harvests, 2009."

Oil and Gas Exploration and Development – Surface Impacts Guidelines
(Refer to page 232 for further detail.)

The Division of Lands and Forests is responsible for managing surface impacts from oil and gas exploration and development on State Forests. These activities are regulated under a temporary revocable permit, which includes special terms and conditions required by DEC to reduce overall impacts and include mitigation measures. A bond is always required to insure all terms are satisfied.

The regulation of subsurface impacts related to oil and gas development and protection of underground aquifers is the responsibility of DEC's Division of Mineral Resources and is not discussed in this plan. The minerals section of this plan does contain information regarding these management responsibilities.

The following guidance documents have been developed to limit impacts on soil and water resources on State Forests;

- Guidelines for Seismic Testing on DEC Administered state Lands
- DRAFT Guidelines for Pipeline Construction on DEC Administered State Lands

ADDITIONAL RESOURCES

Guidelines for Seismic Testing, and

DRAFT Guidelines for Pipeline Construction on DEC Administered State Lands

Both of these resources are available at www.dec.ny.gov/lands/64567.html

"SW" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Soil and Water (SW) Objective I – Soil and water quality will be protected by preventing erosion, compaction and nutrient depletion. Protection of soil and water quality is one of the highest management priorities and is the foundation of sustainable management.

SW Action 1 - Increase monitoring of BMP effectiveness by sampling management sites on a periodic basis after construction of erosion control structures to assess sedimentation and water quality. This monitoring system will be implemented by the end of 2015.

SW Action 2 (also SM 5) - Provide training to Bureau of State Land Management (BSLM) and Division of Operations staff in modern application of BMPs at least every five years.

SW Objective II –All SMZs and highly-erodible soils will be identified and mapped in UMPs

SW SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has been selected as the **preferred alternative**. The above-mentioned BMPs and other soil and water protection mitigations being implemented on State Forests adequately protect soil and water resources. However, there are some exceptions where impacts may occur. This may be due to such issues as illegal ATV use, which requires greater education and enforcement activity and the lack of adequate funding for maintenance. To address these obstacles, DEC will rely more heavily on timber sale-related work and AANR partners to maintain existing infrastructure.

The alternative of not implementing the above mitigations will not be adopted. This alternative is not acceptable, considering the severe impacts to soil and water that can occur with management activities and public use.

SEQR Analysis Threshold: Soil and water protection strategies established in this section will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted.

AT-RISK SPECIES AND NATURAL COMMUNITIES

When air, land, water, plants and animals support each other in a healthy environmental system, all species, including humans, flourish. Alone among the animals, humans have the power to throw the system out of balance and to damage key elements in the web of life beyond repair. But the same knowledge and technology that make humans uniquely destructive also give us the ability to prevent damage to the environment and to care for the environmental support system on which human survival depends. State Forests will be managed with an ecosystem management approach which includes a focus on the overall health of the "system" and on the individual species and communities (elements) within the ecosystem.

Hart's Tounge Fern (A*splenium scolopendrium)* is one of many species that are actively protected on State Forests. *Photo credit: Doug Schmid*

This plan addresses At-Risk Species and Natural Communities with a strategy to:

- "Keep Common Species Common" by enhancing landscape level biodiversity and providing a wide variety of naturally occurring forest based habitat.
- Protect and in some cases manage known occurrences of endangered plants, wildlife and natural communities using the Natural Heritage Database and conservation guides along with assistance from DEC experts in the Division of Lands and Forests and the Division of Fish, Wildlife and Marine Resources.
- Consider other "at-risk species" whose population levels may presently be adequate but are at risk of becoming imperiled due new incidences of disease or other stressors.

The bog turtle *(Clemmys muhlenbergii)*, endangered in New York, is one of the smallest turtles in North America. *Photo credit: Jesse W. Jaycox*

DEC's Endangered Species Program is designed to identify and protect imperiled species and communities. There are several levels of classification that rank the scarcity or vulnerability of species, established by federal and state governments. Under Federal and New York State law, species and natural may be classified as "Threatened", "Endangered", "Special Concern", "Rare", or "Exploitably Vulnerable". Upon classification, these species are granted a

commensurate level of protection under the law. Legal protections do vary, with greater legal protections for wildlife than for plants or natural communities. There are also many species of invertebrates, insects and smaller micro-organisms that are biologically rare and imperiled, but have not gone through the review process necessary for state listing. All of the above listed and unlisted elements are referred to as "At-Risk Species and Communities" (ARS&C) in this plan.

On State Forests, DEC foresters are able to actively promote habitat for the enhancement of ARS&C. In addition, DEC's management role on State Forests requires that the presence of ARS&C are investigated and appropriate protections or management actions are in place. This investigation occurs both through the UMP process and associated inventory of the State Forest resources, as well as before undertaking specific management activities in sensitive sites. Protections include reserving areas from management activity or mitigating impacts of activity.

It is important to note that DEC has the responsibility to protect all fish and wildlife, including those considered at-risk throughout the state, including on private lands as fish and wildlife are all considered property of the state. However, the protection of ARS&C plant species and natural communities is a responsibility that falls primarily with the owner of the land where on these elements occur as these are considered the property of the landowner. Therefore, State Forests present a tremendous opportunity where DEC can actively engage in the protection of RTE plants and natural communities, along with fish and wildlife species found on these public lands.

CLASSIFICATION SYSTEM

On State Forests, DEC will employ the ranking system described below, developed by the New York Natural Heritage Program (NYNHP), which is a joint program supported by DEC and The Nature Conservancy. (More information on this program can be found at www.dec.ny.gov/animals/29338.html.) The rankings compile multiple layers of regulation and protections along with the program's research into one useful system.

Each element in New York State has been assigned a global and state rank that reflects their scarcity or vulnerability. These ranks carry no legal weight. The global rank reflects the rarity of the element throughout the world and the state rank reflects the rarity within New York State.

Global Rank

G1 - Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.

G2 - Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.

G3 - Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.

G4 - Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 - Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH - Historically known, with the expectation that it might be rediscovered.

GX - Species believed to be extinct.

NYS Rank

S1 - Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.

S2 - Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.

S3 - Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

S4 - Apparently secure in New York State.

S5 - Demonstrably secure in New York State.

SH - Historically known from New York State, but not seen in the past 15 years.

SX - Apparently extirpated from New York State.

SZ - Present in New York State only as a transient migrant.

***SxB** and **SxN**, where Sx is one of the codes above, are used for migratory animals, and refer to the rarity within New York State of the breeding (B) populations and the non-breeding populations (N), respectively, of the species.*

Ecological Communities

In 1990, NYNHP published Ecological Communities of New York State, an all-inclusive classification of natural and human-influenced communities, using the ranking system outlined above (Reschke 1990). This classification system is now the primary source for natural community classification in New York and a fundamental reference for natural community classifications in the northeastern United States and southeastern Canada. This classification system is used in many decision-making processes on State Forests, guiding the establishment, maintenance and protection of natural systems.

ENDANGERED SPECIES LAW

Federal Law

One of the results of the environmental movement of the 1960s and 70s was the enactment of the Endangered Species Act of 1973. The Act was designed to prevent the extinction of plants and animals, addressing problems of both exploitation and habitat destruction. The Act defines an endangered species as any species of animal or plant that is in danger of extinction over all or a significant portion of its range. A threatened species is defined as one that is likely to become endangered. The Act regulates the "taking" of endangered and threatened plants on federal land or when they are affected by federal actions or the use of federal funds.

AT-RISK SPECIES and NATURAL COMMUNITIES

A particularly important section of the Act promotes the conservation of habitats of endangered and threatened species. The Act authorized the acquisition of land for the protection of habitats of these species and directs federal agencies to ensure that their activities or those authorized or funded by them do not jeopardize the continued existence of endangered and threatened species.

The Act prescribes strict procedural guidelines for determination of status and listing of species. These provide that species be listed only after extensive input and review by biologists, the states and the general public. This procedure ensures that only species in need of protection are listed, and it provides baseline data from which further population monitoring may proceed.

Presently, 11 New York rare plants are on the federal endangered and threatened list:

Endangered Plants

Agalinis acuta - Sandplain Gerardia - presently known from Long Island
Schwalbea americana - Chaffseed - historically known from the Albany Pine Bush
Scirpus ancistrochaetus - Northeastern Bulrush - historically known from Washington County

Threatened Plants

Aconitum noveboracense - Northern Monk's-hood - presently known from the Catskills
Amaranthus pumilus - Seabeach Amaranth - presently known from Long Island
Asplenium scolopendrium var. *americanum* - Hart's Tongue Fern - presently known from Central New York
Helonias bullata - Swamp Pink - historically known from Staten Island
Isotria medeoloides - Small Whorled Pogonia - historically known from Central and Eastern New York and Long Island
Platanthera leucophaea - Prairie Fringed Orchid - historically known from Central New York
Rhodiola integrifolia ssp. leedyi - Leedy's Roseroot - presently known from the Finger Lakes region
Oligoneuron houghtonii - Houghton's Goldenrod - presently known from Western New York

In addition, the following animal species that are known to occur, have been known to occur in the past or could potentially occur on or near State Forests, are on the federal endangered and threatened list.

Endangered Animals

Molluscs:	*Alasmidonta heterodon* - Dwarf Wedgemussel
	Lampsilis abrupta - Pink Mucket
	Pleurobema clava - Clubshell
	Potamilus capax - Fat Pocketbook
Insects:	*Nicrophorus americanus* - American Burying Beetle (extirpated from NYS)

	Lycaeides melissa samuelis - Karner Blue Butterfly
Fishes:	*Acipenser brevirostrum* - Shortnose Sturgeon
Birds:	*Charadrius melodus* - Piping Plover *Numenius borealis* - Eskimo Curlew (extirpated from NYS) *Sterna dougallii* - Roseate Tern
Mammals:	*Myotis sodalist* - Indiana Bat *Canis lupus* - Gray Wolf (extirpated from NYS) *Felis concolor* - Cougar (extirpated from NYS)

Threatened Animals

Molluscs:	*Novisuccinea chittenangoensis* - Chittenango Ovate Amber Snail
Insects:	*Cicindela dorsalis* - Northeastern Beach Tiger Beetle (extirpated from NYS)
Reptiles:	*Clemmys muhlenbergii* - Bog Turtle
Mammals:	*Lynx canadensis* – Canada Lynx (extirpated from NYS)

State Laws and Regulations

Plant Rarity and the Law

Various laws, regulations and policies protect rare plants. Probably the most surprising aspect of rare plant protection is that, unlike animals, plants are the property of the landowner whether that might be an individual, corporation, or government agency. This means that the protection of rare plants is under control of the landowner unless, in some cases, a government-regulated action is affecting them. Then the government entity regulating the action may require that protection efforts take place to preserve the rare plants and their habitat. As a large landowner, as well as the agency which promulgated many of the above mentioned legal requirements, the DEC has a responsibility to make every effort to fulfill the intent of those requirements.

At-risk plants in New York State are protected under New York State Environmental Conservation Law section 9-1503 and under regulations in 6NYCRR Part 193. Part (f) of the regulation reads as follows: "It is a violation for any person, anywhere in the state to pick, pluck, sever, remove, damage by the application of herbicides or defoliants, or carry away, without the consent of the owner, any protected plant. Each protected plant so picked, plucked, severed, removed, damaged or carried away shall constitute a separate violation." Violators of the regulation are subject to fines of $25 per plant illegally taken. This regulation contains lists of protected plants under four different categories (rare, threatened, endangered and exploitably vulnerable) based on their scarcity in New York State. The DEC Protected Plant Program and Part 193 Regulations can be viewed on the DEC website at: www.dec.ny.gov/regs/15522.html

Accordingly, the DEC long ago adopted regulations to protect rare and endangered plants on state lands. Specifically, 6 NYCRR 190.8(g) makes it illegal for anyone to “deface, remove,

destroy or otherwise injure in any manner whatsoever any tree, flower, shrub, fern, fungi or other plant organisms, moss or other plant, rock, soil, fossil or mineral" on state lands.

Wildlife Rarity and the Law

Regulations related to fish and wildlife protection have been in existence even longer than for plants. Current Environmental Conservation Law Chapter 11 contains protections for game and non-game fish and wildlife species with related regulations found in 6NYCRR Chapter I, Sub-chapters A-J. Endangered and threatened species of fish and wildlife are located within those regulations in Part 182 which is available online at: www.dec.ny.gov/regs/3932.html.

ADDITIONAL RESOURCES

New York State's Endangered, Threatened and Special Concern Wildlife Species List – Available at: www.dec.ny.gov/animals/7494.html

NEW YORK NATURAL HERITAGE PROGRAM

The Nature Conservancy established the New York Natural Heritage Program (NYNHP) in 1985 as a contract unit within the DEC. NYNHP's mission is to facilitate conservation of rare animals, rare plants, and natural ecosystems, which are commonly referred to as "natural communities." They accomplish this mission by working collaboratively with partners inside and outside New York to support stewardship of New York's rare plants, rare animals, and significant natural communities, and to reduce the threat of invasive species to native ecosystems.

This limestone woodland (rank: S2) is one of many rare natural communities present on State Forests

Capturing Many Different Levels of Biodiversity

A "coarse filter/fine filter" approach can be used to identify and prioritize the protection of rare species and significant ecological communities. Ecological communities represent a "coarse filter," an aggregate of biodiversity at a larger scale than the species level. Their identification and documentation encompasses whole assemblages of plant and animal species, both common and rare. The conservation of good examples of natural communities ensures the protection of most of the species that make up the biological diversity of the state.

However, because rare animals and plants often have narrow or unusual habitat requirements, they may fall through the coarse filter, not being captured within protected communities. Identifying and documenting viable populations of each of these rare species serves as the "fine filter" for protecting the state's biological diversity. This coarse filter/fine filter approach to a natural resources inventory is an efficient way to account for the most sensitive animals, plants, and communities in an area.

Ranking: Putting Biodiversity into Context

NYNHP's lists of rare species and natural communities are based on a variety of sources including museum collections, scientific literature, information from state and local government agencies, regional and local experts, and data from neighboring states.

Each natural community and rare species is assigned a rank based on its rarity and vulnerability. Like all state Natural Heritage Programs, NYNHP's ranking system assesses rarity at two geographic scales: global and state. The global rank reflects the rarity of a species or community throughout its range, whereas the state rank indicates its rarity within New York. These ranks are usually based on the range of the species or community, the number of occurrences, the viability of the occurrences, and the vulnerability of the species or community around the globe or across the state. As new data become available, the ranks may be revised to reflect the most current information. Sub-specific taxa are also assigned a taxon rank which indicates the subspecies' rank throughout its range.

Individual occurrences of rare plants, imperiled animals, and natural communities are ranked according to their quality, or perceived viability, based on factors including size, condition, and landscape context. All occurrences are assigned a quality rank of A-F, H, or X.

Species occurrence ranks are based on historical evidence of presence and/or on current population data. They are determined by evaluating the population's size, condition, and reproductive health, plus ecological processes needed to maintain the population and total landscape condition. Each of these factors is compared against specifications gathered from other populations throughout the species' global range. A final occurrence rank is calculated from this comparative review. Generally, an A-ranked occurrence is considered to represent one of the largest, most viable populations within a natural landscape.

Significant natural communities are also assigned ranks based on quality and are evaluated within the context of the known or hypothesized distribution of that particular community. Several ecological and spatial factors must be considered when determining the occurrence rank of a community. These include the occurrence size, maturity, evidence and degree of unnatural disturbance, continued existence of important ecological processes, overall landscape context, and existing and potential threats. A-ranked community occurrences are among the largest and highest quality of their type. These community occurrences are large enough to provide reasonable assurance of long-term viability of component ecological processes. They are essentially undisturbed by humans or have nearly recovered from past

human disturbance, and typically exhibit little or no unnatural fragmentation. Exotic or particularly invasive native species are usually absent from high-quality community occurrences, or if present, are observed at very low levels.

STATE LANDS ASSESSMENT PROJECT

The State Lands Assessment Project is an ambitious effort by the NYNHP to assess State Forests for rare species and significant natural communities. The State Forest Assessment, a partnership between the Division of Lands & Forests and NYNHP, began in 2004 and was completed for New York State Forests in 2009.

The overall objectives of the project were to conduct a detailed examination of approximately 723,000 acres of State Forests managed by DEC's Division of Lands & Forests for rare species and significant natural communities (i.e., occurrences of rare natural communities, and the state's best examples of common natural communities) to (a) develop tools for state land managers that will help conserve rare species and significant natural communities on State Forests and (b) improve human understanding of New York's biodiversity, which will enhance informed conservation outside of State Forests.

The State Forest Assessment Project included detailed rare species and significant natural community surveys, targeted observation point data collection at non-significant community occurrences, delineation of all significant natural communities within each State Forest, and preparation of in-depth reports for each property. The assessment project updated element occurrence data in DEC's GIS database, and created region-specific biodiversity reports and conservation guides for many rare, threatened and endangered species and natural communities on State Forests.

The final report, including tables, maps, conservation guides, and detailed element occurrence records is housed for internal DEC and NYNHP use and is delivered on a server located in the Albany DEC office and is available to forestry staff when planning management activities. Conservation guides for the species and natural communities documented over the course of this project are also available on the web at http://guides.nynhp.org.

At the completion of the State Lands Assessment Project in 2009, a total of 393 rare species and significant natural community occurrences (hereafter referred to as element occurrences) were documented on 137 State Forests. These records were distributed among State Forests as follows:

- 98 rare plant populations,
- 141 rare animal populations, and
- 154 natural communities

NEXT STEPS

As discussed earlier in this plan, State Forest management will strive to enhance habitat level diversity using an ecosystem management approach. The primary focus of management will be to provide a wide diversity of habitats that naturally occur in New York. This approach will help keep common species common. When species and communities ranked S1, S2, S2-3, G-1, G-2 or G2-3 are present, actions will be taken to protect those specific populations or communities. This may involve taking action to enhance habitat, or may entail preventing actions that would degrade habitat. DEC Foresters who manage State Forests will be provided educational opportunities, technologically advanced tools like GIS and GPS, and access to expert advice from DFWMR, USFWS, and NHP staff to improve their ability to recognize, manage and protect rare species and forest communities with exceptional values. DEC Foresters use the following resources to make broad-scale ecological and social assessments: this Strategic Plan for State Forest Management, the State Lands Assessment Project – Biodiversity Inventory of (Regional) State Forests, DEC's Comprehensive Wildlife Conservation Strategy and the NYS Open Space Conservation Plan.

DEC DFWMR have developed the New York State Comprehensive Wildlife Conservation Strategy (CWCS) which is a valuable tool for managing at risk wildlife species on State Forests. The CWCS identifies "Species of Greatest Conservation Need" (SGCN) in New York State. This designation takes into account species abundance and downward trends in population levels. Management of State Forests will consider at-risk species which, without intervention, might become imperiled. A list of SGCN that rely on forested habitat has been prepared by DFW&MR and is available on the DEC website. This list will be consulted, along with DFW&MR biologists when developing UMPs.

DEC Lands and Forests GIS staff and staff from NYNHP have deployed a new data layer in GIS for use by L&F Foresters. This data layer is based on predictive models (the EDMs) for targeted rare plant and animal species developed as part of the State Land Assessment Project to make the 'Predicted Richness Overlays' (PROs) available to Foresters in addition to the element occurrences presently being used. With this new tool an additional layer of protection has been created. In addition to protecting known occurrences of rare plants and animals or high quality natural communities, DEC Foresters are now able to look for new or unknown occurrences in areas where the PROs indicate areas where the elements might be present. The PROs data layer is consulted prior to any timber sale contract, oil and gas lease, or construction project.

DEC foresters use predictive models to focus efforts to discover and protect at-risk species and communities

Bureau staff will address ARS&C concerns within the context of each individual UMP, which includes public input and review. While a majority of management actions focus on habitat-level diversity, protection of rare, threatened and endangered species will take priority over other management concerns. DEC Foresters will reference NYNHP conservation guides and will confer with Natural Heritage Program staff along with college and university experts to apply appropriate management strategies. It is important to recognize that in some cases active management is required or desirable to protect or enhance ARS&C.

ADDITIONAL RESOURCES

'Predicted Richness Overlays' (PROs) – DEC data layer used by foresters to identify new or unknown occurrences

Conservation Guides for species and natural communities documented by TNC's Natural Heritage Program project are available on the web at guides.nynhp.org. Additional info is available at www.dec.ny.gov/animals/29338.html.

Comprehensive Wildlife Conservation Strategy (CWCS) - completed by the Division of Fish, Wildlife and Marine Resources (DFWMR) of NYSDEC in September of 2005 to address the wildlife species in greatest need of conservation in the state. The CWCS utilizes the best available data on the status of fish and wildlife species to define a vision and establish a strategy for state wildlife conservation and funding. www.dec.ny.gov/animals/9404.html

List of SGCN that Rely on Forested Habitat - www.dec.ny.gov/lands/64567.html

Land Classification

DEC developed a land classification for those portions of State Forests which have known high conservation values that DEC feels should take precedence over all other land use and management decisions. Areas identified as having exceptional values may, in certain circumstances, be managed using harvesting as a tool to reach management goals, but all management activities must maintain or enhance the high conservation values present. DEC consults with NYNHP, university scientists, and other concerned citizens and topical experts to develop and define these classifications. Currently, DEC has identified two land classifications that are considered to have high conservation values on State Forests and address ARS&C:

1. Biologically Diverse Forest - Forest areas that are in or contain rare, threatened or endangered ecosystems.
2. Special Treatment Area - Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, and refugia).

Land Classification Ranking

DEC recognizes that State Lands have many unique or special designations and are being managed to maintain or enhance these unique features. As a result, some areas may be part of more than one land classification. Therefore, it is necessary to rank all classifications against each other to help land managers incorporate management decisions based on the highest

priority for the forest. However, if a situation arises where a management decision protects the values of a higher ranking forest attribute but may have a known or unknown negative impact on the values of a lower ranking attribute within the same forest, no management actions will take place until further analysis can be accomplished to verify impacts and assure the protection of all unique forest values. Ranking from highest to lowest priority is: 1) Biologically Diverse Forest; 2) Special Treatment Area; 3) Cultural Heritage Forest; 4) Watershed (either above a *primary source aquifer* or supplying public water to municipalities greater than 5,000 people).

"AR" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

At-Risk Species and Communities (AR) Objective I – Where any ARS&C ranked S1, S2, S2-3, G1, G2 or G2-3 is present, management activity will be conducted for the protection of these elements as a high priority compared to other management goals.

> **AR Action 1** –Conduct up-to-date training for forestry staff on the identification and protection of at-risk species and communities, including use of PROs, by 2011.

AR Objective II – UMPs will identify the presence of ARS&C and will present appropriate management actions to protect these elements, conduct habitat restoration, or otherwise promote the recovery of declining species, including use of timber harvest contracts as a mechanism for accomplishing proactive species restoration work.

> **AR Action 2** – Maintain and contribute additional data to the existing Master Habitat Database on ArcGIS which identifies all known occurrences of rare, threatened and endangered species and important natural communities in conjunction with the New York Natural Heritage Program.

AR Objective III – All new UMPs will be developed using the Comprehensive Wildlife Conservation Strategy and DFWMR staff to consider protection and management of Species of Greatest Conservation Need.

AR SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has been selected as the **preferred alternative**. Use of data collected by the State Lands Assessment Project, including newly-identified occurrences of at-risk species and communities, the PROs layers, and TNC management guides provide important protections and management tools. DEC will continue to provide educational opportunities for land managers in the identification and management for RTE elements.

The alternative of not implementing the actions above will not be adopted. This alternative is not acceptable, considering the impacts timber harvesting, construction projects and minerals development can have on at-risk species and communities.

SEQR Analysis Threshold: Endangered species and natural community protection strategies established in this section will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted.

VISUAL RESOURCES AND AESTHETICS

"A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise." -Aldo Leopold

Foresters manage many diverse aspects of a forest. Some aspects of forest management are easy to observe and measure while others are more subjective and may not be measured easily. The visual resource aspect of forest management and the associated benefits to people fall into the latter category.

A natural floral arrangement on Cameron State Forest in Steuben County

"Many amenity values defy simple qualification. Their worth depends upon subjective factors that many people can only describe in terms of feelings and emotional benefit. Foresters cannot often translate this worth into tangible measures that have a marketable value. Instead, they can only rank the alternatives by user preference, without defining how much people would pay for different kinds of experiences, or gain by having them. On the other hand, people can often quite readily tell when some management activity destroyed or lessened an intangible value, or what areas do not provide quality experiences of some inexplicable kind." (R. Nyland, Silviculture Concepts and Applications 1996).

"In the last three decades, environmental legislation has mandated that recreation (and related aesthetic and ecological) values be considered more fully in forest management decisions. For these reasons, recreational resources can be as important to the land manager as the more tangible values of wood and water and forage." (Avery and Burkhart 1994).


A hardwood stand, following a timber harvest, with regeneration (newly seeded trees) and woody debris

When it comes to aesthetics, people hold different opinions. What may be aesthetically pleasing to some, may not be to others. Often, ecologically responsible management may not exhibit the most aesthetically pleasing results. State Forest management practices such as silvicultural and wildlife decisions take many considerations into account. Even so, the visual impact of some of these practices may not be kindly greeted by many people. While it is important for State Forest managers to consider

the visual effects of their management actions in terms of recreation and public perception, the ecological health of State Forests must be paramount.

While this plantation provides an aesthetically pleasing "park-like" setting, it lacks many attributes necessary for ecological health and integrity. *Photo credit: Melody Wolcott*

A stereotypical example of this concept may be seen in the public's perception of and positive reaction to a park-like setting, one that exhibits large evenly spaced trees with mowed grass or a thick bed of pine needles beneath them. While this image may be desirable to many, it does not necessarily represent much diversity from an ecological perspective. The forest manager must consider the forest's value to wildlife, through habitat and food and protective cover requirements. The manager must consider the next generation of trees or vegetation to inhabit the site and the manager must consider the area's susceptibility to erosion or environmental impacts. Frankly, both healthy, well-managed forests and most old growth forests may not look very inviting at all. Even this natural, uninviting look, however, may provide a core subconscious wild lands appeal to the viewer, who even though they may not wish to wander through the area and have a picnic, can still appreciate the appearance of disorder and its benefit at an ecological level.

VISUAL RESOURCES ON STATE FORESTS

History

Historic management of State Forests in New York has focused on timber management while also considering recreation, watershed protection and wildlife management. Many magnificent natural features, unique areas, historic structures, and wildlife habitats can be found in New York's State Forests. Management decisions regarding these many natural features have included development of hiking trails, creating access to water bodies and unique areas, construction of scenic public forest access roads, development of scenic vistas, creation and maintenance of forest openings, mowing of field areas to encourage various forms of wildlife, preservation of historic structures and carefully planned harvest operations.

Over the years, the general appearance of many State Forests has undergone quite a dramatic change. A significant amount of State Forest land came into state ownership as old farm areas with abandoned fields and pastures. A majority of these areas were replanted and have grown into mature and dense forests. As these forests matured and were harvested or tended, forest management practices focused on minimizing the visual impacts of management practices. The removal of most of the diseased, defective and over-mature trees left a park-like setting in

some places, which may be perceived by the untrained eye as a forest that has developed without any disturbance.

Current Conditions

Current aesthetic qualities and considerations of State Forests cover a broad spectrum. Seemingly greater importance has been placed on scenic areas in recent years, recognizing the uniqueness of certain areas and preserving or creating opportunities for the public to enjoy them. New York's State Forest land base is expanding. When available properties are deemed desirable and funding is in place to purchase such properties, they are slowly added to the State Forest inventory. Many of these new properties have significant unique attributes which make excellent additions to New York's public land. Recent acquisitions and existing State Forests provide many opportunities for the public to recognize and enjoy the many visual resources at their doorstep.

A gravestone on State Forest land

Some of the interesting aspects of many State Forests are historic structures or remains. Throughout most State Forests, remnants of old farms or other settlements are visible through stone walls, foundation holes, wells, chimneys, root cellars, gravestones, stone culverts, bridge abutments, etc. The origins of many of these structures date back many years and tell an interesting story of the history of the area. These structures add a unique aesthetic quality to the areas they occupy and should be protected from any management activities that would disturb them. Any historic structures that exhibit imminent safety concerns for the public should be dealt with immediately and documented in the UMP when it is written.


Stone wall on Stoney Pond State Forest in Madison County

See *Historic and Cultural Resources on page 139 for further detail.*

Trends

Large, unbroken tracts of forest and natural areas on private lands (farms, game reserves, etc.), which have served as public recreation areas in the past, are decreasing in number and size. As this trend continues in New York, the public will have fewer opportunities to recreate on such lands. DEC recognizes the valuable visual resources found on state lands and will maintain opportunities for the public to enjoy these unique and wonderful aspects of State Forests. As

policies bring about the increased use of mitigation measures to reduce the visual disruptions associated with timber harvesting, silvicultural activities will become less noticeable.

AESTHETIC STANDARDS AND GUIDANCE

Timber Management

Various forms of timber management can have differing effects on visual resources. Foresters can use vegetative buffering, irregular edges, and other techniques to alter the visual effect harvest areas may have on the public. Creative application of Forest Retention Standards can provide aesthetic benefits to timber harvests in addition to reaching ecological goals. Informational kiosks and signs may also be placed near harvests to educate the public about the reasons for, and benefits of, the visible operation.

Prescribed burning, as with clearcutting, may be essential to managing some types of ecosystems; however, these practices may result in an appearance that is offensive or shocking to the general public. Special consideration must be given to aesthetic resources when planning prescribed burns or clearcuts.

Betty Brook Road leads to a recently harvested area on Burnt-Rossman State Forest in Schoharie County

Current standards in regard to timber harvesting are referenced in the DEC Timber Management Handbook chapter 200 and include:

203.4 – Log Landings – Where possible, log landings should be concealed from the view of major travel corridors (state, county or heavily used town highways). They should be put behind a hill or other land form that hides them from main public roads. If this is not possible, they should be set back in the woods as far as practical with the long axis of the landing area. Entrances from the road should be kept narrow, as equipment allows, reducing the visibility from the roadside. At all times, the landing should be hardened with gravel so it can be maintained throughout the harvest to avoid the creation of ruts and mud holes (as outlined in the rutting guidelines). All woody debris should be either buried or dragged back into the forest and spread thinly, avoiding all damage to the residual stand.

204.1 – Softwoods – It shall be mandatory that the tops of all felled conifer trees be lopped to a 3” diameter in compliance with the Sale of Products Agreement.

204.2 – Hardwoods – It shall be mandatory in compliance with the Sale of Products Agreement that the tops of all deciduous trees be lopped so that no branches over 2” in diameter extend over four feet from the ground under the following conditions:

a. For a distance of 100 feet from the ditch lines of any state, county or town roads, or truck trail traversing the harvested area where no uncut strip is left for a screen.
b. For a minimal distance of 25 feet on both sides of any marked hiking trail, marked snowmobile trail, or marked horse trail traversing the harvested area unless an uncut strip is left for a screen.

205 – Brush Removal Standards – All debris caused by any harvesting operation including brush, slash, logs, or any other inflammable material, shall not be allowed to remain on or within twenty feet of the right-of-way of any public highway.

206 – Aesthetics Standards – Adherence to the practices within this plan concerning stream protection, road and landing design, and top lopping will add much to render the aesthetics of a harvested area acceptable to the public. However, there are other considerations which would benefit the aesthetics of an area which shall be practiced. These are as follows:

1. Use of uncut strips to screen clearcut areas, shelterwood cuts or other heavy cuts.
2. Directional felling of trees so tops fall away from roads and trails.
3. Removal of trash, such as lunch papers, oil cans and miscellaneous junk during and after the harvest operations.
4. Removal of hanging trees and severely damaged trees.
5. Removal of all logging debris from along roadsides and ditches for a distance of 20 feet.
6. Cutting lightly near well traveled roads.
7. Keeping skidders back in the woods and off road rights-of-way.

The Timber Management Handbook is more than 30 years old and in need of revision. As part of the review and modification of this document, these standards will be updated and included in the final Strategic Plan for State Forest Management, and will supersede the Timber Management Handbook. Additional management practices that should be considered for aesthetic purposes include: new road construction; use of gates and signage; vegetation used to stabilize landings, skid trails and disturbed areas; vegetative variety; prescribed burning; and making appropriate vegetative choices around scenic areas.

Roads

Mount Washington State Forest in Steuben County

During new road construction, designing a road that travels directly from point A to point B may be the most efficient design, however, if the route can be altered to expose a unique hidden natural feature, the land manager should take that into consideration. Opportunities to develop access to scenic vistas and aesthetically pleasing areas have a value that should be given appropriate weight as managers make decisions.

Gates

Gates have been routinely used on State Forests in New York to prevent unwanted use of motor vehicles. Gates, while effective and sometimes necessary for maintaining administrative use, may appear unsightly. Where appropriate, the land manager should consider use of natural barriers such as large boulders or logs in place of unsightly gates in aesthetically sensitive areas.

Gates can be unattractive

Natural barriers may be preferable

Signs

Signs used on state lands have maintained a consistent and pleasing appearance over the years. Sign designs remain noticeable and informative and unobtrusive. Signs should continue to follow this format to maintain a consistent look to State Forests. Some warning signs may appropriately consist of brighter colors where it is necessary to grab the attention of the public for safety concerns. Signs are also helpful to inform the public of the reasons why the land manager has made certain management decisions in an area. An educational sign describing why a specific management area may look a little out of the ordinary can be educational and helpful in putting the public's mind at ease.

An example of sign pollution

Yet signage can be overdone and become an unsightly addition to an otherwise scenic area. In such cases, managers will install kiosks at areas to replace numerous individual signs avoiding "sign pollution."

Birdseye Hollow State Forest Auto Tour

'Reforestration Project" sign explaining a clearcut forest regeneration project in DEC Region 4

Soil Stabilization

Log landings and areas of disturbed soil on State Forests have traditionally been stabilized with grass seed mixes. In areas where the public comes into frequent view with disturbed soil areas, or in additional areas deemed appropriate, the land manager may vary the stabilization plantings by adding a native wildflower component to the stabilization mix. Care should be taken to ensure the seed mixture is free of unwanted and invasive seeds. DFWMR may be consulted to help determine which additional vegetation could increase benefits to wildlife while enhancing the aesthetic quality of the area.

Aesthetics and biodiversity go hand in hand. Restoring landing areas with a variety of vegetative cover can improve habitat diversity

Maintaining a vegetative variety over the forest landscape is aesthetically important at the ecosystem level as well. Aesthetically, maintaining vegetative variety helps to avoid visual impacts from a potential catastrophic event.

Recreation

Recreational facilities managed on State Forests include: structures, parking facilities, campsites and trails. As with signs, the DEC has maintained a consistent and pleasing appearance of its many structures. Outhouses, parking lot bollards, equestrian structures, picnic tables and other wooden structures typically exhibit similar designs from one working unit to another and are protected with the same brown stain. This dark brown color helps the structures blend into their surroundings and has come to be one of the ways the public can

Accessible fishing pier and observation deck on Green Pond, Bonaparte's Cave State Forest in Lewis County, built using primarily natural materials

more easily recognize state facilities. Fireplaces or fire rings are found at some day use areas on State Forests or at the occasional campsite and typically have a consistent natural or unobtrusive design of stone, concrete or steel.

Stone fireplace

State facilities should maintain a natural appearance where possible while accounting for accessibility. Natural materials such as wood or stone should be used in construction to help create a visually appealing finished structure that tends to blend in to the surroundings and not stand out.

Parking Lots

Parking lot design allows convenient access to facilities, provides for efficient flow of traffic, and offers a form of control by limiting the number of recreational users in an area to a level that will not degrade the resource. Aesthetic considerations in parking lot design should include vegetative manipulation in or around the parking area, scenic view opportunities from the parking area, and the general appearance of the parking area from the surrounding area.

This parking lot provides a scenic view of the valley, however, it may be larger than needed for intended use and has a large visual impact from above

Design of a parking lot can have a negative effect on the aesthetics of a nearby area. For example, removal of trees and construction of a large open parking area directly below a scenic overlook, as opposed to creating a masked parking area that allows access to the same overlook but remains hidden from the view.

Campsites

Designated primitive campsites on State Forests and areas typically used for camping should be monitored to ensure they are not getting overused and degrading the resource. Proper consideration in locating campsites will help ensure the area holds up to use and avoids the undesirable appearance of an over-used site. The visibility of a campsite is another

consideration. Is the campsite obscured from view of nearby trails or roads, so it does not detract from the view of other users of the resource?

Trails

Recreational trails are another important component of many State Forests. Snowmobile, horse, ATV access routes for people with disabilities, mountain bike, hiking, and accessible trails are some of the trails commonly found on State Forests. Trails can me marked to allow or prohibit certain types of use. In some situations, multiple use may be appropriate and in others trail use should be restricted to a single type of recreational activity.

Construction of new trails should take aesthetics into consideration. Does the trail bring the recreational user to some scenic destination or does it provide an aesthetically pleasing experience along the entire length or portions of the trail? If not, could it? Does the trail have variety? Is it irregular in nature and does it allow the user more of a personal experience as opposed to long straight stretches where, even when spaced out, users remain in view of one another? Will trail construction in certain areas detract from the view of that area from afar?

Trails must be signed properly. The manager must have direct oversight of the signs used along trails and in the frequency of trail markers. Some trails are improperly over marked with trail markers, which can detract from the trail's appearance. Proper trail site determination and construction will also help ensure that its aesthetics are not destroyed from overuse or erosion.

In applying retention standards to harvesting near recreation trails, foresters will consider leaving legacy trees and other green tree retention within sight of those trails for aesthetic enhancement, when the opportunity exists and long-term safety considerations do not preclude it.

An oil well in DEC Region 9

Additional Structures

Other structures on State Forests may impact the visual resources of a unit. Additional structures need to be considered on a unit by unit basis. Gas and oil wells, communication towers, and utility lines all can have a large visual impact on an area. These structures may

not be appropriate in certain locations on State Forests. Foresters assess the visual resources of the unit and any potential impact an additional structure will have on these resources. If structures already in existence have a significant negative impact on the visual resources of the unit, they should be moved to an appropriate location. If structures cannot be moved, the land manager should concentrate efforts on vegetation management to screen them and minimize the negative visual impacts the structures have on the unit and the surrounding area.

Scenic Vistas

Scenic vistas on State Forests may become compromised by vegetation that grows on or around them. If it is deemed appropriate to create or maintain a vista, the land manager should plant a native species of tree or other vegetation that will not threaten to block the scenic vista in the future.

Zoar Valley Multiple Use Area in Erie County

Managers of State Forests that exhibit multiple scenic vistas or other interesting attributes may wish to document those attributes in the form of a map or informational table in the UMP for that area. Documentation will aid in the management of the vista and may provide information for the public. To aid in management of the vista, the documentation should include photos and information such as the location of the vista, maintenance requirements, etc. Information that may be used by the public should also include the location of the vista and perhaps a brief description or history of the area. A map showing all of the major scenic attributes of a unit may be a valuable resource for the public.

Scenic vista on Cameron State Forest in Steuben County

Potential Alternatives and Related Impacts

If State Forests were managed with no consideration for aesthetics, public perceptions and the failure of those State Forests to provide the emotional, subconscious necessities for a pleasing

natural experience would likely result in numerous complaints to DEC. Aesthetic considerations must, however, be weighed carefully against ecological goals, and the diversity and quality of important biological forest communities and habitats must also be considered.

"VR" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Visual Resources (VR) Objective I – State forests will be managed such that the overall quality of visual resources is maintained or improved.

> **VR Action 1** – Develop guidance for visual impact assessment and mitigation around timber harvests, mineral extraction sites and infrastructure. Guidance to be developed by 2013 and will include an updated Timber Management Handbook.
>
> **VR Action 2 (also AFM 1, AFM 5, PM1)** – Incorporate visual resource protection into final DEC policies for retention, plantation management and clearcutting.

VR Objective II – Natural materials such as wood and stone will be used for observation and fishing deck structures, and barriers such as large boulders, in areas that experience greater amounts of recreational use and where administrative access is not frequently needed or anticipated. To be addressed on a site-by-site basis in UMPs.

VR Objective III – In case of new construction, roads and trails will be laid out to highlight unique natural features of the land and develop access to scenic vistas. UMPs will address.

VR Objective IV – Kiosks will be developed where appropriate to provide educational material and reduce sign pollution. To be implemented within UMPs.

VR SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has not been selected. As mentioned in this section, policy revisions are needed to ensure the protection of visual resources.

The **preferred alternative** is to implement the new plantation management, retention and clearcutting policies and update the timber management handbook, which all address visual impacts related to active management practices. In addition, the recommendations in this plan related to soils, recreation, scenic vistas and other infrastructure will be implemented under this alternative.

SEQR Analysis Threshold: Visual resource protection strategies established in this section and elsewhere in this plan will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted. However this plan has identified specific thresholds for some management activities, such as clearcutting and oil and gas development, that could otherwise cause significant visual impacts.

HISTORIC AND CULTURAL RESOURCES

The term "cultural resources" encompasses a number of categories of human created resources. The term used in state and federal law for these resources is historic properties. Historic properties include buildings, structures, objects and districts listed or eligible for listing in the State and National Registers of Historic Places. These can include standing structures, ruins, archaeological sites and other related resources. Such resources form the historical record and legacy of New York State. They tie us to and inform us of history and culture and are an important part of community identity and sense of place.

Leonard Hill Fire Tower on Leonard Hill State Forest in Schoharie County

DEC is required by the New York State Historic Preservation Act (SHPA) (PRHPL Article 14) and SEQRA (ECL Article 8) to include such historic and cultural resources in the range of environmental values that are managed on public lands. SHPA and State Education Law (EDN Section 233) are the legal mechanisms affecting the management of historic properties on state land.

SHPA does a number of things. First it authorizes a comprehensive statewide inventory of such properties. Second it directs state agencies to behave as stewards of the resources under their care, custody and control. SHPA also sets up a process by which agencies are required to identify and avoid or mitigate impacts to historic properties from the actions they permit, fund or undertake directly.


CCC Tool and Engineering Building on Winona State Forest in Jefferson County

On lands managed by DEC's Division of Lands and Forests, the number of standing structures is generally limited, due to the nature of past and current land use. Often those that remain are structures that relate to DEC's land management activities such as fire towers, ranger cabins and related resources. Fire towers as a class of resources have been the subject of considerable public interest over the last decades.

The majority of surviving fire towers have been found eligible for inclusion in the State and National Registers of Historic Places and a number have been formally listed in the Registers since 2001. Whether formally listed in one of the

registers or merely found eligible, DEC must treat these resources appropriately, requiring that special procedures be followed should it be necessary to remove or otherwise affect them.

Former Civilian Conservation Corps (CCC) camp on McDonough State Forest in Chenango County

Archaeological sites are, simply put, any location where materials (artifacts, ecofacts) or modifications to the landscape reveal evidence of past human activity. Human occupation of New York State extends as far back as immediate post-glacial times, perhaps as early as 15,000 years ago. Evidence of the human past includes a wide range of resources ranging from pre-contact Native American camps and villages to Euro-American homesteads, cemeteries and graves as well as mills and other industrial sites. Such sites can be entirely subsurface or can contain above ground remains such as foundation walls or earthwork features. All of these types of resources are known to exist within the State Forest system.

The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) and the New York State Museum are charged by law with creating and maintaining a comprehensive inventory of archaeological resources, including those on public lands. Other state agencies are charged with helping to develop this inventory by providing information on archaeological resources on their lands to OPRHP and the State Museum. Other agencies are also charged with acting as stewards of the archaeological resources under their care, custody and control.

A cursory examination of the inventory reveals several hundred identified archaeological resources as being present on DEC managed lands. Many of these were recorded prior to state ownership as DEC has never had the funds budgeted to undertake a systematic inventory. Were a systematic inventory to take place, it is likely that many new archaeological sites would be added.

The quality of site inventory information varies a great deal in all respects. Very little systematic archaeological surveying has been undertaken in New York State, especially on state land. 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 and 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 shown on inventory maps can be unreliable or encompass a large area.

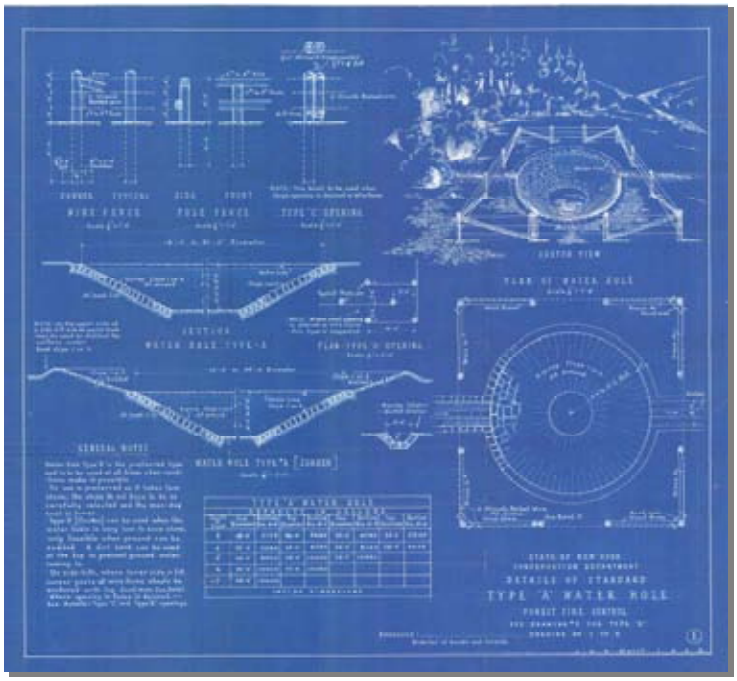
Sawmill foundation in Cattaraugus County

As a part of the inventory effort associated with the development of UMPs, DEC arranges for a search of the archaeological site inventories maintained by the State Museum and OPRHP in order to identify known archaeological resources that might be located within or near a State Forest unit. This is done for two reasons: to determine if any known sites might be affected by actions proposed within the unit, and to assist in understanding and characterizing past human use and occupation within the unit. Archaeological site information is maintained as a part of the DEC's resource inventory for a given unit and is discussed in general in the UMP. To prevent damage to sites, specific site locations are not published in plans or otherwise made public as required by PRHPL Article 14.07.

HISTORIC AND ARCHAEOLOGICAL SITE PROTECTION

The historic and archaeological sites located on State Forests as well as additional unrecorded sites that may exist are protected by the provisions of the New York State Historic Preservation Act (SHPA - Article 14 PRHPL), Article 9 of Environmental Conservation Law, 6NYCRR Section 190.8 (g) and Section 233 of Education Law. 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. In some cases additional protection may be afforded these resources by the federal Archaeological Resources Protection Act (ARPA).

State Forests can be made available for research on known archaeological sites, as well as unrecorded sites that may be suspected to exist on the property. Such research requires permits which can be issued only after consultation with the New York State Museum and OPRHP.



CCC firefighting reservoir design

HISTORIC PROPERTY MANAGEMENT AND PROTECTION GUIDELINES

Resource Inventory

DEC will continue to provide its forestry staff with training opportunities to enhance their ability to identify and protect historic and cultural resources on the lands they manage. While conducting forest inventory or timber management tasks, they will note the presence of possible artifacts for future investigation, and will shelter or protect these features from management activities until that investigation has been completed. All known and suspected historic and cultural resources will be discussed in all new UMPs and added to a GIS database.

When new cultural and historic sites are identified, their presence will be shared with OPRHP and NYSM using inventory forms developed for this purpose. DEC will explore an enhanced partnership with NYSM to develop and initiate a long-term State Forest archeological inventory project as funding and staffing permit.

Resource Protection

Timber harvesting, well site construction and recreational activities that would impact historic properties should be avoided. Haul roads, skid trails, landings, trailheads and parking areas should not be located in the vicinity of historic resources that might be damaged by such activities. A *do-no-harm* approach should be applied where possible artifacts are identified, until such time as a full archeological review can be conducted to establish the true nature of the find.

Cultural resources should be managed to preserve the integrity of individual sites such that the association between site features is not diminished. For example, the relationship between foundations, stone walls, garden plots and old orchards provides evidence about a functioning farmstead. Activities that disrupt this integration decrease the accuracy of site interpretation and lessen the ability to learn about the past.

Where necessary, place protective conditions on sales contracts that prohibit harvesting activities that would impact historic properties, or direct harvesting activities in such a way as to protect historic properties. Should disturbances be necessary, the contract or Temporary Revocable Permit (TRP) can require that the structures be returned to their pre-impact condition.

Protections will be put in place such that stone walls and other structures will not be dismantled and efforts will be made to accommodate access using existing gateways. Hedgerows, shade and fruit trees, garden shrubs and other ornamental plants associated with cultural sites will be excluded from harvesting, and efforts will be made to sustain non-invasive vegetation through thinning and pruning. Hedgerows will be maintained, though hazard trees may need to be removed.

"HC" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Historic and Cultural Resources (HC) Objective I –Historic and cultural resources will be preserved and protected wherever they occur on State Forests.

HC Action 1 – Develop standard operating procedures for managing historic and cultural resources, including old homesteads, water wells and stone walls by 2013.

HC Objective II –Historic and cultural resources on State Forests will be identified and addressed during development of UMPs. Inventory forms will be completed and submitted to OPRHP and NYSM and resources will be added to DEC's state land assets GIS layer as they are identified.

HC Objective III –Historic and cultural resources on State Forests will be inventoried at a statewide level.

HC Action 2 – Initiate a systematic and comprehensive archaeological inventory of State Forests in partnership with the New York State Museum to be completed by 2020.

HC SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches has been selected as the **preferred alternative**. This means that protective measures will be applied where known historic and cultural resources occur. In addition, resources will be inventoried as staffing and other resources allow.

The alternative of not implementing the above mentioned protections has not been selected because it would neglect DEC's responsibility as a landowner.

SEQR Analysis Threshold: Historic and cultural resource protection strategies established in this section will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted.

CHAPTER 4

REAL PROPERTY AND INFRASTRUCTURE

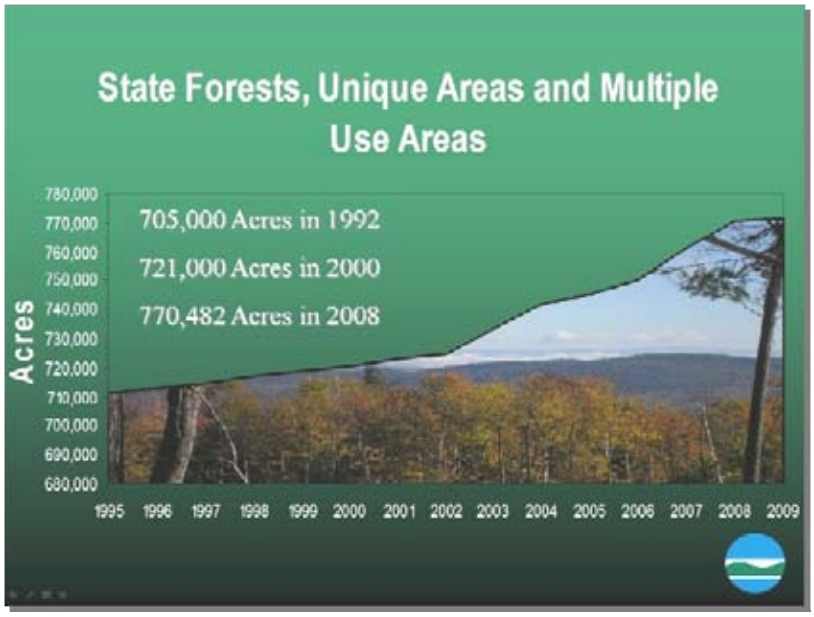
LAND ACQUISITION

Acquisitions in fee and conservation easements have been utilized by New York State to conserve land for more than a century. These lands have created the State Forest Preserve, reforested marginal farmland, created state parks, and have protected sensitive natural habitats for threatened and endangered species.

New York's State Forests, to be managed separately from the State's Forest Preserve, were established by The State Reforestation Law of 1929 and the Hewitt Amendment of 1931. Today, these laws are authorized under Article 9, Title 5 of the Environmental Conservation Law (ECL). Both laws set forth legislation that authorized the former Conservation Department to acquire land by gift or purchase for reforestation areas. Land Acquisition Bond Issues in 1960, 1962, 1970, 1972, 1986 and 1996 as well as today's Open Space Conservation program funded by the Environmental Protection Fund have strengthened the public commitment to acquire, protect and preserve these valuable areas.

In 1990, the state legislature passed ECL Article 49, Title 2 to ensure citizen input into state land acquisition decisions made by DEC and the Office of Parks, Recreation and Historic Preservation (OPRHP). Nine Regional Advisory Committees were established to assist DEC & OPRHP in identifying areas in which land acquisition is a high priority for conservation purposes. Through a formal public review and natural resource evaluation process, projects are required to be listed in a state land acquisition plan, now formally known as the New York State Open Space Conservation Plan (Plan). As one of the principles of the State's Open Space Conservation Program, the Plan recognizes fee acquisition from willing sellers as one of a variety of tools to be utilized for conserving land.

Shortly following, in 1993, the New York State Environmental Protection Fund (EPF) was created to provide funding for open space conservation and land acquisition. Purchases of land in areas identified in the Plan are eligible for funding from the EPF, and other state, federal and local funding sources for acquisition purposes, with "State Forest, Wildlife Management Area & Unique Area Protection" identified as a statewide



priority project. Projects listed in the State's Open Space Conservation Plan are required to be reviewed every three (3) years.

Profile of a Successful Acquisition

In June of 2010, the City of Rochester's lands surrounding Hemlock and Canadice Lakes, totaling about 6,684 acres in Livingston and Ontario Counties, were acquired by DEC, and re-named the **Hemlock-Canadice State Forest**.

View of Canadice Lake, on Hemlock-Canadice State Forest, in Ontario County

Hemlock and Canadice Lakes have provided drinking water for the City of Rochester and adjacent communities for more than 100 years. The City began drawing water from the lakes in order to put an end to cholera outbreaks. To protect water quality, the City acquired much of the watershed property around the lakes. However, much of the property being acquired in the early 1900's was in agricultural use. Therefore, in 1902, an aggressive tree-planting program began in order to provide the desired forest cover. During the next 29 years, 3.7 million conifer seedlings were planted on 3,000 acres. The remaining acres naturally re-grew to trees without needing to be planted. Few traces remain of the land's former uses except for stone walls.

With the addition of a water filtration plant in the 1980's, the protection provided by natural forest cover was no longer a high priority in comparison with other financial concerns. Hemlock and Canadice Lakes were identified as a "high priority" on the state's Open Space Conservation Program since its inception in 1992 - state acquisition would remove the pressure on the City to sell off the buffer lands for development. Today, the lakes, with their steep forested shorelines guarding the deep clear water, show visitors a glimpse of the past when all the Finger Lakes were wild lakes. While protecting water quality continues as the most important function of this property, the lands will be managed for multiple benefits as described in this plan.

POLICY

Under the state's Open Space Conservation program, available acquisition funds for State Forest protection would be placed on fee acquisition of parcels that are either: a) in-holdings, i.e., parcels with at least three sides bordered by existing State Forest; b) improve access to an

existing State Forest; c) are scenically important; d) contain threatened or endangered species; or e) are of exceptional historical or cultural importance. Priority will be placed on the elimination of "in-holdings" and the consolidation of State Forest parcels in order to lessen management demands and fiscal expenses by significantly reducing boundary line maintenance, improving operational access, and by providing additional protective buffers from non-compatible or potentially non-compatible adjoining land use.

Procedure

ADDITIONAL RESOURCES

New York's 2009 Open Space Conservation Plan – www.dec.ny.gov/lands/47990.html

In order for land to be acquired for State Forest protection, as described in the Open Space Conservation Plan, a proposed parcel will be evaluated to determine: a) the impact of the location of the parcel on its ability to achieve the project's objective; b) the compatibility of the parcel with other state environmental plans and other regional and/or local environmental plans; c) the multiple benefits afforded by the proposed parcel; d) the availability of alternative or additional funding for purchase of the parcel; e) post acquisition management needs and the availability of post acquisition management support; f) the extent to which a parcel encompasses agricultural lands; and g) the fiscal and economic benefits and burdens resulting from acquiring the proposed parcel, including those on state agencies, the local government and the local economy (2009 New York State Open Space Conservation Plan).

The Commissioner of DEC will then consider: a) the extent to which the parcel's location contributes to the geographical balance and availability of the State's diversity of resources, as well as the fair distribution of the available monies across the State; the availability of the project for acquisition by purchase, gift or partial; b) the suitability and practicality of a conservation easement, or other less than fee acquisition strategies, as required by ECL Section 49-0203(2); c) the cost of the project in relation to its resource value; d) the social, cultural and educational values, benefits, and potential of the project; and e) the comments from the Regional Open Space Advisory Committees.

Once the Commissioner decides whether to proceed with the acquisition of certain parcels, he/she will establish priorities for approved projects and will individually propose the projects for funding through the EPF, which are listed in the capital project budget prepared each fiscal year. Priority projects listed in the final budget are then approved or denied by the Governor and State Legislature.

As stressed by the Regional Advisory Committees, it is important for DEC to critically evaluate the feasibility of managing additional public lands and its incurring expenses beyond the initial acquisition costs. The Committees recommend that: 1) a percentage of the land acquisition portion of the EPF be allocated annually for stewardship activities; 2) user fees should not be

collected since they potentially discourage economically disadvantaged people from enjoying these areas, reducing attendance on these lands; and 3) the state should compensate municipal taxing units for property tax on all public lands (including easements) to offset the potential impacts to a local municipality's tax base resulting from the removal of property from the municipalities' tax base.

Implementation

Following approval by the Governor and the state legislature, and in accordance with the state Open Space Conservation Plan, DEC's Bureau of Real Property performs all aspects of the land and conservation easement acquisition process from appraisals and boundary surveys through negotiations and contracts. Legal assistance is provided to the Bureau from DEC's Office of General Counsel and the State Attorney General Office's Real Property Bureau.

Applicable Laws

- State Reforestation Law of 1929
- Hewitt Amendment of 1931
- ECL Art. 9 Title 5 - Reforestation Areas
- ECL Art. 49 Title 2 - State Land Acquisition
- ECL Art. 54 Title 3 - Open Space Land Conservation Projects

FUTURE NEEDS FOR LAND ACQUISITION

Identify Priority Connectivity Parcels

Connectivity between private and public forest patches across the landscape will become increasingly important for biodiversity and ecosystem health as time progresses. State Forest Management Unit Plans should refer to New York State Open Space Plan for guidance and ideas on how to keep the State Forest System connected to other public and private lands. DEC's cooperative forest landowner outreach program can help private landowners learn how their lands fit into the bigger ecosystem picture. An incentive system similar to the 480-a tax law program or conservation easements will be needed provide long term contributions to connectivity from privately held lands.
Connective corridors identified in the Landscape Assessment section of this plan should be referenced in each UMP as being important assets at the landscape level, worthy of protection through tools such as conservation easements or direct purchase.

Meet Demand for Open Space and Watershed Protection

Consider new acquisitions of state forest lands in areas of the state that have not traditionally been served by State Forests but are underserved by open space and recreational benefits or are in need of watershed protection. Any proposed acquisition will be listed in the Open Space Plan.

List Priority State Forest Parcels specifically in the NYS Open Space Plan

Identify, list and map priority acquisition parcels as specific projects by unit and/or eco-region in the New York State Open Space Plan.

"LA" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Land Acquisition (LA) Objective I – Acquisition of inholdings and adjoining properties that would reduce management costs and benefit resource protection and public access goals will be prioritized with potential acquisitions listed in UMPs.

LA Objective II – Acquisition of the mineral estate will be priorittized wherever it is split from a State Forest tract with potential acquisitions listed in UMPs.

LA Objective III – Acquisition of properties within identified matrix forest blocks and LCP corridors will be prioritized with potential acquisitions listed in UMPs.

LA Action 1 – Work with regional advisory committees to add matrix forest blocks and LCP connectivity as priorities for State Forest acquisition in the NYS Open Space Plan

LA SEQR Alternatives Analysis and Thresholds

SEQR analysis for the action of land acquisition by New York State for addition to the State Forest system has been addressed in the 2009 New York State Open Space Conservation Plan and Generic Environmental Impact Statements (GEIS).

BOUNDARY LINE MAINTENANCE

Background
DEC has under its jurisdiction nearly 5 million acres of land and easements, among which are included State Forests, Forest Preserve and others lands managed through the Division of Lands & Forests. Although limited at times by fiscal constraints, the state has a firm commitment and responsibility to protect and manage these resources. State Forests alone have 6,520 miles of boundary lines. That's roughly equivalent to the distance from New York State to the southern tip of South America.

Given current staffing levels and the rate at which boundary line markings deteriorate, it will take about 120 years to catch up with the backlog of needed surveys at the rate they are currently being completed. Unfortunately, this backlog will result in additional encroachment issues demanding an even greater level of staff involvement to solve.

Policy
DEC places great emphasis on stewardship, with boundary line maintenance being an important and necessary element. It is DEC's responsibility to make all state forest boundaries readily identifiable to the public. Well marked boundary lines enable the public to more fully use state land, while reducing unintentional trespass. Additional resources are needed to meet stewardship responsibilities.

PROCEDURE

In an effort to make state boundaries readily identifiable, it is important to keep markings consistent throughout the state and through the various program areas and in line with surveying norms and standards. These standards include the practices of painting and blazing trees along the boundary lines as well as establishing monuments at property corners. Blazing involves the cutting or removal of small patches of a tree's bark by a licensed land surveyor. These blazes are then painted with yellow paint to enhance visual identification of the actual boundary line.

Boundary lines to be maintained will include all lines where existing evidence of paint and blazes can be readily found. All other lines must be verified or established by DEC's Bureau of Real Property before maintenance can take place. Ideally, it is the goal of the Real Property Supervisor to see that all new state land boundaries are surveyed, monumented, blazed and mapped, so they may be maintained.

A seven- to ten-year maintenance cycle for forest lands should be implemented to insure that state boundaries remain clearly marked. In certain situations, boundary lines such as those in wetlands and lands in heavily populated areas may require more frequent maintenance as

dictated by local conditions. Regular maintenance can reduce the need for costly resurveys, illegal occupancies and encroachments.

Implementation

Generally, Forest Rangers implemented the boundary maintenance program until the mid-1990s when they assumed a greater law enforcement role. Today, boundary maintenance duties vary greatly from region to region, where functions are shared and overlap between DEC's bureaus of State Land Management and Real Property, and its Division of Operations. Each region knows its needs and resources, and can best set up a customized program for implementing a suitable boundary maintenance program while staying within the 7- to 10-year rotation cycle.

Generally, an annual maintenance schedule or request is set up by either the Division of Operations or the Bureau of State Land Management. Actual maintenance (painting and signing) is carried out by seasonal trail crews from the Division of Operations with the assistance of either the Bureau of State Land Management or Bureau of Real Property. Again, how each region manages its boundary maintenance duties depends on its available resources and growing demands on its staff.

When boundary lines are questioned, blazes or corners are missing, or other discrepancies are found, the Bureau of Real Property must be notified to re-establish the boundaries. However, the Bureau of Real Property has suffered the same fate as the rest of the Division of Lands and Forests, with staffing losses and increased responsibilities, and has not had sufficient resources to address the backlog of survey requests. It is estimated that more than 2,300 miles of boundary line need to be established or re-established on State Forests, representing a backlog exceeding 100 years at current levels of staffing and funding. This has led to a number of encroachment issues with adjoining neighbors.

As UMPs are developed, DEC will inventory, monitor, and schedule boundary line maintenance, noting encroachments and areas of special need and attention.

Impacts of Boundary Line Maintenance

Blazing trees can have a minor and temporary impact on a tree's health. Most blazes are 3-4 inches square, depending on tree size. The size and depth of a standard blaze is intended to minimize long term effects. While it is recognized that the visual impact of painted trees can be viewed negatively by some, it is a cost-effective and necessary practice with no viable alternatives.

Applicable Laws

Applicable Laws relating to destruction of boundary markers, trespass and timber theft are:

- Education Law Section 7209, Subdivision 9 established by Chapter 730, Laws of 2005. Sets penalties for the damaging of monuments and/or boundary markers.
- Environmental Conservation Law (ECL) 9-0303
  Restricts the use of state lands including trees and timber – no cutting, removing, etc.
- ECL 9-1501
  No person shall cut, pull or dig up and remove trees on the lands of another without consent of the owner.
- ECL 71-0703 Penalties
  Establishes fines and civil penalties for violating provisions of Article 9.
- Real Property Actions and Proceedings Law, Section 861
  Consequences for cutting, removing, injuring or destroying trees or timber, and damaging lands.
- Article 145 – Penal Law – Criminal Mischief
  Establishes penalties for intentionally damaging the property of another person.
- ECL 71-0712 Timber theft and trespass education training
  Establishes training programs for courts, district attorneys and law enforcement agencies for control and prosecution of timber theft and trespass.

"BL" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Boundary Line Maintenance (BL) Objective I – Illegal use of State Forests will be minimized through the regular maintenance of boundary lines.

BL Action 1 – Ensure that all State Forest boundary lines are surveyed by 2025.

BL Objective II – Boundary line maintenance will be inventoried and scheduled during UMP development, while noting encroachments and areas of special needs and attention.

BL SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has been selected as the **preferred alternative**.

The alternative of not identifying (painting and marking) boundary lines has not been selected. Even though marked boundary lines have some negative visual impacts, they are necessary for the purpose of resource protection and land management.

SEQR Analysis Threshold: Boundary line management approaches established in this section will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted.

INFRASTRUCTURE

State Forests are managed with a minimal amount of improvements to accommodate rustic, forest based recreational opportunities while providing for resource protection; public health and safety; and access for individuals of all ability levels. Minimal development is in harmony with the open space and ecological goals of these lands, which are of increasing importance, as the surrounding landscape continues to be subdivided and in some cases developed. Intensive recreational use and supporting facilities such as athletic fields, playgrounds, man-made beaches, bath houses and developed campgrounds (with running water and bathroom facilities) are beyond the scope and budget of the Division of Lands and Forests.

Infrastructure development must consider DEC's ability to provide long term maintenance to meet sustainability mandates. This is the case with all infrastructure development by DEC or AANR partners. It is always easier to build new infrastructure than to maintain it. Without careful attention, the level of infrastructure development on a State Forest could potentially reach a level that is disproportionate with multiple uses, ecological goals and DEC's ability to maintain health, safety and facility quality or which displaces other uses. For example, trail systems, when developed with the help of AANR agreements, have shown the potential to incrementally expand beyond expectations or sustainable levels. It is important at the outset of AANR construction activity, to determine and agree to the appropriate bounds of potential development. In most cases, development of new infrastructure will be considered as part of a UMP to consider the above factors and provide opportunities for public input.

GENERAL INFRASTRUCTURE GUIDELINES

ALL infrastructure projects planned or built on State Forests will be developed in accordance with Best Management Practices (BMPs), including the following:

Use BMPs for the protection of soil and water resources
(Refer to page 108.)

Avoid areas where habitats of threatened and endangered species are known to exist.
(Refer to page 115.)

Consider aesthetic impacts, including use of natural materials to blend structures into the surroundings and wooded buffers to screen structures from view of public roads.
(Refer to page 127.)

Apply universal design to incorporate accessibility for people with disabilities;
(Refer to page 173.)

Reduce or eliminate the introduction and spread of invasive species by pressure washing equipment between jobs and re-vegetating areas of exposed soil along roadsides using native plants. *(Refer to page 275.)*

ROADS


A public forest access road

Early needs for State Forest access roads were for tree planting and forest fire protection, since over one half of the acquired acreage was in grassland or light brush. Early access was primarily via old town roads and former farm lanes. Where these were not sufficient, new roads were constructed by the Civilian Conservation Corps (CCC). In the days of the CCC, labor was not expensive. Large crews of men built roads and trails using limited machinery and mainly hand labor. Some of the roads were built extra wide to serve as fire breaks to protect the newly established plantations. Although there were few heavy trucks used at that time, the CCC roads were generally built to a high standard and many still exist today. Decades later, as the plantations and natural forests matured, access to stands was needed for timber stand improvement thinning. New roads were built as needed to do this work. Some of these projects involved and were funded by sales of forest products, which included mostly firewood, pulp and Christmas trees.

Present Situation

Over the past 20 years recreational use of State Forests has expanded dramatically with new uses like mountain biking and geo-caching added to the list of activities enjoyed on these lands, increasing the need for State Forest access. In addition, as State Forests have matured, management has included additional harvesting activities. These harvests are conducted to enhance forest health, promote biodiversity and to provide jobs and economic stimulus for the local economies. Department standards for road maintenance have also increased commensurately with an increased focus on resource protection and higher standards for harvesting operations as established in DEC Rutting Guidelines and strict Timber Sale contract terms. In addition, ecological impacts, such as forest fragmentation, resulting from road development are considered.

Two types of DEC administered Roads can now be found on State Forests, Public Forest Access Roads and Haul Roads.

- **Public Forest Access Roads (PFARs)** are permanent, unpaved roads which may be designed for all-weather use depending upon their location, surfacing and drainage. These roads were previously referred to as “truck trails”. They provide primary access

for administration and unless restricted by a sign, regulation or law, these roads serve as trails for hiking, cross country skiing, snowmobiling, horseback riding, carriage riding and motor vehicles registered for use on public highways. There are 563 miles of PFAR statewide.

- **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 State Forest 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.

A haul road on Pochuck Mountain State Forest in Orange County

Legal Status

In limited cases, access to state land requires the use of roads with uncertain or unresolved legal status. Examples include: former town roads that are now maintained by DEC as Public Forest Access Roads but have an initial section passing through private land before reaching state land; town roads that were abandoned improperly by the Town (without regard to Chapter 203 of the Laws of 1976); town roads that receive little or no maintenance by the Town; and DEC Public Forest Access Roads that also serve as the only access to private parcels. These issues will be researched on a case-by-case basis, as part of the UMP process.

Funding

While the demand for better roads has increased, money available to provide them has not. DEC Division of Operations maintenance staff are hard pressed just to maintain existing roads. Reduced timber sale activity due to L&F staff losses has translated into less maintenance being conducted by timber harvests. It is hoped these constraints will be addressed as New York State's economy improves.

Trends

Towns are also being heavily impacted by shrinking budgets and continue to abandon or stop maintenance on roads used to access state land, or post roads against use by heavy trucks. The demand for forest access continues to increase. As some of DEC's constituents age, roads are increasingly important for providing access for hunting, fishing, and trapping. Existing roads and trails will need to be upgraded to a higher standard that will be safer and easier to maintain. New access roads will be needed to replace those that are not up to standards or that cannot be fixed at a reasonable cost. Some roads were built in a poor location and will need to be

rebuilt using up-to-date standards. Roads should be moved out of riparian areas where possible and the old road bed should be restored to a natural condition. However most new road construction and major upgrades of existing forest roads must be done as sale-related work to the extent possible. Maintenance and improvement work on existing forest roads done by DEC Operations will continue to lag behind. Many access roads on State lands need new culverts and gravel. These issues will be discussed in more detail in individual UMPs.

Potential Impacts of Road Establishment and Use

Properly constructed and maintained roads actually mitigate impacts by concentrating and redirecting uses to the least sensitive areas and by properly preparing those areas to support such use. However, there are aspects of road establishment and use which have the potential for negative environmental and ecological impacts. These impacts, along with mitigation measures, are listed here:

- Road construction can create forest fragmentation in the form of edge effect, bringing in predatory species when they are unwanted. They can also create barriers for some species of amphibians, reptiles, and stream based aquatic species. These impacts can be mitigated by maintaining narrow road corridors instead of providing wide mowed shoulders. This is not possible in all cases. Heavily used roads must have good sight distances to prevent accidents and need to be "daylighted" to maintain a hard dry surface (to prevent erosion). Heavily used roads are usually those which serve popular recreational destinations or which are "through roads" which provide connectivity with other public road systems.
- Roads can provide a vector for the establishment and spread of invasive species like garlic mustard or chervil. This can be mitigated by using the guidelines established under the invasive species section of this plan.
- Roads can negatively impact aesthetics. This can be mitigated by design considerations like meandering the road course. An added benefit of this approach is the tendency for people to travel slower on a curvy road.
- Roads can increase public use of an area. While this is preferable in many locations there are instances where lower public use would decrease the impacts on sensitive areas. This will be addressed at the UMP level.

Road construction on Turkey Point State Forest in Ulster County

Road Management Guidelines

Permanent access may be established for public use; forest management and silvicultural operations; forest protection; and emergency management. The policy of DEC as regards forest

roads shall be as follows:

1. All roads will be planned, designed and constructed in a sound manner to avoid or minimize unnecessary degradation of natural resources, providing the service needed and at a justifiable cost, with minimal negative impacts to the environment.
2. Roads will be operated in accordance with Vehicle and Traffic Laws, Public Highway Laws and 6 NYCRR Part 190

ADDITIONAL RESOURCES

DEC Unpaved Forest Road Handbook – August 19, 2008. Available at www.dec.ny.gov/lands/64567.html

New York State Forestry; Best Management Practices for Water Quality BMP Field Guide – 2007. Contains additional information to guide planning, design and construction activities. Available at www.dec.ny.gov/lands/37845.html

Rutting Guidelines for Timber Harvests and TRPs on State Forests – May 2008. Developed by DEC Bureau of State Land Management. Also available at www.dec.ny.gov/lands/64567.html

USDA Forest Service Handbook for Eastern Timber Harvesting – Provides additional road building guidance

POINTS OF ACCESS

Rock barrier on Morrow Mountain State Forest in Madison County

Points of access, where roads and trails border State Forest lands, provide valuable locations for providing information and orienting visitors. Visitors receive their first impression of the area from the nature and condition of the trailhead/parking facility. For highway travelers, trailheads and/or parking areas are often the only indication that they are passing through public lands. Access points also provide trailhead registration data that can be utilized in quantifying the public's use of a particular area, and for providing crucial information that may assist in search and rescue operations. Parking lots enhance public safety at popular areas, as the shoulders of rural town roads are seldom adequate to accommodate parked cars. Environmental impacts of access points are similar to the impacts of roads.

Point of Access Guidelines

- Locate parking lots roadside. While aesthetic goals would be enhanced by screening parking lots from the road, this is not an acceptable solution in most cases due to security issues and the goal to reduce forest fragmentation.
- Use natural material barriers such as logs and boulders whenever practical.
- Provide combined signage to provide necessary information along with a trail register where needed, following the signage guidelines below.

DIRECTIONAL AND INFORMATIONAL SIGNS

DEC produces and posts a variety of signs that provide information about regulations, recommendations, directions and distances to destinations, and resource conditions. These signs are posted at trailheads as well as interior locations.

Designated trails on state forests are identified with trail markers. State forests with designated trail systems may have brochures and maps at the trailheads. The brochures typically describe appropriate trail activities and trail etiquette and give a brief description of the history and features of the state forest. Most state forests have at least one 48" x 25" identification sign at or near a main entrance location. This large sign lists the name of the forest and acreage. Smaller 8" x 11" “State Forest” signs are also placed along roadsides and property lines. These signs identify the area as state forest land.

Signs restricting or prohibiting certain activities are posted at key locations, however the present information available to the public about rules and regulations is often inadequate. A few state forests have kiosks* that provide additional information. Signs are occasionally placed on state forests to describe natural features or forestry activities. Self-guided interpretive trail systems are present on some State Forests. Several have a self-guided interpretive auto tour that describes the history, natural features and forestry practices of the state forest area.

Signage Guidelines

To maintain a consistent and recognizable appearance, the dimensions, materials, colors, and wording of DEC signs will be standardized. To ensure the public’s ability to locate the State Forest lands and facilities easily, the following guidelines will apply to the design and erection of signs:

- All roadside directional signs, trailhead identification signs and interior guide boards will be made of wood and will be brown with yellow lettering.
- Informational “posters” may be made of metal or plastic and generally will be brown with yellow lettering, although other unobtrusive color combinations may be used, such as yellow or white with dark green lettering, or white with black lettering. Posters or

signs intended to draw attention to obstacles or hazardous conditions may be red and white.

- Lettering clearly indicating the unit name and classification; ex. “Witch’s Hole State Forest”, will be given in all roadside directional signs and trailhead identification signs.
- Standard boundary signs will be posted every 400 feet along all highways that pass through or adjacent to State Forest lands and at other strategic locations, such as points on trails where they pass from private onto state lands.
- Managers will use the smallest number of signs necessary to accomplish an informational or regulatory objective.
- Signs will be clustered on a single sign post or bulletin board placed where they are most likely to be seen by visitors.
- As a general rule, informational signs will be posted on the periphery of a unit rather than in the interior.
- Signs will be constructed of rustic materials and will be limited in number.
- Only signs that conform to DEC rules and regulations and policy will be placed.

TRAILS

Bent Rim Trail, Rock City State Forest, Cattaraugus County

A wide variety of trails can be found on State Forests to accommodate the needs of a wide variety of recreational activities. Over 2,400 miles of multiple use, single use and dual use trails are provided with the goal of having something for everyone. While it is impossible to accommodate every recreational use on each property, every attempt is made to locate trails in areas where the demand is greatest and to design trails to serve the needs of each recreational use. Some trails serve multiple uses while others may be designed and limited to only one recreational use. The development of formal trails must also rely on the availability of volunteer organizations are able to assist with trail maintenance under Adopt a Natural Resource Agreements. There are over 110 active AANR agreements between DEC and local volunteers, clubs and organizations, which are crucially needed to maintain recreational trails on State Forests. Where possible, trails are developed and maintained in partnership with local governments, organizations, and residents.

State Forest trails can be linked with nearby communities and trail systems through trail connections where feasible, appropriate, and supported by local governments, residents, and landowners. Priority is given to trail linkages that tie into existing public transportation, reduce

the need for new structures and improvements within the unit, support local economic development plans, and foster the development of interpretive and educational programs.

Trail Infrastructure Guidelines

- Sufficient parking will be provided at the trailhead to accommodate anticipated use and in accordance with that area's resource capacity to withstand use.
- Trails will be clearly marked, and well maintained.

Foot Trail Construction:

Where it is not possible or appropriate to construct using the most current ADAAG available at the time of construction, the following technical specifications will be used.

- Trail width: 3 ft
- Trail tread width: 2 ft
- Trail clearance: 7 ft
- Trail tread surface: Trail surface will be native soils where trail is on moderately well- to well-drained ground. Those portions of trail on poorly drained ground will have a hardened surface or improved trail drainage to prevent muddy conditions.
- If a section of a trail must cross a small area of wet or soft soil that section will be hardened, or bog bridging (puncheons) will be installed.
- Trail signs: Trail markers will be placed such that they are inter-visible
- Some trails will be laid out on existing roads, skid trails or other partially cleared areas
- Erosion control measures shall be installed on slopes where expected use has potential for significant erosion
- Erosion control measures shall consist of water bars, broad based dips and water diversion ditches

Cross-country Ski Loop Trail Construction:

- Trail width: 4 ft for ungroomed trails; 6 ft for groomed trails
- Trail tread width: 2 ft for ungroomed trails; 6 ft for groomed trails
- Trail height: 12 ft
- Trail length: 5 to 10 miles
- Slope: 3 to 25%
- Cross slope: 0 to 5% for groomed trails
- Minimum acreage needed: 500 acres of contiguous upland acreage
- Trail signs: trail markers will be placed at appropriate distances
- Trails will avoid wet areas
- Wherever possible, trails will be laid out on existing roads, skid trails or other partially cleared areas

Horseback Riding Trail Construction:

- Type of trail: loop trail
- Trail width: 6 ft
- Trail tread width: 4 ft

- Trail height: 12 ft
- Trail length: 5 to 15 miles
- Slope: 3 to 25%
- Cross slope: 0 to 5%
- Minimum acreage needed: 1,500 acres of contiguous upland acreage needed for a trail system that is contained within a given State Forest
- Trail signs: Trail signs will be placed at appropriate distances
- Refer to "Construction and Maintenance of Horse Trails in Arkansas State Parks" for guidelines on location of road crossings and signs at intersections
- Trails shall be built and maintained to standards sufficient to prevent or minimize erosion
- Water bars or broad-based dips will be installed as needed
- Trail tread on wet or soft soils will be hardened
- Streams will be crossed with culverts if possible
- Stone fords or bridges will be used as a last resort
- If it is necessary to use a bridge, it will be designed or approved by DEC operation engineers.

Mountain Bike Trail Construction*:

- Identify control points (i.e. wetlands, rock outcrops, scenic vistas)
- Avoiding sensitive areas, such as wetlands and wherever water collects, steep slopes, unique habitats, and elevations above 2,000 ft
- Use existing roadways where possible, on grades that do not exceed 10%
- Clear new single-track trail tread two to three feet wide with a maximum width of four feet, with the assumption that a narrower track will develop it re-vegetates.

The Golden Hill Bike Trail in Cattaraugus County

- Trail corridor can be cleared 5-8 feet wide based on expected vegetation re-growth, speed of users and frequency of use. Care should be taken to avoid opening the canopy to minimize fragmentation and the establishment of invasive species.
- Frequent grade reversals and drainage dips will allow for water management.
- Texture the tread by leaving natural features, such as small rocks and logs, in the trail to help control speed.
- Remove vegetation at the root level, not at ground level.
- Keep routes close to the contour & avoid fall lines where water is likely to flow downhill.
- On side slopes, follow the contour, cutting full benches to construct the tread (out-sloping at 5% to remove water from the trail), and re-vegetating back slopes.
- Design trails with an open and flowing route, with broad sweeping turns. Avoid long straight stretches and acute sharp angle turns.
- Cross streams at 90 degree angles, preferably across rock, gravel, culverts or bridges.

- Install bridges where steep banks prevent normal stream crossings.
- Avoid construction of skid berms or extensive banked turns that may accelerate erosion.
- Plan trails for beginner/intermediate riders by maintaining overall grades of 10% or less.
- Monitor and inspect all trails annually; addressing water problems immediately.

*These standards have been adapted from both DEC and International Mountain Bicycling Association recommendations.

Snowmobile Trail Construction:

- Type of trail: Corridor or loop trails
- Trail width, trail tread width and trail clearance
- Refer to NYS Snowmobile Trail Manual based on the class of trail
- Trail length: Minimum of 50 miles; shorter for loop trail
- Slope: 3 to 25%
- Cross Slope: 0 to 2%
- Minimum acreage needed: 5,000 acres of contiguous upland acreage for loop trails
- Trail signs: Will be in accordance with the NYS Snowmobile Trail Signing Manual
- Speed Limit: 25 mph on public forest access roads
- Other uses allowed: Sections of snowmobile trails may be part of multipurpose trail systems
- Other: Grooming of trails by snowmobile clubs will be allowed through the Adopt-A-Natural Resource Program or a temporary revocable permit
- Trails will be located to minimize unnecessary cut and fill
- Trails will avoid wet areas
- Wherever possible, trails will be laid out on existing roads, skid trails or other partially cleared areas

Potential Impacts of Trail Establishment

Like roads, properly designed, constructed and maintained trails actually mitigate impacts by concentrating use along an appropriate corridor. The most significant impact associated with trails is the potential for erosion. This impact will be mitigated by the thorough application of BMPs for soil and water protection. Trails may create a small-scale edge effect which does not impair the ecological function of the forest. Additional trail related infrastructure, such as parking lots, staging areas, manure pits and watering stations have the potential to add to these impacts and must be properly located.

The level of trail use and number of multiple uses is very closely associated with the amount of maintenance needed and potential environmental impacts. Therefore, the discussion of impacts and mitigations related to trail use is located in the Recreation section of this plan. (*refer to page 187*)

FACILITIES AND STRUCTURES

Various facilities and structures can be found on State Forests, however the overwhelming majority of lands are unfragmented and undeveloped. The primary consideration for DEC staff, before undertaking new facility construction or the maintenance of existing facilities is the need to minimize forest fragmentation and development. Facilities and structures are first developed in areas already fragmented. Facilities may be developed in unfragmented areas if they have a small footprint of impact (ex. campsites) or a relatively short duration of impact (ex. gas wells). Intensive use recreational facilities such as playgrounds, athletic fields and other broad areas of turf require significant resources for maintenance. These facilities can often be found at municipal parks and other areas. No new facilities of this type will be developed on State Forests.

Recreational Facility Construction Guidelines

Campsite, Privy & Lean-to Construction and Maintenance:

- Any technical specifications will be in compliance with the ADAAG
- Located away from streams, wetlands and unstable slopes whenever possible
- Located on flat, stable, well drained sites
- Constructed during periods of limited rainfall whenever possible

Fishing Pier Construction:

- Any technical specifications will be in compliance with ADAAG, including edge protection, accessible railings, clear floor space and access route from parking lot
- Bureau of Fisheries shall be consulted to ensure that the pier is placed in a location that is likely to provide a positive fishing experience
- If applicable, vertical slots should be placed at regular intervals in the pier railing to provide easy access to caught fish, particularly for seated anglers
- Location of fishing piers will comply with Article 15 and Article 24
- Approach will be on dry ground, where possible
- Unnecessary cut and fill will be minimized
- Location of pilings will be done to minimize disturbance to aquatic vegetation
- Access points will be located and stabilized to minimize shore erosion and sedimentation

Towers and Wind Turbines

The placement of new communications towers (for purposes other than DEC administrative use), wind turbines or other utilities should be avoided and for ecological purposes would be more appropriately placed on private lands which have already been fragmented. For example, there are vast areas of agricultural lands throughout the state whose owners would surely appreciate the income provided by leasing for windmills, and where agricultural use could carry on unimpeded by the presence of windmills. State Forests are not an appropriate setting for

industrial-scale wind farms that would require permanent clearing of land. State Forests are more appropriately used for providing unfragmented habitat blocks along with smaller-scale openings created for forest management activity or oil and gas production.

Wind turbines established on adjacent properties have the potential to impact their neighbors' lands. For this reason, many towns have established property boundary line setbacks to buffer neighbors. These same ordinances often provide options for the neighbor to waive this setback. It shall be DEC's policy not to grant waivers from setback provisions where these local ordinances apply, in recognition of the recreational and ecological importance of State Forests.

Utility Corridors

Much of the legislation authorizing acquisition of State Forest lands has specifically prohibited DEC from entering into any long term leases or selling any real property rights, including utility rights of ways. This demonstrates the intent to minimize development or fragmentation of these lands. There are currently some power lines in use across State Forest lands established prior to state acquisition or, in a limited number of cases, established without DEC approval or proper authority while the land was in state ownership. It is not reasonable to require the immediate removal of utilities previously established without proper authority, especially when the majority were established decades ago. However, it is DEC's intent to address these utilities on a case-by-case basis to secure proper compensation for the state and/or establish a legal basis for their continued use. Generally speaking, DEC will resist the establishment of new utility ROWs to limit future fragmentation of the forest. An exception may be made for future oil and gas exploration and development which has been specifically authorized by the NYS Legislature.

"INF" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Infrastructure (INF) Objective I –Basic infrastructure will be provided and maintained, including public forest access roads, access trails, haul roads, and parking areas, and associated appurtenances.

INF Action 1 - Update *Unpaved Forest Road Handbook* to include the application of new technology. Complete update by 2015.

INF Action 2 – Develop a standard process for assessing State Forest infrastructure to assign maintenance schedule priorities and budgets.

INF Action 3 – Increase the amount of money to DEC Operations for the upgrade and maintenance of roads and trails.

INF Objective II – Opportunities for infrastructure upgrades, replacement or relocation out of riparian areas will be identified at the unit level.

INF Objective III – Issues of uncertain legal status or jurisdiction along roads will be resolved via UMP development to decrease the number of future encroachments and lawsuits.

INF Action 4 - Complete surveys of all roads and create maps showing the legal status of all access roads as issues are raised during UMP development.

INF Action 5 – Enlist the aid of Real Property and/or Legal Affairs to resolve uncertain status of existing encroachments, rights of way, etc.

INF Objective IV – Prevent over-development of State Forests at a unit level by ensuring the sustainability of trail systems and avoiding the installation of facilities with running water.

INF SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has been selected as the **preferred alternative**. State Forests will continue to be managed to provide rustic recreational opportunities with a limited amount of supporting infrastructure. In most cases, new infrastructure development will be undertaken to concentrate use and mitigate impacts that would otherwise occur on an undeveloped surface. Most projects involving development of new infrastructure will be addressed in a UMP, or a similar formal public process.

The alternative of not developing new infrastructure has not been chosen, considering public demands, increased public use and the need to mitigate related impacts.

The alternative of building highly developed recreational areas for intensive use has not been selected. This would create a long term change in the nature of land use on State Forests and displace traditional recreational and forest-resource related uses.

SEQR Analysis Threshold: Compliance with the guidelines and strategies of this section will avoid and minimize potential impacts resulting from infrastructure development. Any development of facilities with potable water supplies, septic system supported restrooms, camping areas with more than 10 sites or development in excess of other limits established in this plan will require additional SEQR analysis.

CHAPTER 5

PUBLIC/PERMITTED USE

UNIVERSAL ACCESS

Forest-based outdoor activities in both active and passive forms are widely enjoyed by people of all ages and abilities. Time in the woods is increasingly important as much of society has turned indoors for entertainment. Nature provides opportunities for exercise and physical well-being, meeting unique challenges, learning new skills and gaining healthy perspectives on modern life. A day on the water or an evening around the campfire brings family and friends together to make personal discoveries and connections with each other. Disability awareness and consideration of diverse needs will lead to greater inclusion in these valuable recreational opportunities.

One in five Americans has a disability. Persons with disabilities comprise 19% of the total national population, constituting the largest minority group in the United States.

Like any minority group, there is great diversity and individuality within the whole. Upholding broad universal access standards enables people of all abilities to satisfy their need for nature and recreation.

DEC staff play an essential role in providing universal access to recreational activities that are often rustic and challenging by nature, and ensuring that facilities are not only safe, attractive and sustainable but also compatible with resources. Fortunately, there are existing accessibility guidelines for the built environment (buildings, bridges, roads and trails), and draft federal accessibility guidelines for outdoor developed areas that recognize this delicate balance and help us to incorporate physical accessibility into the natural environment. Beyond these guidelines, the principles of "universal design" aid in effective planning and design of future facilities from the ground up with consideration of ease-of-use for everyone from children to elders, including people with disabilities.

One in five Americans has a disability as it is defined in the Americans with Disabilities Act (ADA). Every person can face some level of difficulty or impairment at some point in their lives. Since the passage of the ADA in 1990, a growing record of legal decisions has provided guidance as to what constitutes disability and how best to provide accommodation. The best policy is not to make assumptions about any particular user's ability, but to make programs and facilities accessible to the largest population possible.

With steps and a ramp, this horse mounting platform at the Otter Creek Trail System in Lewis County provides for many diverse users including children

PUBLIC/PERMITTED USE

UNIVERSAL ACCESS

Universal access incorporates multiple layers of inclusion:

Physical Inclusion
site/facility scale

Universal Design
Non-segregated activity
Access route connections
Accessibility Guidelines

- Clear floor space
- Surfacing
- Changes in level
- Turning space
- Protruding object range
- Reach ranges
- Operable parts
- Signage

Administrative Inclusion

People-first language
Inclusive outreach
Disability awareness
Availability of large-print
Sign language interpreter
Accessible public meetings

Programmatic Inclusion
regional/statewide scale

Access across DEC programs

- Fishing
- Hunting and Trapping
- Birdwatching
- Camping
- Trails, etc.

Focus on abilities

MANAGEMENT REQUIREMENTS

This campsite at Brasher State Forest in St. Lawrence County features a hardened natural surface that meets or exceeds width requirements, a universal picnic table with extended tabletop, a fire ring with raised base and thin walls, a tent pad, and connection to an accessible path (not shown).

The 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 that prohibits discrimination against people with disabilities in employment practices, in the use of public transportation, telecommunication facilities, and 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, such modification would create an undue financial or administrative burden on the Department. Since recreation is an acknowledged public accommodation and program of the Department, and because there are services and activities associated with that program, the Department is obligated 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. This 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) and/or the New York State Uniform Fire Prevention and Building Codes, as appropriate.

Inventory and Assessment

The level of existing access will be monitored at the regional and statewide level by DEC staff including the statewide Universal Access Coordinator and Regional Access Coordinators. UMPs will also be reviewed to ensure access in appropriate areas across programs and geographic areas.

Currently adopted ADAAG establishes guidelines for buildings, like this privy facility on Basswood Pond State Forest in Otsego County

The inventory and assessment of recreational facilities takes place through the development of UMPs. The need for new or upgraded facilities will also be addressed within each UMP. The Department is not required to make each of its existing facilities and assets accessible. This plan includes guidelines for the inventory and assessment of all the recreational facilities that support the programs and services available within a particular unit.

Existing Guidelines

The ADA requires public agencies to employ specific guidelines to ensure that buildings, facilities, programs, and vehicles are accessible to people with disabilities. The Access Board, a federal government agency, has issued the ADAAG for this purpose. The Department of Justice Rule provides authority for these guidelines.

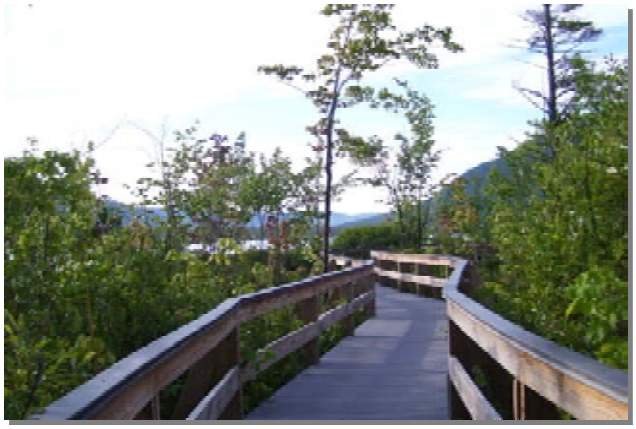
Currently adopted ADAAG address the built environment: buildings, ramps, sidewalks, and rooms within buildings. Boating and fishing facilities are addressed under the ADA/ABA amendments of 2004. The Access Board has proposed guidelines to expand the ABA to cover outdoor developed facilities: trails, campgrounds, picnic areas, and beaches on Federal lands. The proposed guidelines are contained in the October 19, 2009 Draft Final Accessibility Guidelines for Outdoor Developed Areas.

PUBLIC/PERMITTED USE

UNIVERSAL ACCESS

ADAAG apply to newly constructed structures and facilities and alterations to existing structures and facilities. Further, the guidelines apply to fixed structures or facilities, i.e., those that are attached to the earth or attached to another structure that is attached to the earth.

When the Department is planning the construction of new recreational facilities or assets that support them, or the alteration of existing recreational facilities or assets that support them, it must consider providing access to the facilities or elements for people with disabilities. The standards which exist in ADAAG and the ADA/ABA or are contained in the proposed federal guidelines, also provide guidance to achieve modifications to trails, picnic areas, campgrounds (or campsites), and beaches in order to obtain programmatic compliance with the ADA.



Labrador Hollow Unique Area in Onondaga County

Universal Design

Taking ADAAG one step further, the Department can now apply the Principles of Universal Design. Universal design makes products and environments usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. The intent is to do so from the beginning of a project at little or no extra cost. Universal design benefits people of all ages and abilities (Mace 2008).

Principles of Universal Design

Equitable Use - The design is useful to people with diverse abilities.

Flexibility in Use - The design accommodates a wide range of individual preferences & abilities.

Simple and Intuitive Use - Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.

Perceptible Information - The design communicates information effectively to the user, regardless of the conditions or the user's sensory abilities.

Tolerance for Error - The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Low Physical Effort - The design can be used efficiently and comfortably with minimal fatigue.

Size and Space for Approach and Use - Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.

Application of the Americans with Disabilities Act Accessibility Guidelines (ADAAG)

Current ADAAG, the ADA/ABA and proposed guidelines for outdoor developed areas will be used in assessing existing facilities to determine accessibility compliance. Management recommendations in UMPs will be proposed in accordance with the ADAAG and ADA/ABA for the built environment, the draft guidelines for outdoor developed areas, the principles of Universal Design, the New York State Uniform Fire Prevention and Building Codes, and other appropriate guiding documents. Until such time as the proposed guidelines for federal lands apply to state governments, the Department is required to use the best information available to comply with ADA. This information includes, among other things, the proposed guidelines.

ADDITIONAL RESOURCES

DEC Accessible Recreation – Information on DEC's Universal Access Program and a listing of accessible recreation destinations, including facilities on State Forests can be found at www.dec.ny.gov/outdoor/34035.html

Final and Draft ADAAG can be found at www.access-board.gov

Principles of Universal Design can be found at www.design.ncsu.edu/cud/about_ud/udprinciples.htm

MOTORIZED ACCESS PROGRAM FOR PEOPLE WITH DISABILITIES

The Department's Motorized Access Program for People with Disabilities (MAPPWD) permits qualifying people with disabilities to use motor vehicles along specific routes for access to programs, such as hunting and fishing, on state lands. These routes are provided to facilitate access to these traditional programs and not for the support of ORV or ATV riding activities. This program provides access to significant recreational opportunities throughout the state and is one more way that New York is opening the outdoors to people with disabilities. This permit program is maintained pursuant to DEC Commissioner's Policy 3 (CP-3).

ADDITIONAL RESOURCES

MAPPWD Permit Application and Instructions – www.dec.ny.gov/outdoor/34035.html

DEC Commissioner's Policy 3 – www.dec.ny.gov/regulations/64558.html

MAPPWD permits may be obtained from Regional DEC Foresters through regional DEC offices. The permit provides access for those who seek solitude, connection to nature, undisturbed wildlife habitat, and inclusion with fellow sportspeople. Permit holders can use specified vehicles to travel beyond the reach of public roads, to areas where others must hike or bike.

A listing of MAPPWD routes is at www.dec.ny.gov/docs/lands_forests_pdf/mappwdroutes.pdf and is distributed to permit holders. MAPPWD routes and the types of vehicles allowed on the

routes are carefully selected to protect natural areas and recreational activities. Access is restricted to designated routes only. All routes are subject to closure due to seasonal conditions or maintenance.

In the development of UMPs, existing and potential MAPPWD routes will be assessed along with other recreational facilities and assets. Routes will be evaluated for the degree to which they provide inclusion and access to DEC programs and recreational opportunities. Motorized access will be considered only where non-motorized access such as a foot trail that is improved to meet proposed accessibility guidelines is not feasible due to terrain or other considerations. MAPPWD routes are carefully located in areas which are able to support this use. It has been DECs experience that these designated routes receive low levels of use and a low impact nature of use. As a result, the use has been sustainable and has not created unacceptable adverse impacts with the exception of trails which have also experienced illegal ATV and OHV use. DEC will continue to monitor MAPPWD routes to prevent overuse or abuse and unacceptable impacts.

IMPACTS OF PROVIDING UNIVERSAL ACCESS

Providing Universal Access in many cases, does not create any additional environmental impacts, such as when accessible picnic tables and fire rings are provided in place of traditional features. In some cases, the hardening of trails and parking lots reduces impacts related to potential erosion, creating a positive benefit. There are however, some instances, such as trail widening and lengthening to reduce running slope, that may require the removal of vegetation, use of heavy equipment and visual impacts in excess of that associated with traditional trail construction. Indirect impacts may include higher levels of illegal off road vehicle use due to “inviting” conditions. Increased construction and maintenance costs can in some situations be related to providing access, especially where natural drainage of surface water must be accommodated. These potential negative impacts are addressed through application of creative designs, vehicle barriers, and proper trail layout to avoid unnecessary construction-related development.

Universal access will only be provided where it will not fundamentally alter the character or recreational programs of an area. The goal is to maximize accessibility while protecting the natural setting to the greatest extent possible, thereby preserving the fundamental experience for all. A minimum tool approach will be used to implement this vision, resulting in projects that blend into the natural environment and protect the landscape.

"UA" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Universal Access (UA) Objective I – Apply a minimum tool approach to provide a recreational program that is universally accessible.

UA Action 1 – Consider opportunities to enhance universal access to State Forest recreational programs and facilities in all UMPs.

UA Action 2 – Update operations staff universal design guidebook to reflect the most current guidelines by 2012.

UA Action 3 – Develop DEC universal access policy by 2016.

UA SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has been selected as the **preferred alternative**. State Forests will continue to be managed to provide accessible recreational opportunities, following the most current available guidelines, considering inclusive access to all programs, and application of a universal design approach to new construction, as described above.

No other alternatives have been considered as DEC is dedicated to providing access for recreationists of all abilities.

SEQR Analysis Threshold: Compliance with the guidelines and strategies of this section will avoid and minimize potential impacts associated with the need to provide universal access and no further SEQR analysis is required.

FORMAL AND INFORMAL PARTNERSHIPS AND AGREEMENTS

Conservation and stewardship partnerships are increasingly important, especially for public land management agencies. Considering the fact that resources will always be limited, collaboration across political, social, organizational and professional boundaries is necessary for long-term success and sustainability. Encouraging the development of cooperative and collaborative relationships is and can be done through DEC's Adopt-A- Natural Resource Program and the development of UMPs. Successful collaborative efforts build on common ground established by a sense of place or community; mutual goals or fears or a shared vision. Collaborative efforts recognize that partnerships are made up of people and not institutions and mobilize support and resources from numerous sources. In their book Making Collaboration Work - Lessons from Innovation in Natural Resource Management, authors Julia Wondolleck and Steven Yaffee address the question of "why collaborate?" (Wondolleck and Yaffee 2000). Their answer: "collaboration can lead to better decisions that are more likely to be implemented and, at the same time, better prepare agencies and communities for future challenges."

State Forests are owned by the people of the state and entrusted to DEC for sustainable management. DEC will in turn, encourage public involvement and citizen participation in management of the land. Public comment is encouraged throughout the management planning process. In addition, user groups, such as equestrian or mountain bike clubs, can support Department regulations, help plan for appropriate use, and assist in maintenance of trails and other facilities. This ensures that, with Department oversight, State Forests will meet the needs of people most actively engaged in use of the land. Shared benefits are also realized by cooperating with college based researchers and Native American Nations.

ADOPT-A-NATURAL RESOURCE AGREEMENTS

Historically, State Forests have provided open space for outdoor recreational activities that require minimal facilities. The intensity of recreational use was once low, with few environmental impacts or user conflicts. During the 1990s, demand for recreational trails increased substantially (NYS DEC 2001).

To help meet the increasing demand for recreation, DEC increasingly depends on partnerships with recreation groups to help maintain, enhance, and construct recreational assets. Partnerships between

recreation groups and DEC are formalized through the Department's Adopt a Natural Resource (AANR) Program. The program is authorized by Section 9-0113 of the Environmental Conservation Law. The statute authorizes DEC to enter into stewardship agreements for activities it approves for the preservation, maintenance, or enhancement of state-owned natural resources. These agreements are generally written for a three to five year term.

ADDITIONAL RESOURCES

DEC's AANR Policy – www.dec.ny.gov/regulations/2568.html

Volunteerism is the cornerstone of the AANR program. It is a means for completing work that helps preserve, maintain and enhance natural resources at minimum cost to the state. Individuals and groups interested in providing volunteer services are afforded a formal opportunity to propose activities that meet management needs of state-owned natural resources. Such activities may involve remediating vandalism, establishing or maintaining access or nature trails, building camping sites, providing interpretive services for school groups and other citizens, managing fish and wildlife habitats, and otherwise providing positive benefits to the natural resource.

The AANR program has been very successful in parts of the state. Since the inception of the program, volunteers have built lean-tos, cleared miles of trails from ice storm damage, built miles of new trail, groomed snowmobile trails, and have removed refuse. There are currently 113 active AANRs on State Forests facilitating countless hours of volunteer assistance. These volunteer construction and maintenance activities add significant value to the State Forest system and the people it serves.

The Department's AANR partners are strongly committed to enhancing and protecting natural resources. Not surprisingly, these AANR partners have developed a strong sense of ownership and are very interested (and often involved) in the planning and natural resource management activities that take place on the State Forests in their area.

It is important that recreational development initiated by AANR partners is not allowed to incrementally increase to an unsustainable level. DEC must consider the impact from increased use on other management goals or other recreational uses. Even though a volunteer organization may offer the needed materials and labor to develop a new facility, DEC must consider the full range of impacts, including long-term maintenance and the balancing of multiple uses. In most cases, this can only be accomplished within the UMP process.

TEMPORARY REVOCABLE PERMITS

Any group organizing research activity or a competitive or group event must apply for a Temporary Revocable Permit (TRP) from the Department. Historically, TRPs have been issued for lean-to construction, cross country races, forest insect research, wildlife research, town road maintenance and utility line right-of-way work among many other purposes.

TRPs allow foresters to carefully review and oversee the variety of special events and proposed activities that sometimes occur on State Forests. Through the TRP review process, DEC avoids conflicting uses of state land and situations that could threaten health, public safety or integrity of natural resources. The permits also enable corrective actions by neighboring parties, which would otherwise be prohibited by regulation, such as the cutting of hazard trees that pose a threat to adjoining properties.

ADDITIONAL RESOURCES

DEC's TRP Policy – www.dec.ny.gov/regulations/51387.html

In general, TRPs are required for any activity that exceeds normal permissible levels of usage or access. TRP authorization does not provide exemption to any existing state laws and regulations. There is a $25 administrative fee for this permit. To hold any event, a sponsoring organization must request permission in writing at least 30 days in advance of the date of the proposed activity. The TRP applicant or sponsoring organization must provide proof of liability insurance. TRPs are authorized by DEC policy.

NATIVE AMERICAN INVOLVEMENT

Public lands are a vital resource that is used by Native American peoples. Much of their activity is quiet and unnoticed, but none the less very important. Access to DEC State Forests, which often are one of the few natural green spaces available, serves their needs from both a utilitarian and a spiritual sense.

DEC manages forests that contain a wide variety of habitat. This variety supports an array of plant life, of which many species, both common and scarce, serve Native American healers as medicine. Tribal members also hunt, trap and fish on state lands. Quiet, rugged, remote locations on State Forest lands serve some of the spiritual needs of tribal members.

Excellent partnerships can be formed with local tribes. For example, in Region 6, DEC forestry staff have had a long-standing AANR with the St. Regis Mohawk Tribe dealing with a species of special cultural concern to the tribe, the black ash tree. Black ash is the species of choice for Northeast Native Americans for producing splint basketry because of its special qualities. Families and communities are literally woven together, and traditions are passed on through storytelling and interaction while log gathering, log pounding, splint cleaning and basket making. State Forests contain the vital black ash resource, and cooperative efforts have been taken with the tribe to improve, propagate and utilize the black ash on state lands.

Such special uses of state lands may be accommodated via either a Temporary Revocable Permit or AANR agreement. In the process of developing a State Forest UMP, effort should be taken to contact and work with any Indian Nations within or near the acreage covered in the

UMP. Nations will be notified of and invited to participate in all "initial scoping" and "draft review" public meetings.

ADDITIONAL RESOURCES

DEC Commissioner's Policy CP-42 – Contact, Cooperation & Consultation with Indian Nations
www.dec.ny.gov/regulations/64558.html

The Seneca Nation of Indians was also very cooperative when emerald ash borer was discovered near Randolph, assisting in setting traps, participating in strategy discussions and expressing openness to any other suggestions as to how they could assist in the detection and eradication efforts.

EDUCATION AND RESEARCH

Educational activity on State Forests falls into three categories.

- Static interpretive materials (kiosks, signs, walking tours, etc.) *(Refer to Visual Resources, page 132 and Infrastructure, page 162)*
- Public outreach to the community *(Refer to Supporting Local Communities, page 243)*
- Scientific research conducted on State Forest lands

Research activity will be supported on State Forest lands by accommodating researchers and educators where possible and appropriate. Research activity will be conducted via a DEC-issued Temporary Revocable Permit. Often, the resources that draw researchers have unique ecological value or rare historic value. Foresters must ensure that rare and unique resources are not impacted by repeated research activity.

"PRT" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Partnership (PRT) Objective I – DEC will collaborate with local organizations and governments to accomplish mutual goals.

PRT Action 1 – Complete an update to DEC's TRP policy by 2011.

PRT Action 2 – Propose a centralized AANR management program to encourage and facilitate the assistance of recreational user groups, to be designed and proposed for regional review by 2013.

PRT Objective II – Consider the full range of impacts from AANRs and recurring TRPs, including long-term maintenance and the balancing of multiple uses in all UMPs.

PRT SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has been selected as the **preferred alternative**. State Forests will continue to be managed utilizing AANR agreements and TRPs to formally partner with stakeholder groups and accommodate certain uses of State Forests, as described above.

SEQR Analysis Threshold: Compliance with the guidelines and strategies of this section related to the use of partnerships will avoid and minimize potential impacts resulting from organized events, use by partnership groups and other uses of State Forests, requiring no additional SEQR analysis. SEQR thresholds for specific projects by volunteers have been established in the recreation and infrastructure sections of this plan.

RECREATION

The demand for recreational use of State Forests has greatly increased in recent years. Recreational planning is now a major component of State Forest UMPs and includes diverse pursuits such as snowmobiling, horseback riding, hunting, trapping, fishing, picnicking, cross-country skiing, snowshoeing, bird watching, geocaching, mountain biking and hiking. The archer, dog sledder, rock climber and orienteering enthusiast also enjoy their sport on State Forests. Outdoor recreation opportunities are an important factor in quality of life. We often learn to appreciate and understand nature by participating in these activities. However, repeated use of the land for recreational purposes can have significant impacts.

Sandy Pond Beach Unique Area, on the eastern shore of Lake Ontario in Oswego County can only be reached by boat. It provides a great spot for recreation and, importantly, rare dune grass habitat

ADDITIONAL RESOURCES

Outdoor Recreation – DEC's website contains pages for some of the more popular outdoor activities and recreational information. These pages are linked at www.dec.ny.gov/62.html.

Environmental Conservation Law (ECL), Article 1 requires the Department first and foremost to protect New York's environmental resources. This requires planning, monitoring and management of recreational use in order to prevent and mitigate impacts to the environment. Responsible management also reduces the potential for conflicts between multiple uses. Even the lowest impact uses, such as hiking or canoeing, can leave an impression on the land. But with proper management, tomorrow's users will have the same quality experience as today's users and the environmental quality of State Forests will be undiminished for future generations of New Yorkers.

HISTORICAL BACKGROUND

The recreational use of state forests has gradually evolved as society's interest in outdoor recreation has grown. In the early years of the state forests, from the 1930's through the 1960's, there was little interest in outdoor recreation on state forests other than the traditional activities of hunting, fishing and trapping. During the late 1960's and into the 1970's, the interest in outdoor recreation bloomed in America. It was during this period of time that the

first recreational trails became established on State Forests. Trails were often located on historic access routes such as abandoned roads, old farm lanes and cow paths without full awareness or proper planning used to determine the best locations.

Rafting in the Zoar Valley Multiple Use Area, Erie County

As interest in outdoor recreation continued to grow through the 1980's and 1990's, DEC sought to accommodate new recreational demands, compatible with state forests, by improving or developing recreational trails or facilities. Many trails and facilities were developed by authorized volunteer groups without oversight and planning or were developed to meet short term goals, accommodating light use or a single use only. Such facilities have not held up under the stress of increased, multiple use. Now, as demand continues to grow, and with limited staff and financial resources to address recreation concerns, DEC needs to make coordinated management decisions across the landscape to ensure that adequate recreational opportunities, compatible with State Forests, are available while also protecting the environment from recreational impacts and minimizing conflicts between competing recreational user groups.

Mitigation of Environmental Impacts from Recreational Use

In order to minimize impacts related to recreational use, DEC relies on a combination of management planning, along with public education, enforcement of regulations and permit issuance. If public education and enforcement of general regulations are not sufficient to protect resources in a particular area, property-specific regulations may be developed.

Management Planning

The public process of unit management planning is critical to minimizing recreational impacts. This process provides the opportunity for DEC to hear the needs and desires of the people who use the land and to balance these needs in an appropriate manner in a public forum. At the same time, user groups are provided the opportunity to discuss the conflicts between their chosen recreation, and find compromise solutions. Also, greater public awareness of the many demands on the land can lead to more responsible use. Finally, interaction through the management planning process helps to support and engage Adopt a Natural Resource (AANR) partner groups that value the State Forest resource.

Trails may need to be closed entirely or restricted to specific uses when environmental impacts or user conflicts reach unacceptable levels. Management planning must involve the assessment of trail conditions and user compatibility, and setting site-specific parameters under which trails will be closed.

Public Education

DEC's preferred method of mitigating recreational impacts is through a comprehensive public education process. This process includes use of DEC's public website along with on-site signage, brochures and seasonal stewardship employees who can serve to educate the public in the use of State Forests with a minimal impact, and the rules for the use of State Forests.

Enforcement of Regulations

The New York State Environmental Conservation Law establishes broad provisions for protection of the environment. To provide further clarity, DEC has worked with the people of the state to develop rules and regulations that apply specifically to State Forests (ECL Article Section 190.0 -190.10). The development and enforcement of rules and regulations enhance public safety and protect environmental resources. DEC Forest Rangers have the direct responsibility to enforce all laws and regulations on State Forests. This necessitates regular patrols, especially in areas prone to greater use.

ADDITIONAL RESOURCES

Use of State Lands Regulations (ECL Article Section 190.0 -190.10) – available at: www.dec.ny.gov/regs/4081.html

The following activities are prohibited on State Forests:

General Prohibited Activities

- Operating a motorized vehicle on State Forests – except on roads posted and designated as open
- Polluting or disposing of litter, refuse, or waste material on State Forests or in any water resources on State Forests
- Operating a motorized vehicle at a speed in excess of 25 miles per hour on any road under DEC jurisdiction through State Forests
- Use or possession of paint ball guns
- Use or possession of breakable targets, including but not limited to clay pigeons and glass containers
- Gambling
- Intentionally obstructing public vehicular or pedestrian traffic
- Posting notices or signs
- Selling alcoholic beverages
- Obstructing public safety officers or DEC employees from performing their legal duties

- Establishing permanent structures, including tree stands or blinds, except under certain conditions.
- Leaving personal property unattended on State Forests, with the exception of a:
  1. Geocache that is labeled with the owner's name and address and installed in a manner that does not disturb the natural conditions of the site or injure a tree;
  2. Camping structure or equipment that is placed and used legally pursuant to camping regulations, provided that equipment is not left unattended for over 48 hours;
  3. Trap or appurtenance that is legally placed and used during an open trapping season;
  4. Tree stand or hunting blind that does not injure a tree, is properly marked or tagged with the owner's name and address or valid hunting or fishing license number, and is placed and used during big game season, migratory game bird season, or turkey season;
  5. Wildlife viewing blind or stand that is placed for a duration not to exceed 30 days in one location per calendar year, does not injure a tree, and is properly marked or tagged with the owner's name and address or valid hunting or fishing license number.

Additional prohibitions necessary for public safety and mitigations developed for natural resource protection are provided under each recreational activity discussed below.

Issuance of Permits for Special Events, Group Events and Planned Activities

Special events, group events and planned activities are regularly accommodated on State Forests through the issuance of a Temporary Revocable Permit (TRP). These events include snowmobile, bicycle, horse and orienteering races and events, runs, rides or competitions (eg. biathlons and triathlons), archery and fishing tournaments, along with re-enactments, encampments and sponsored hikes.

See page 182 for a description of DEC policy regarding TRPs.

USE OF ROADS

DEC roads provide access within state forests. These roads vary in construction standards and allowed uses. Public highways owned or maintained by municipalities (state, county and townships) also provide access to the forests and, in some cases, continue through the forests.

Motor vehicle use is allowed on state forests only on roads that are signed for such use. Some roads may be closed or restricted to motor vehicle travel at certain times of the year, such as in the winter to restrict motor vehicle access because these roads are not plowed. Other roads

may be temporarily closed during summer months due to timber harvesting. Road closures are often related to safety and access issues.

Motor vehicle use is not considered to be a recreational program of DEC, but rather a means of access for recreation and other uses. Therefore, facilities are not developed in order to meet a demand solely for motorized use. The existing road system has provided adequate access to most state forests. In recent years, new roads are occasionally built to access remote sections of forest land. DEC also recognizes the negative impacts associated with new roads such as fragmentation as discussed in the Infrastructure section of this plan.

Information on road construction, road types, and construction impacts is found in the Infrastructure section of this plan. *(Refer to page 157)*

All roads and trails are closed to use by ATVs, unless they are otherwise designated and signed. *(Refer to page 213)*

Impacts and Mitigations (related to use of roads) – Along with public access by road, there are problems of abuse: littering, dumping of trash, illegal vehicle use. Trash pickup costs thousands of dollars in collection costs and tipping fees. Gatherings for parties usually results in littering, improper fires, and vandalism. Illegal motor vehicle use on closed roads and trails can create serious erosion problems which are very expensive to repair. There are safety problems, legal constraints and user conflicts pertaining to discharge of firearms and bows from roads. Containing the size of road systems, responding to elevated use, preventive public education and law enforcement efforts are critical to mitigating these impacts.

WILDLIFE-RELATED RECREATION

State Forest lands are open to wildlife viewing and with few exceptions, are open to public hunting, fishing and trapping with appropriate licenses. More than 2,000,000 person-days of hunting take place on State Forests annually, and approximately 570,000 person-days of freshwater fishing are estimated for the lakes, ponds and streams located on State Forests (OPRHP 2008). Hunting, trapping and fishing licenses are sold at many town offices, numerous retailers of outdoor equipment – where

Habitat/Access Stamp Program
This program provides funds for projects like building boat launches and fishing platforms for public access and planting native vegetation for improved habitat.
www.dec.ny.gov/permits/329.html

regulation booklets can also be obtained, and via the phone or internet. For more information regarding hunting and fishing seasons, hunting regulations, places to hunt in New York, and trapping or fishing on state lands, please see DEC's Outdoor Recreation web page or contact the appropriate DEC Regional Office.

Hunting

This accessible hunting blind enables broader participation in hunting

Big game hunters often visit State Forests, seeking white-tailed deer and black bear in the fall, while small game enthusiasts hunt for ducks, ruffed grouse, wild turkey, and other small game like the snowshoe hare. Legal hunting is allowed on most State Forests but is restricted or prohibited where there are special hunting regulations such as in intensive use areas and some Unique Areas. Posting of private lands has limited hunting opportunities and increased hunting pressure on public lands open to hunting. However, the demand for hunting, as measured by license sales, has declined in eight of the past ten years. The declining participation in hunting appears to be greater among those from urban or suburban communities than from rural areas. This trend is predicted to continue.

Hunting has long been associated with state forests. Hunting (especially big game hunting for deer) has a very positive effect on hardwood forest management and vegetative biodiversity. Deer are browsers and eat hardwood vegetation, especially young trees. When populations become large, it is possible for the deer to over-browse the forest. Over-browsing can prevent the growth of new trees and reduce species diversity in the forest. *This issue is addressed in detail on page 289 in the Deer Management section of this plan.*

Impacts and Mitigations – Improper camping, illegal off-road vehicle use, litter, indiscriminate shooting of trees and illegal taking of wildlife are environmental impacts associated with hunting. In New York State, all hunters must take and pass an education course to obtain a license. This course teaches safety, ethics, wildlife management and biology. Legal hunting is a compatible activity on state forests

ADDITIONAL RESOURCES

Hunting – www.dec.ny.gov/outdoor/hunting.html

Regulations – www.dec.ny.gov/regs/2494.html

Multiple Use Conflicts – Hunters have noted problems when encountering people with pets. Pets may be unleashed and may chase or harass wildlife. Some pet owners afield during hunting seasons feel that hunters are a danger to themselves and their pets. Hunters have also noted

damage to state forests by motorized vehicles and horses. Other hunters have expressed the desire to use motor vehicles to travel into the forest and remove harvested game. Users of foot trails, campers, horseback riders, cross country skiers, mountain bikers, nature observers, and owners of unleashed pets feel their safety is threatened during hunting seasons. Most non-hunters are aware of the arrival of hunting season and have learned to limit their use of State Forests on weekends during big game gun hunting season.

Trapping

Trapping is the placing, setting, staking or checking of traps for the taking, killing or capturing of wildlife or assisting another person with these activities. Trapping does not require trails on state forests and usually occurs near streams and in wet areas away from trails. Furbearers such as beaver, fisher and river otter are sought by trappers (U.S. Fish and Wildlife Service 2006). Raccoon, fox, skunk, muskrat and mink are also trapped on State Forests.

ADDITIONAL RESOURCES

Trapping –www.dec.ny.gov/outdoor/355.html

Regulations – www.dec.ny.gov/outdoor/9209.html

Trapping has been a traditional and effective method of controlling animals such as beaver. The prohibition of trapping would allow an uncontrolled buildup of the beaver population which has proven to back up water, causing damage to manmade structures and woodland. Trapping is pursued by a relatively small number of sportsmen. In 1997-98, approximately 9,000 trapping licenses were sold throughout the state. The demand for trapping is expected to remain steady, although it may fluctuate with changing fashion trends and fur markets.

Impacts and Mitigations – Off-road vehicle use and illegal taking of wildlife are environmental impacts associated with trapping. Trapping is regulated by Article 11 of the Environmental Conservation Law of New York State. Trapping seasons are set by DEC. In New York State, all trappers must take and pass an education course to obtain a license. This course teaches safety, ethics, wildlife management and biology. At this time, legal trapping is a compatible and suitable activity on state forests.

Fishing

The many waters on State Forests support thriving communities of sportfish. The common warmwater sportfish include smallmouth and largemouth bass – the most frequently sought after fish in the state, as well as chain pickerel, northern pike, walleye, bluegill, pumpkinseed, rock bass, black crappie and brown bullhead. In waters that maintain suitable temperatures for coldwater fish (maximum temperatures do not exceed 70 degrees F for

extended periods), common coldwater sportfish include rainbow, brown and lake trout. These coldwater lakes, ponds and streams may be stocked with brook, brown or rainbow trout to supplement existing trout populations, or to provide a trout fishery where trout are incapable of maintaining themselves. Larger, deeper waters may also be stocked with lake trout.

ADDITIONAL RESOURCES

Fishing – www.dec.ny.gov/outdoor/fishing.html

Regulations – www.dec.ny.gov/outdoor/7917.html

Fishing has a long tradition on State Forests. Although angler surveys have shown a decline in the number of anglers in New York over the past two decades, public input to DEC indicates that fishing is still very important to State Forest users.

Brook trout, New York's state fish, and a species identified as being of greatest conservation need in New York, is found in many of the small, coldwater streams found on State Forest land. It is essential that riparian habitat is protected and water quality is maintained in these waters. Brook trout can also be found in ponds, but are very intolerant of competition from other non-native fish species. DEC is working to restore and maintain brook trout in many ponds. The primary threats to these populations are non-native fish species, typically via bait bucket introductions. To address this, waters managed for brook trout are typically managed with regulations that prohibit the use of baitfish. Where possible, brook trout ponds are stocked with native "heritage" strains of brook trout.

New York is a member of the Eastern Brook Trout Joint Venture (EBTJV) which is comprised of a diverse group of partners, including state fish and wildlife agencies, federal resource agencies, academic institutions, and private sector conservation organizations. The EBTJV is working to conserve native brook trout and their habitats. The EBTJV has already produced a range-wide population assessment; completed extensive work that identifies key threats, and developed conservation strategies to protect, enhance, and restore brook trout and their habitats.

Impacts and Mitigations – Improper camping, off-road vehicle use, litter, and the illegal taking of fish are environmental impacts associated with fishing. Fishing is regulated by Article 11 of the Environmental Conservation Law of New York State. Fishing seasons in New York are set by DEC. Legal fishing is a compatible activity except where prohibited by regulation.

Viewing Natural Resources

This category includes activities such as birding, nature photography and wildlife observation. Between 1980 and 1995, the US Fish and Wildlife Service reported that all regions of the country experienced at least a

ADDITIONAL RESOURCES

Watchable Wildlife – www.dec.ny.gov/outdoor/55423.html

52% increase in nature viewing activities. The demand for birding, wildlife/nature observation and similar activities is predicted to continue to increase. State forests offer large, relatively undisturbed natural areas where people can enjoy nature viewing activities. Forestry activities on state forests have traditionally created, maintained and protected a wide variety of habitats required for a diversity of wildlife and plant species.

Impacts and Mitigations – Environmental impacts of viewing natural resources are minimal. The Environmental Conservation Law prohibits anyone from removing or destroying natural or cultural artifacts found on state land. The law also states that songbirds and their nests and other wildlife will not be molested or disturbed at any time, except during any open season on these animals. Viewing natural or cultural resources is compatible with state forests.

Multiple Use Conflicts – Activities that have been reported to conflict with natural resource viewing include off-road motorized vehicle use and hunting. Users generally desire a minimum of disturbance and tend to view state forests as places to escape from the daily noise of society and motor vehicles.

ADDITIONAL RESOURCES

Back-Country Camping – www.dec.ny.gov/outdoor/41282.html

Regulations – www.dec.ny.gov/regs/4081.html

CAMPING

State Forests provide abundant opportunities for camping of a rustic, undeveloped character. Most areas are open to dispersed, primitive, back-country camping while other areas may accommodate use only on designated campsites. Only a few, if any, amenities are offered for camping on State Forests. Where camping sites are designated, there may be nearby parking areas, mowed or cleared areas for camping, picnic tables, fire rings and latrines. Running water, heated facilities, and electricity are not available. There is no fee for camping on State Forests. However, a stay of longer than 3 days in one location or camping in groups larger than 10 persons requires a permit, obtained from the regional Forest Ranger listed at www.dec.ny.gov/ about/50303.html.

Dispersed, primitive back-country camping is an appropriate activity, except where specifically prohibited. Individuals may camp throughout State Forests provided they camp at least 150 feet from roads, marked trails, streams, ponds, lakes, and other water bodies. This dispersed camping spreads the impact over a large area and mitigates negative effects, since most sites rarely see repeated use. Camping near roads is often preferred by hunters during hunting seasons. Hunters frequently pull their trucks or campers off the road onto old log landings or

other cleared areas to camp over an extended stay while hunting nearby. This use is accommodated through the issuance of a temporary permit.

There are some areas where dispersed camping would cause unacceptable degradation of the area and sanitation issues. These are usually areas with a level of use that is higher than normal (eg. in scenic areas and near water bodies) or on sensitive sites, which deserve a higher level of protection. In these areas, camping has been restricted to designated sites only. These sites have been designed and built to withstand repeated occupancy and concentrated use, allowing the remainder of the area to stay in a more natural state. Camping at some designated sites on some State Forests may also require a permit. Permits are used to limit the amount of use where necessary to ease overcrowding, reduce user conflicts, and for resource protection.

Leanto on Sugar Hill State Forest in Schuyler County; most designated campsites on State Forests are undeveloped tent sites

Impacts and Mitigations – Environmental impacts of camping on designated sites may include soil compaction, litter, human waste, and unauthorized cutting of trees for use as firewood. Dispersed camping may cause water pollution from camping too close to water sources, degradation of trees around campsites, and disturbance to wildlife. Camping may also cause damage to rare species or cultural resources. The regulations for camping on State Forests and Unique Areas are listed in Title 6, Chapter II, Part 190 of the New York State Environmental Conservation Law.

Signage, in areas with a high level of use, is used to remind campers to practice campfire safety and follow rules, including requirements to carry-in-carry out and use dead and downed wood only. Camping sites may occasionally be designated "Reserved ♿"; such a site may only be used by a qualified person with a disability and that person's associated camping group.

Multiple Use Conflicts – Activities that may conflict with camping include off-road motorized vehicle use and hunting during hunting seasons. Conflicts may result from choosing inappropriate sites for camping, such as forest access road turnarounds or along private land boundaries.

WATER-BASED RECREATION

Swimming

Swimming is permitted on State Forests, unless specifically prohibited by sign or regulation. Lifeguard supervision is not provided on State Forests. Anyone swimming on State Forest shall be responsible for risks associated with their activity.

Impacts and Mitigations – Environmental impacts of swimming are greatest at those areas which receive heavy use. Impacts may include litter, damage to dunes, shoreline erosion, destruction of vegetation, and disturbance to riparian wildlife. Swimming may be prohibited in specific areas, for example, Unique Area properties where habitat requires protection.

Non-Motorized Boating, Canoeing & Kayaking

The bodies of water typically found on State Forests are well suited to non-motorized boating. In many cases, this is the only suitable form of boating on State Forests. Many of the ponds on state forests are man-made and were originally built for waterfowl nesting. Most ponds are spring fed, so there is usually not a great inflow of water except in the spring after snow melt. Because of their small size, these ponds would be greatly affected by pollution. The dikes of the ponds may be especially susceptible to erosion from wave action that would be created from motorized boating. These ponds are typically shallow and contain stumps from dead trees that can be a hazard to navigation of any boat.

Impacts and Mitigations – Environmental impacts of non-motorized boating are minimal. At present there are no regulations or statutes prohibiting the launching and use of human-powered craft on any of waters on State Forests.

Motorized Boating

Due to the size of most of the waters on state forests, few people use motorized watercraft on them. Certain State Forest properties provide access to waters adjacent to state lands, but which are not wholly within the boundaries of the State Forest. Use of boats on these waters may be regulated by DEC or other government agencies. Electric and gas-powered motors are permitted on water bodies unless otherwise posted against such use or where prohibited by regulation.

Impacts and Mitigations – Environmental impacts of motorized craft include noise, shoreline damage, and air and water pollution. Due to the unique characteristics of each pond or lake, use is generally regulated on a case by case basis during unit management plan preparation or by Environmental Conservation Law. The DEC can regulate activities only on those ponds where the DEC controls the entire shoreline. 6 NYCRR Part 190.8 (t) www.dec.ny.gov/regs/4081.html prohibits mechanically propelled watercraft on some small ponds and water bodies which are too fragile or shallow or contain submerged stumps. This section also places a 25 Horsepower limit on boats using Long Pond in Chenango County. In addition, regulations have been established for the use of boat launching sites within Part 190.24. Signage at boat launching sites is employed to remind boaters of rules prohibiting inappropriate use, leaving unattended

vehicles and boats, obstructing access, erecting structures, building fires, conducting business or mooring for over 24 hours.

Multiple Use Conflicts – Conflicts occur between motorized and non-motorized boating activities.

TRAIL-BASED RECREATION

Trail-based recreation occurs throughout State Forests on roads as well as on a variety of trails. Most roads and trails are open to multiple uses, creating demands and impacts on the land. The issues associated with trail use are best-addressed from an overarching perspective that considers these many uses and demands.

Trail Supporter Patch Program
This program helps maintain New York State's trails including those on State Forests.
www.dec.ny.gov/outdoor/36016.html

In the 1980's-90's, trails were often developed in response to local demand without proper planning or consideration of long-term consequences. Volunteers were authorized to locate and construct trails. This was done without adequate understanding of proper trail location, design and construction requirements. Trails were constructed to minimum standards that were intended to accommodate a low level of use. Years later, these trails are receiving a greater amount of use than originally was anticipated. Trails were also designed for single uses without regard for future multiple uses of the same trail. For example, portions of cross country ski trails were originally located on areas of poor soil drainage because they were intended to be used during frozen conditions. However, years later, as demand for trails increased, those same trails have become used by horse riders or mountain bikers. Poorly planned trails have become eroded, muddy paths resulting in unsafe and unpleasant conditions for trail users and unhealthy conditions for the environment. In the 1990's mountain biking became a significant activity on state forests resulting in increased use of trail systems on state forests. In some areas trail users have constructed their own trails without approval from DEC, often in unsuitable locations. In other areas, long distance trails established across state forests and private lands sometimes cause problems on the property of adjacent landowners or in nearby communities. These issues must be addressed to ensure healthy state forests with quality recreational opportunities in the future.

Adopt-A-Natural Resource Partnerships

The development and maintenance of recreational trails on State Forests can often be best accomplished through the AANR Program, in accordance with guidance in the Infrastructure section of this plan and with any applicable UMP. An AANR Agreement is required prior to construction, to further detail guidelines and responsibilities related to the trail. Trail locations proposed by AANR partners on State Forests must be approved by DEC personnel in advance of

construction. AANR stewards developing trails from private lands across State Forests must follow the prescribed procedure for addressing new trail proposals. DEC will assume no administrative or financial responsibility for trail segments outside of State Forests. Following construction, the sponsor must maintain the trail to DEC standards.

See page 182 for a description of DEC policy regarding AANR agreements.

Management Planning

Proper management of trail-based recreation is aided greatly by the unit management planning process (see "Mitigation of Environmental Impacts from Recreational Use" above).

Resolving Multiple Use Conflicts

Conflicts between different types of trail use will be minimized, and if necessary, use will be separated. Often, separating use occurs with the changing season (e.g. snowmobiling and mountain bicycling). If demand exists for a type of trail use in an area where it is appropriate but cannot be separated from other trail uses, the use will be allowed on existing trails where shared use will not lead to unacceptable conflicts between trail users or unacceptable physical impacts.

On shared-use trails, DEC will inform visitors about the types of trail uses allowed and will promote the principles of trail-sharing etiquette through trailhead signs and publications. Trail use will be monitored. Should monitoring reveal that the addition of a new type of trail use has caused unacceptable levels of conflict between trail users or unacceptable physical impacts to a trail, appropriate action will be taken to reduce such conflicts or impacts. Action may include elimination of a type of trail use from the trail, or closing the trail entirely.

Trail Condition Assessments

As staffing and funding are available, it would be helpful to develop a program for carrying out regular trail assessments on State Forests to identify maintenance needs and avoid overuse and erosion. Factors that would be evaluated are: suitability of trail use and location, condition of trail surface, and need for erosion control. Assessment forms could be used to track maintenance needs and costs, obtain budget review and approval, and assemble a request for the next year's regional work projects.

Foot Trail Use - Hiking, Snowshoeing and Trail Running

Hiking includes the use of foot trails for day hikes as well as long distance multi-day backpacking trips. Trail runners use foot trails for training or exercise. In winter, snowshoers

and cross country skiers also use foot trails, primarily for day use excursions. A variety of different types of foot trails can be found on state forests. These include long-distance linear trails, loop trails, destination trails and interpretive trails. There are 1,211 miles of combined road and trail available for hiking on State Forests.

Accessible Trails

Pedestrian trail access for people with disabilities is one category of trails that are needed on state forests. These trails do not only provide access for those with disabilities but they also are often preferred by others such as elderly or families with children and baby strollers. More foot trails and associated facilities, meeting ADAAG standards, must be developed to accommodate people with disabilities where possible and appropriate.

Interpretive Trails

More interpretive foot trails and loop trails are also needed on state forests. Currently, there are few interpretive foot trails on state forests. Additional trails with interpretive information are needed to provide opportunities throughout the state for the public to learn about and appreciate the unique features found on state forests. Additional foot trails are also needed to provide or improve access to some existing trails or facilities.

Impacts and Mitigations – Environmental impacts of hiking include trail compaction and erosion from poor trail design or overuse. Monitoring and trail closures can help to mitigate impacts. Otherwise, all areas of state forests are open to foot travel except for special restricted areas around NYS Department of Corrections facilities. Competitive events require a TRP from DEC.

Multiple Use Conflicts – Public input to DEC has indicated that people using foot trails prefer trails be restricted to pedestrian use only because they have a variety of conflicts with other recreationists, especially with motorized use, mountain bikers and horse riders. They are concerned that foot trails maintained by volunteers can be damaged from these other uses resulting in increased trail erosion and maintenance. These activities usually require wider trails and have more environmental impact on the foot trail than pedestrians do. The riding, driving or leading of horses is prohibited on foot trails on lands under the jurisdiction of the DEC, except where foot trails are part of a publicly maintained road, or are specifically designated to allow travel by horses. They have also expressed concern about hunting because they feel in danger using the trails during hunting season. Hunting is generally a safe activity with relatively short seasons, however, anyone afield during hunting season should wear some blaze orange clothing to increase their visibility to others and reduce their risk for injury. Anyone who seeks to use foot trails and not encounter hunters can obtain the dates of the hunting seasons to better plan their trip.

Long-Distance Foot Trails

Where appropriate, development of long-distance trails that cross UMP units and DEC regions will be encouraged. However, long-distance trails will not be located where anticipated levels of use on new or existing trails or increased access to adjacent areas will have unacceptable impacts on natural resources or the recreational experiences of visitors. Because most long-distance trails cross both public and private lands, the forester will coordinate with private landowners, the managers of other involved public lands and trail organizations in the development and management of long-distance trails.

Each long distance trail system has its own character, acceptable uses and in some cases even its own formal design standards. To the fullest extent possible accommodations will be made for these criteria on trail sections which pass through State Forests.

This section of the Finger Lakes Trail crosses the Cheningo Creek using large boulders in place of a traditional bridge. Taylor Valley State Forest, Cortland County

The Finger Lakes Trail (FLT) is a good example of a long distance trail system with its own character and standards, and is also the only long distance trail of which there is any appreciable mileage found on State Forests. According to the Finger Lakes Trail Conference's website, the FLT travels 561 miles from Allegany State Park to the Long Path in the Catskills. In addition, the FLT trail system includes branch, loop and spur trails totaling another 351 miles. The FLT is also an official component of the 4,600 mile long North Country National Scenic Trail. FLT trail mileage is split almost evenly between public and private lands creating interesting management challenges. This over 40 year old trail system was constructed and is maintained by an extensive and very dedicated group of volunteers on State Forests under Adopt-a-Natural Resource Agreements. Through its long history the FLT has been constructed and is maintained as a single use hiking trail. This is a very important issue since the trail was designed and built to standards which can't sustain most other uses. In addition, a majority of the private landowners who allow the trail to cross their properties only allow it to be used by hikers.

To the fullest extent possible DEC will accommodate the FLT as a single use foot trail on State Forests in respect for neighboring private landowners who host the trail under that constraint and in full understanding that the present layout, design and volunteer support is limited to the extent that the trail system can only be sustainably managed as a foot trail. There may be very limited exceptions, where segments of the FLT on State Forests may be open for other or multiple uses under the following terms:

1. When the FLT or another neighboring trail is temporarily relocated:
   -- to accommodate other management activities, or
   -- due to a DEC-imposed closure due to safety concerns, and where it is not feasible for the re-route to accommodate the FLT as a single use foot trail, in the affected section. Examples of this temporary situation might include places where the re-route must follow a Public Forest Access Road or another existing multiple use trail segment or where another trail must be relocated onto the FLT footprint.
2. Where the FLT passes through a State Forest which is also dedicated to an extensive system of trails, accommodating other recreational uses, and it is not feasible or avoidable to have some trail overlaps.
3. When the Finger Lakes AANR partner requests a re-route and the only feasible accommodation includes use of an existing multiple use trail or a PFAR.

Cross-country Skiing

Cross country skiing is allowed anywhere on State Forests other than on trails posted as closed for this use. Cross country skiers prefer loop trails. There are 881 miles of cross country ski trail on State Forests. In addition to the hundreds of miles of old logging roads, firebreaks, public forest access roads and unimproved trails, there are also more formal designated trails, some of which are groomed by Volunteers under AANR Agreements. Some of these are designed for classic style skiers and others for skate style which requires a wider track. To maintain the rustic character of state forests, trails will generally not be groomed. The designated ski trails on state forests are all designed for the beginner to intermediate skill level. No trails are designated for skiing where the conditions would require an expert skill level. Individuals should call their local DEC Lands and Forests office for more information.

DEC does not have the resources to remove snow from all parking areas. In some cases, the local Towns plow parking areas which are accessed by Town roads. If this service is not provided, some facilities may have to be closed.

Impacts and Mitigations – Environmental impacts of cross country skiing are minimal. Competitive and organized group events require a TRP from the Department.

Multiple Use Conflicts – Activities that have been reported to conflict with cross country skiing include hiking, snowshoeing, taking pets on trails, snowmobiling and motorized vehicle use. Toboggans, sleds and snowmobiles are not permitted on designated ski trails.

Equestrian

Horseback riding, driving or leading is permitted on State Forest lands unless otherwise prohibited by law, regulation, posted notice or this subdivision. 762 miles of designated trails and Public Forest Access Roads are available for equestrian use. DEC will consider proposals for development of additional trails or the use of undesignated trails to accommodate local use of State Forests on a case-by-case basis.

Most trail systems on State Forests are designed to accommodate use where people trailer their horses to the trail to ride. This use requires significant infrastructure for the tender of horses, including outdoor stalls, water supply and manure pits, and occurs in a limited number of locations. However, concentrating this use makes it easier to mitigate potential impacts.

There currently exist user-created, un-designated, “private” trails established and used by local horseback riders on state forests. These trails typically access state forests from private land and they have been located and constructed without approval from DEC. Because these trails may be in unsuitable locations and do not receive regular maintenance, they are likely to become eroded. Use and development of these trails in a responsible manner will require a partnership between those who use them and the Department. To address this problem, DEC will allow use of these trails provided that they are in suitable locations, they meet Department technical specifications for design and a sponsor enrolls the trail under the Adopt-A-Natural Resource program. After enrollment under the Adopt-A-Natural Resource program, the trails on state forests will be designated as DEC horse trails and the sponsors may be responsible for maintaining them to DEC specifications. By officially recognizing these trails as DEC horseback riding trails, the Department will be able to track them for maintenance while also making them available for public use.

Impacts and Mitigations – Horseback riding is a compatible use of state forests when the trails are properly located, designed and maintained. Environmental impacts of equestrian use on state forests include trail erosion, muddy conditions, manure, unauthorized trail clearing, and damage to trees from leaving horses tethered up at locations outside of horse stalls. Trails are most vulnerable to damage and erosion during periods of wet and muddy ground conditions. Generally these are the months of November, December, March and April. Trails may be closed during the regular seasons of wet weather to protect the trails from deteriorating. 6NYCRR Part 190 prohibits anyone from riding or leading a horse on snow covered cross-country ski or snowmobile trails, foot trails, or on land devoted to intensively developed facilities. Competitive/organized trail rides require a TRP from the Department.

Trails in eroded, muddy condition are environmentally unacceptable, unsafe and unpleasant to use. Trails not specifically designed to support equestrian use are especially vulnerable to erosion and are not suitable for horseback riding.

Multiple Use Conflicts –Horseback riders may experience conflicts with those who hike, hunt, snowmobile, camp without horses, target shoot, or mountain bike. Many conflicts relate to the concern for people becoming injured when horses are surprised by unexpected actions from others.

Mountain Biking

Mountain bikes are permitted to travel on any existing road or trail on State Forests unless the road or trail is posted as closed for this use. Riding occurs across a variety of track types and trail conditions. Trails can range from being fairly flat and easily ridden to steeper, narrow "single track" trails with frequent elevation and direction changes, more suitable for the advanced rider.

There are different styles of mountain bike riding characterized by the motivation, conditioning and personal preferences of the participant. Family and leisure riders may travel at a slow to moderate pace on relatively gentle ground on easy-to-ride trails. These riders tend to stop frequently to enjoy the sights and sounds of the forest. Some riders seek a recreational experience that offers challenging physical and technical riding opportunities in a natural forest setting. Competitive riders travel at a faster pace on all types of terrain in order to get a more physically challenging workout. A small percentage of riders gravitate to extreme mountain biking. This type of riding is for professional or advanced riders who do not depend on any certain trail type. Extreme riders travel at various speeds over difficult and steep terrain where there are obstacles such as rocks, roots and logs in the path of the rider. Input to DEC has indicated a preference for single track loop trails and for technically challenging trails.

The designated mountain bike trails on State Forest are for beginner to intermediate use and are designed to be compatible with the natural setting of the State Forest and safety of the users. These trails do not include man-made structures which would negatively impact the aesthetics of the State Forests, however in some instances, natural features like small fallen logs, rocks and exposed roots, occurring naturally in the trail, may be left to provide intermediate level challenges.

Impacts and Mitigations –Soil impacts from mountain biking include widening of trails to avoid obstacles such as water and downed trees. Trail braiding results from several paths in close proximity which avoid the same obstacle. Rutting occurs when the ground is too soft to support the weight of the vehicle and rider, especially during wet periods. Ruts collect rain water and

runoff, keeping the trail wet, and also channel water, leading to erosion of the trail. On unsuitable soils, trails need constant maintenance to control erosion. Where erosion cannot be controlled, the trails need relocation or closure. Trees are often cut or damaged when trails are established by users without authorization. Water quality impacts include siltation of nearby water resources from riding on wet and muddy trails; erosion of stream banks where the trail crosses a stream; and erosion of trail surface. Aesthetic impacts result from muddy, rutted, poorly designed and maintained trails that are unpleasant to other users of the forests.

Due to environmental concerns and conflicts with other users of the state forests, mountain biking is acceptable only on trails that have been assessed and approved for such use. Trail use restrictions may be imposed on trails during unusual periods of wet weather. Constructing unauthorized trails, or placing objects (trail structures designed for advanced users, such as jumps, expert ramps, trick bridges, etc.) in or near a trail for the purpose of offering additional riding challenges is prohibited. Such obstacles pose a safety hazard to trail riders and are a liability concern for the state. All mountain bikers riding on State Forests are encouraged to follow the International Mountain Bicycling Association (IMBA) Rules of the Trail www.imba.com/about/trail_rules.html.

Multiple Use Conflicts – Mountain bike conflicts may occur when horseback riders and horses are startled when they are approached from behind and taken by surprise. Right of way is a usual conflict occurring between mountain bikers and hikers on the same trail. Mountain bikers sometimes feel threatened by the presence of hunters on or nearby the trails. Mountain bikes on cross country ski trails sometimes conflict because bicycles cause ruts in the snow.

Snowmobiling


Snowmobilers on Stewart State Forest in Orange County

Snowmobiling is permitted on any snow covered trail on State Forests other than designated ski trails and ski slopes (see 6NYCRR Section 190.8[d]), unless the trail is posted as closed for this use. A majority of the dedicated snowmobile trails on State Forests are a part of the Statewide Trail System. Trails are located on unplowed town roads, DEC roads and on woodland trails. Corridor trails are usually routed along roads or wider trails. There are also numerous secondary trails that spur from the corridor trails. The overall system traverses over 10,000 miles across public and private lands in New York State and is managed by the NYS Office of Parks, Recreation and Historic Preservation (OPRHP) with the assistance of volunteers from numerous snowmobile clubs. The NYS Snowmobile Trail Fund, which is supported by a portion of snowmobile registration fees, is also administered by OPRHP and used to fund trail grooming and maintenance. Segments of the Statewide Snowmobile Trail System on State Forests are maintained by DEC operations staff and volunteer clubs under the AANR program

and are partially funded by the trail fund. All trail grooming on State Forests is completed by these AANR volunteer clubs.

ADDITIONAL RESOURCES

State Forests Containing Corridor Trails – A map of statewide connector trails is developed bi-annually by NYS OPRHP. Contacts for this map and other snowmobile information can be found at nysparks.state.ny.us/recreation/snowmobiles/contact.aspx

Impacts and Mitigations – Environmental impacts of snowmobile trails include air and noise pollution, unauthorized tree cutting and trail creation, and litter. The legal use of horses and the illegal use of ATVs on snowmobile trails in other seasons can create environmental problems on the snowmobile trails. In most cases, the snowmobile trails were designed to be used only in winter. Many of the trails are on soil that does not support activity when the ground is not snow covered. If the trails are used for only snowmobiling, they need little or no maintenance. Use of snowmobile trails in other seasons necessitates maintenance. The New York State Snowmobile Trail Manual published by OPRHP offers these additional environmental considerations: trails should avoid deer wintering yards, wetlands and other sensitive areas. Trail layouts should strive for good snow retention. For safety, trails will avoid crossing bodies of water.

Multiple Use Conflicts – Snowmobiling may conflict with hiking, cross country skiing, snowshoeing, and wildlife populations. Horses may conflict with snowmobiles on snowmobile trails. Other problems include lack of trail etiquette, poor trail layout, poorly constructed bridges, poorly located signs, and illegal use of trails by ATVs and/or dirt bikes. Neighboring landowners have problems with riders trespassing. Neighboring landowners may have noise conflicts when corridor trails are used at night.

OTHER RECREATIONAL ACTIVITIES

Orienteering

Orienteering is a sport of navigation using maps and a compass. The object is to run, walk, ski or snowshoe to a series of points shown on a map in the shortest amount of time. Orienteering is a compatible use of state forests. State Forests provide ideal areas for orienteering because they are large and remote forested areas where participants can travel long distances while remaining on public land. At the current level of participation, this is a low-impact activity which causes few conflicts with other activities on state forests. Improved maps and information on State Forests will provide a better orienteering experience.

Dog Training / Field Trials

Dog training involves training dogs to hunt and retrieve. Training may involve the shooting of blanks to accustom the dog to guns firing, setting up situations that may be encountered while hunting and teaching the dog obedience to commands. A field trial is a competition to test the

skills of the hunting dog. Opportunities are limited on state forests because dog training and field trials require large unwooded areas which are generally not found on state forests.

Impacts are minimal but include noise from vehicles, dogs, whistles and gunfire, compaction and disturbance of soil where there are parking and staging areas. Dog training and field trials can conflict with other nearby recreational activities because of the noise and from the increased traffic on the roads and on the land. Dog training and field trials may disturb wildlife due to the hunting and retrieving activity. The statutes concerning dog training, field trials are found in Article 11, Title 9 of the ECL.

Hang Gliding

Hang gliding is the use of a rigid-framed, wing-shaped glider for non-powered flight. The pilot flies the glider in the prone position. Launch sites are located on ridge tops where thermal updrafts are utilized for flight. Participation in this activity on state forests is limited by topography.

Environmental impacts include maintaining a cleared area for a launch site, constructing an access road for vehicles to transport flying apparatus to the launch site, and maintaining a cleared landing site for emergency landings. A temporary revocable permit (TRP) is required before a launch site may be used for hang gliding. The TRP will only be issued to a hang gliding club recognized by the US Hang Gliding Association before using the launch site. The TRP will further stipulate that each club member must be certified by the club as being qualified and competent to use a hang glider to gain access to the launch site. Hang gliding may conflict with private property owners when there is a landing on private property without permission. Also, traffic on launch site access roads may present liability and safety issues.

Where the proper site exists and an acceptable access route to the site is available, hang gliding is an acceptable use of state forests. Currently there is only one site on State Forest land that is used for hang gliding purposes.

Paint Ball

Paint ball games are combat simulation games where the participant uses an airgun for a "weapon." The airgun powered by CO_2 cartridges, fires a paint ball at high velocity, which splatters on impact. Participants wear safety equipment, including goggles, ear protection and vests. Neutral safety zones, where no weapons can be fired and safety equipment can be removed, are established on the playing fields. Paint ball activities are generally done in organized group events but can be conducted individually.

Paint ball activities may conflict with other uses on the state forests. Conflicts between other users and management activities are possible. Environmental impacts include litter, intensive use of a small number of acres and aesthetics. To conduct timber sales, DEC uses tree marking paint to mark trees for harvest. Paint on trees, as a result of paint ball activity could easily be mistaken for tree marking paint. This confusion could alter timber harvests and have a long

term negative impact on the forest. There is a potential hazard to other recreational users. Non-participants could be seriously injured if they were inadvertently shot by a paint ball. Paint ball activities would require exclusive use of an area, which is not appropriate for state forests.

The use of paint ball guns on state forests is prohibited by 6 NYCRR Section 190.8(ff). It is not an appropriate activity due to safety and aesthetic concerns.

Target Shooting

Target shooting includes trapshooting, skeet shooting and silhouette shooting, or shooting to sight-in guns or to improve the accuracy of a weapon for hunting. There is also shooting using targets glass bottles, cardboard boxes, clay pigeons and plastic jugs.

The primary concern with target shooting is safety. Without a proper backstop, projectiles can travel long distances and strike unintended targets. Shooting without knowing where a bullet will strike is the cardinal sin of shooting. Damage to trees is a very significant impact from target shooting. Litter is also a large problem. Broken and whole clay pigeons, spent shell casings, broken glass, cardboard and plastic are litter left behind by target shooters. Target shooting as practiced on state forests may conflict with other activities.

Shoot at any breakable target on State Forests is prohibited under 6 NYCRR 190.8(bb). This includes items such as glass bottles and clay pigeons.

RECREATION POLICIES AND GUIDANCE

Best Management Practices

Best Management Practices (BMPs) are those methods, procedures, and/or devices that are designed to prevent or minimize soil erosion, water run-off, damage to natural resources or wildlife habitat, pollution, pathogens, or other negative environmental or aesthetic impacts when conducting various management activities. Use of BMPs are not typically required by regulation or policy, but are incorporated into management activities.

Soil and Water Protection BMPs
(Refer to page 108.)

Infrastructure Construction and Maintenance BMPs
Includes BMPs and guidelines for roads, points of access, signage, trails, campsites and other facilities. *(Refer to page 157)*

Universal Access

The Americans with Disabilities Act (ADA) mandates that it is the duty and responsibility of public agencies to ensure that people with disabilities have access to public recreational

programs and facilities. While State Forests are generally rustic in nature, there are opportunities for universal access to hunting, fishing, wildlife viewing, nature immersion and other recreational programs. Over the past decade, many parking areas, trails, access routes, platforms and other surfaces and facilities on State Forests have been upgraded or designed as described in the Universal Access section on *page 173* of this plan. In addition, some roads and trails are open by permit only, to motor vehicle access by people with disabilities.

Limits to Recreational Development

It is important that recreational use is not allowed to incrementally increase to an unsustainable level. DEC must consider the impact from increased use on other management goals or other recreational uses. Even though a volunteer organization may offer the needed materials and labor to develop a new facility, DEC must consider the full range of impacts, including long-term maintenance and the balancing of multiple uses. In most cases, this can only be accomplished within the UMP process or a similar formal public process.

Commercial Use of State Forests

Commercial enterprises occasionally approach DEC requesting the use of state forests for developing new trails or accessing existing recreational trails or other facilities. The development of trails on state forests connecting to a commercial facility may be beneficial to the activities or facilities on the state forest. For example, commercial enterprises can complement trails on state forests because they can provide, on adjoining lands, amenities such as electricity, flush bathrooms, food and supplies or other desired services not available on state forests. However, there can also be negative consequences to such development including trail construction and maintenance costs and impacts to other uses or features on state forests. Furthermore, when such trails originate from commercial recreation facilities, they give the impression that the commercial entity in some way controls that portion of the state forest. The decision on whether to allow commercial use of state forests depends upon numerous factors and will need to be approved through a written agreement with DEC. In no instances will exclusive use of State Forests be granted to any user, including commercial enterprise or their paying customers. In addition, vendors are not allowed to operate on State Forests.

Availability of Recreation Information on State Forests

Informational materials consist of the various methods used to communicate with the public, including brochures, signs, maps, information boards, presentations and web sites which disperse recreation information on state forests.

During management planning meetings, many people have commented about the adequacy and availability of information and educational materials. There is increased demand for recreational information including additional and improved maps of state lands; trail etiquette

education to reduce user conflicts; more information about available opportunities; information and signs explaining what is permitted and not permitted on state forests; and more interpretive signs and information.

In order to provide more information to the public with improved maps, brochures and signs, DEC will assess current availability through the UMP process. The availability of official and accurate information has been improved through the use of the DEC website and will be updated during UMP development.

Inventory of Existing Recreational Facilities

Using GIS, DEC staff have gradually built and continue to develop an inventory of recreational assets on State Forests. This information can be accessed through DEC's "Mapping Gateway" at www.dec.ny.gov/pubs/212.html via the State Lands Interactive Mapper as well as in Google® Earth and Google® Maps format. It is a priority to update this information during UMP development so that accurate information is available to recreational users.

"REC" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Recreation (REC) Objective I - Illegal activities will be prevented, environmental impacts reduced and public safety assured as recreational use is accommodated on State Forests.

> **REC Action 1** – Develop a Backcountry Steward program to provide public education and assistance on State Forests with higher levels of public use. Program to be in place by 2012.

REC Objective II – Provide public information regarding recreational opportunities on State Forests. In individual UMPs assess the need in areas of higher levels of public use, for the use of signs, kiosks, outreach to user groups, Backcountry Stewards, online resources and working with neighboring landowners (Neighborhood Watch groups).

> **REC Action 2** – At least every 10 years, during UMP development, a web page for each State Forest will be created or updated, including an electronic, printable map showing the location of recreational amenities on the State Forest

REC Objective III - Recreational facilities and amenities will be provided and maintained such that they are safe, functional, universally accessible and environmentally sound. Each UMP shall inventory existing recreational amenities and provide an implementation schedule and budget for recreation management actions, which will be subject to change based on funding or staffing constraints.

> **REC Action 3** – Develop a program for carrying out regular trail assessments on State Forests by 2020.

REC Objective IV – Enhancement of sporting wildlife habitat will be considered in UMPs.

REC SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current approaches to recreational management, has been selected as the **preferred alternative**.

Due to public demand for forest-based recreation and related quality-of-life and economic benefits, the alternative of reducing support of recreational activities and facilities has not been selected.

The option of dramatically increasing the level of recreational use and development on State Forest cannot be accommodated due to the constraints and concerns expressed in this plan.

SEQR Analysis Threshold: Compliance with the guidelines and strategies of this section will avoid and minimize potential impacts resulting from recreational use and development. Any development of facilities with potable water supplies, septic system supported restrooms, camping areas with more than 10 sites or development in excess of other limits established in this plan will require additional SEQR analysis.

OFF-HIGHWAY AND ALL-TERRAIN VEHICLE USE

Off-road motorized recreational activities have grown in popularity over the past two decades. These include four-wheel drive vehicles (also referred to as off highway vehicles or OHVs), ATVs, UTVs and off-road motorcycles. For the discussion of these various vehicles in this plan we'll collectively refer to them as OHVs and ATVs. Impacts and issues associated with OHVs are much the same as those associated with ATVs, therefore for the purpose of this plan, DEC policy as regards State Forests will be applied to both vehicle types alike.

An **All-Terrain Vehicle (ATV)** is any self-propelled vehicle manufactured primarily for use on off-highway trails or in off-road competitions and that is not more than 70 inches wide and weighs no more than 1,000 pounds dry weight. This includes vehicles with two or more wheels. Snowmobiles are not included and are subject to other regulations.

An **Off-Highway Vehicle (OHV)** is designed for use off highways, weighs more than 1,000 pounds, and is wider than 70 inches. An OHV may also be designed for and registered for highway use. An OHV differs from most vehicles because it is usually a four-wheel- drive vehicle. This means it gets traction from all four wheels. This makes the vehicle capable of traveling on almost every type of terrain.

Some people own and operate these types of vehicles as a relatively benign means of conveyance to access programs like hunting and fishing. Many off-road enthusiasts, however, enjoy a riding experience that includes characteristics such as challenging mud holes and steep hill climbs, as is often depicted in ATV manufacturer ads and on ATV club web pages. As discussed below, those types of uses, as well as other attributes of recreational ATV use are not compatible with State Forest management goals and cannot be successfully managed on State Forest lands.

Environmental impacts from ATV and OHV use include soil erosion, displacement and compaction, direct impacts to streams and wetlands from ATV crossings, including increased siltation and turbidity, noise, disturbance to wildlife and their habitats, damage to vegetation, and air pollution. ATV use impacts neighboring landowners and conflicts with other recreational pursuits.

Illegal use of ATVs and OHVs on State Forest roads and trails officially closed to ATV and OHV use is frequent, difficult to prevent, and presents significant enforcement issues. Despite a variety of signs, gates, boulders, and other barriers designed to notify ATV and OHV users that particular roads and trails are closed to their use, a large amount of illegal riding continues to occur on these prohibited areas. Illegal use of ATVs presents significant enforcement problems because illegal riding often occurs in remote areas, where apprehension of violators is difficult and impoundment of unregistered ATVs is impractical.

ATVs raise substantial safety concerns in comparison with various recreational activities because they are especially prone to accidents. In a 17-year period, New York State recorded

137 ATV-related fatalities, and New York has been ranked third highest in the nation for ATV-related deaths.

The environmental impacts (including noise), intensity, and nature of both legal and illegal ATV use has been shown to cause other recreational uses to decline, and in some cases completely cease, once an area is opened for ATV use.

Over the years, attempts have been made to accommodate off highway and all terrain vehicle use on several State Forests but in each case, the use was not sustainable. Serious issues with soil erosion, illegal off-trail use and trail rutting developed. In all cases DEC was not able to find acceptable ways to mitigate the impacts, even when organized user groups were included in the process. In the end, each of the former off-road vehicle trail systems was closed.

Assessment of Current ATV Opportunities

Riding currently occurs on private lands in most rural areas. Farm families often use ATVs and OHVs in their work. Private and club trails exist in numerous locations. In addition, there are commercial ATV facilities in New York State which are open to the public.

DEC administers certain conservation easement lands where the state has acquired the public recreation right for ATV use. On these lands, DEC may designate specific routes that are opened through a public recreation management planning process.

ATV use is also allowed on highways designated by regulation (for state roads) or local law or ordinance (for municipal roads) pursuant to the requirements of Vehicle and Traffic Law §2405 (1), requiring that the designating authority determine that it is otherwise impossible for ATV's to gain access to trails or areas adjacent to the highway and posted for ATV use by the state or local authority having jurisdiction over the highway. A number of towns, primarily in the western Adirondack and Tug Hill regions have opened town roads to ATV use under this statute.

Certain State Forest and Forest Preserve routes are open to motor vehicle use only by those who have a DEC-issued Motorized Access Permit for People with Disabilities (MAPPWD) *(Refer to page 177).* The permits allow the individual to ride only on marked and designated routes where the public use of motor vehicles is prohibited.

There are no recreational trail systems dedicated primarily to ATV riding on State Forests, due to unsuccessful attempts in the past and other limitations and concerns expressed in this chapter. There are however, limited instances in which DEC has designated short sections of road for ATV use in order to connect adjacent areas that are legally open to ATV use.

ATV BACKGROUND

Prior to 1983, DEC regulations allowed motor vehicles (including four-wheel-drive trucks, motorcycles and ATVs) anywhere on State Forests except where there were signs prohibiting such use. Unsuitable areas were signed to prohibit motor vehicle use. This approach led to widespread use of motor vehicles on State Forests resulting in serious rutting and erosion problems in many areas. The signs prohibiting motor vehicle use were often removed by the public, making it difficult to enforce the law restricting use in certain areas. In response to this problem, the regulations were changed in 1983 to allow motor vehicle use only on signed roads and trails or through a permit issued by DEC (see 6 NYCRR Section 190.8[m] and Vehicle and Traffic Law §2405). Appropriate roads and trails were then signed for motor vehicles to accommodate local use. Signing these roads and trails created short sections of designated trails. This did not satisfy the recreational demand for a long-distance loop trail system. The low mileage of short trail sections also contributed to illegal off-trail use.

In 1986, Article 48-b of the Vehicle and Traffic Law was established which required all ATVs to be registered for a ten dollar fee with 50% of the fee allocated to the New York State ATV Trail Development and Maintenance Fund. The law specified that no more than 25% of the money in this fund could be made available to the NYS Office of Parks, Recreation and Historic Preservation and the DEC for ATV trail development and maintenance on state lands. The counties were also to be given funds to compensate them for the costs associated with ATV trail development and maintenance. In 1990, the state legislature abolished the fund and used the money to balance the budget. ATV and off-road motorcycle riders are still required to pay the ten dollar registration fee despite the lack of a dedicated fund.

ATV Case Study: New Michigan State Forest (1985)

In 1985, a loop trail for ATV use was established on New Michigan State Forest (Chenango 5 & 24). The trail was approximately 20 miles long and it received much use. ATV riders eventually became dissatisfied with the trail because it was considered too short and there were no other trail systems to ride. ATV riders desired a longer trail similar to the Brookfield Trail system in Madison County which contains 59 miles of off-road horse trails on five State Forests and includes camping facilities. The loop trail on New Michigan State Forest was closed in 1988 due to not meeting the public demand, excessive mud holes and soil erosion.

ATV Case Study: Anderson Hill State Forest (1993-1997)

ATV riding was also allowed through permits issued to clubs for competitive events on Anderson Hill and nearby State Forests in Tompkins and Tioga counties in the Southern Tier. The permits allowed trails to be established and signed for temporary use during the event. This led to problems as the public would ride ATVs on the signed trail before the event. After the race, the trail markers were removed and water diversion structures were constructed to prevent erosion on the trail. Unfortunately, residual use of the trail continued. A visible trail exists to this day, and it continues to attract illegal use. Illegal use by local ATV and motorcycle riders has resulted in damage to the water diversion structures and has caused soil erosion.

ATV Case Study: Morgan Hill State Forest and Taylor Valley State Forest (1985)

ATV trails were also established in Cortland County in 1985. A 6.5 mile trail was established on the Morgan Hill State Forest (Cortland 4) and a 3.5 mile trail was established on the Taylor Valley State Forest (Cortland 2). Both of these trails were signed for use by motor vehicles weighing less than 1,500 pounds. In 1991, an assessment of both trails revealed significant environmental problems. The trails were eroding, badly rutted and contained numerous mud holes. In the short span of 6 years, the trails were in need of either relocation or complete rehabilitation to make them acceptable for use. In addition, many unauthorized or illegal trails had been established by trail users. These unauthorized trails were unacceptable for use due to their environmental impacts. Both of the trails in Cortland County were closed for motor vehicle use in 1991 due to their excessive deterioration from use which caused unacceptable environmental impacts.

ATV Case Study: Proposed trail system on the Treaty Line Unit (1993)

In 1993, the Department issued a position paper regarding all-terrain vehicles on State reforestation areas. The paper states that an ATV trail system is consistent with ECL however; the Division of Lands and Forests must determine whether a proposed trail is compatible with the natural resource as well as with administrative, cultural and recreational demands and uses. This paper led to the examination of the State Forests for a location to potentially develop an ATV trail system.

The draft Treaty Line UMP proposed the development of an 80- to 100-mile ATV trail system. The Treaty Line Unit consists of Chenango 9 & 15 and Broome 2 in Region 7 and Delaware 2, 4, 5, 6 and 9 in Region 4. This unit was chosen as the most feasible location in the region to develop an ATV trail system. The proposal was withdrawn from the final plan due to significant public opposition, unresolved environmental issues of air and noise pollution, potential conflicts with other users and neighbors, and the impact of the trail system causing significant socially unacceptable changes in the character of the Treaty Line State Forests and surrounding area.

The proposed trail system included a number of measures to mitigate the impacts through trail design, layout, patrol and maintenance. The trail proposal was strongly supported by ATV trail groups. Environmentalist groups were strongly opposed. Other recreational users were greatly divided in support of and opposition to the trail proposal. Hikers and birders generally opposed the trail proposal, while other recreationists more often supported the trail proposal. Most local residents opposed the ATV trail proposal even though the trail system would potentially have provided an economic boost to the region through increased tourism and growth of associated…

… continued: Proposed trail system on the Treaty Line Unit (1993)

… small businesses. Comments in opposition to the trail mentioned concerns over increased traffic, trespassing, safety, noise and environmental degradation. Most landowners who lived in the neighborhood of the proposed trail were very strongly opposed to the change in character this trail would bring to the immediate area and concerns will illegal use spilling out on their lands.

In addition, a 1993 DEC position paper states "all cost associated with an ATV Trail must come from an ATV Trail maintenance and development fund. No costs will be directly charged to Department resources." Although such a fund once existed in New York, it no longer does. Recently, attempts have been made by interest groups to reestablish an ATV trail fund through new legislation. Without an ATV trail development and maintenance fund, sufficient staffing to properly administer, maintain and patrol the proposed ATV trail system was not guaranteed. The Treaty Line ATV trail system proposal was withdrawn based on the criteria that it was not both environmentally compatible and socially acceptable.

ATV Case Study: DEC Region 6 (1985-2008)

In the 1980s, all of the multi-use trails in the Brasher State Forest were opened to ATV use; 36 different trails were opened as well as all 15 Truck trails. Use was low to minimal to begin with, consisting mainly of local ATV enthusiasts who lived adjacent to the State Forest. In a relatively short time, ATV use escalated dramatically, and environmental issues began to surface.

By the early 1990s, ATV use was curtailed on trails that had become badly rutted or which had developed severe mudholes. In most cases, "Braid Trails" were illegally established by ATV riders to avoid the obstacles created by previous ATV activity. With no funding source available to maintain the trails or remediate damage, unacceptable environmental impacts led to further closures. By 2000, 12 trails remained open, and by 2004, only five trails remained legally opened to ATV use. Illegal ATV use continued to occur on the closed trails. Illegal braid trails continued to be created, and unauthorized new trails saw ATV use.

DEC worked with a local ATV club to remediate damage to several key trails, and the volunteers did some excellent work to fix the damage that had occurred on those trails. The rest of the trails that were closed due to ATV damage have yet to be remediated due to a lack of funding. A 2006 DEC legal opinion found that within NYS Vehicle and Traffic Law, ATV's and regular public motor vehicle traffic could not share use on the same public roads and trails over long distances. Since the few remaining open trails were linked by miles of Truck Trails that remained open to car and truck traffic, all roads and trails were closed to ATV traffic.

Public Input

In the process of Unit Management Planning for numerous State Forests throughout the state, extensive public input regarding ATV and OHV use has been gathered. This input is very similar from one state land unit to another. Input gathered in development of the DRAFT Region 7 Recreation Master Plan is representative of that given throughout the state.

ATV Case Study: Region 7 Recreation Master Plan (2001-2002)

DEC staff in Central New York (Region 7), which holds more State Forest acreage than any other region of the state, conducted an extensive public review of recreational activity on State Forest lands. Five public meetings were held at different locations throughout the region during the month of January 2002. Each meeting offered a brief overview of the completed Draft Recreation Master Plan for State Forests, as presented by DEC staff, followed by a session to receive public comments. All formal comments received at these meetings were recorded, along with hundreds of mail-in comments submitted to DEC following the meetings.

Comments received by the Department concerning ATV use on State lands were numerous and varied. Strong sentiments both for and against ATV use were expressed at the public meetings and in the written comments that followed.

Input from ATV riders included a variety of ideas and comments. ATV riders want access to existing trails or would like new trails constructed. They feel that the benefits they receive are not proportional to the registration fees paid to DMV. Off-highway motorcycle (OHM) enthusiasts are looking for trails 100 miles in length with portions of the trail designed specifically for OHM verses three- and four- wheel ATVs. ATV riders are looking for varied terrain and challenges in trails. Hill climbs and terrain courses are a desired part of a trail system.

Additional comments received from ATV riders in the public meetings and questionnaires include the following:

- Allow ATVs on truck trails.
- Develop a facility for camping and ATV riding.
- Allow ATVs on snowmobile trails.
- Allow people to use ATVs to remove game during spring and fall hunting seasons.

The following are responses to the question “What can DEC do to reduce conflicts?”

- Supervise ATV riders through use of clubs.
- Install gates to control ATV access.
- Allow clubs to develop separate ATV trails.
- Educate DEC on ATVs.

Comments from those who don’t ride ATVs were mixed. Environmental organizations and people who primarily participated in hiking, birding or cross-country skiing tended to be strongly opposed to development of ATV trails. They felt that ATV riding is not compatible with State Forests. Other groups of recreationists tended to have more mixed opinions.

ATV IMPACTS AND CONSTRAINTS

A properly sited, maintained and restricted ATV trail system could provide for ATV use. However, this is the most difficult type of trail system to properly locate and develop on State Forests due to the potential environmental impacts, constraints and the possibility of conflicts associated with the activity and the desire by ATV riders for a long-distance loop trail system. Many constraints limit the potential for the development of an ATV trail system and include:

ATV Use on Conservation Easement Lands

It is important to note that the analysis of impacts and constraints associated with State Forest lands is not applicable to Conservation Easements. The important differences include: rights retained by fee owners; differences in road standards; and use by and wishes of the fee owners and surrounding landowners. ATV use may be found to be compatible with the different set of circumstances found on Conservation Easement lands.

- **Maintenance** – Preventing and controlling erosion and rutting is an expensive and difficult proposition. In most cases trails must be maintained by moving large quantities of gravel into remote wooded locations with manual labor or small specialized equipment. A full-time maintenance staff with a significant budget would be required to maintain a viable trail system. The types of hardened trails the Department would construct are not the type of trails a majority of the ATV or OHV users desire.
- **Potential conflicts with neighbors of State Forests** - State Forests are generally located in rural settings with a moderate level of housing development in the immediate area. Homes and building lots adjacent to State Forests are highly valued on the market. People who live near State Forests often choose to live there because it is a relatively quiet, undisturbed location. Neighbors are often opposed to the development of ATV trails because of increased ambient noise and disturbance levels.

  Even though State Forests are “working” forests, harvesting normally only occurs on 1% of the land area or less on an annual basis and there is usually over 30 years between harvests. Gas well pad development also occurs on State Forests, but its impacts are controlled and directed toward suitable sites which are closed and remediated within a relatively short timeframe.

  ATV use can create impacts that spread across the State Forests and neighboring lands, occur much more frequently, and occur without end. This constitutes a major change of the character of a State Forest. Neighbors are frequently concerned that ATV trail riders on State Forests may ride off the trail and go across the property line onto their land. In addition, increases in traffic patterns on local rural dirt roads and associated dust produced by trucks and trailers are issues which have blocked proposed off-road vehicle trail development on State Forests in the past.

- **Potential conflicts with other recreationists** - Recreationists who value and use State Forests because they provide places where one can experience solitude are opposed to the development of ATV trails because of concerns such as noise, pollution, disturbance to wildlife and ground or vegetation impacts. The impacts, intensity, and nature of both legal and illegal ATV use has been shown to cause other recreational uses to decline, and in some cases completely cease, once an area is opened for ATV use.


ATVs have made hiking this trail difficult and unpleasant

- **Size of the forest area or group of forests** - An ATV trail system suitable for day use must be at least 30-40 miles long. The area under consideration for trail development should be at least 5,000 acres or larger to accommodate this size of a trail system.
- **Environmental impacts** - Public use of ATVs can cause significant, adverse impacts to natural resources, including soil degradation; destruction of vegetation; disruption of local hydrology; increases in surface runoff and erosion; direct impacts to streams and wetlands from ATV crossings, including increased siltation and turbidity, destabilization of shorelines, destruction of in stream and riparian habitat, and destruction of vegetation; fuel discharges, resulting in degradation of water quality; air pollution; and impacts on wildlife including direct mortality, habitat modification, and disturbance.

  Increased runoff and erosion from ATV impacts occur across the landscape and have serious consequences for soil and water quality *(Refer to page 105)* causing increased sedimentation and turbidity in multiple water bodies throughout the forest. These factors can affect biological health, for example, a stream's ability to support trout populations or aquatic plants' ability to photosynthesize. Sedimentation from recurring ATV damage often increases with successive storm events.
- **Design requirements for a suitable trail** - The DEC's 1993 position paper stated that any consideration for trails in New York will stay within standards established by the US Forest Service. The paper also stated that all trail locations should have stable soils and avoid steep or wet areas. Therefore, it is critical that the area chosen for a potential trail system have few areas of poorly drained soils. Otherwise, portions of a trail system on poorly drained soils need costly improvements to the trail surface and drainage to prevent those areas from becoming muddy or eroded. Establishing a trail on poorly drained soils without improvements to prevent trail erosion is unacceptable to DEC. The

position paper also required that critical wildlife areas and significant habitats be avoided. Unfortunately a trail system designed to these specifications cannot provide the experience a majority of ATV/OHV enthusiasts are looking for: steep challenging terrain and mud holes.

- **Air and noise pollution** - There are varying opinions about the environmental impacts of the air pollution produced by ATVs. Presently, it is not possible to measure air pollution caused specifically by ATV's. Noise pollution is generally an issue of concern for those who currently use or live near State Forests as described above. The 1993 position paper states that machines will be monitored for compliance with muffler requirements and a minimum 1,000 foot buffer zone must be left between the trail and neighboring private structures. Leaving a 1,000 foot buffer zone from private structures precludes ATV trail construction, as it is nearly impossible to accomplish due to the pattern of ownership of State Forests and private lands.
- **Enforcement challenges-** Where ATV trails have been opened in the past, enforcement staff found it very challenging if not impossible to prevent illegal use. This issue is not as significant on conservation easement lands, since there are enforcement resources (landowners, lessees) available beyond DEC's enforcement staff.
- **Cost** – While poorly drained soils commonly found on many State Forests are unsuitable for trail development, marginally acceptable soils would require extensive and costly improvements to the trail surface and drainage to prevent those areas from becoming muddy or eroded. There is currently no dedicated funding source to support an ATV trail system. The high costs for construction, maintenance and operation of an ATV trail system on public lands are best assumed by an agency with a formal fee structure and on-site staffing including an enforcement presence. Other agencies responsible for providing recreation opportunities on public lands include the NYS Office of Parks, Recreation and Historic Preservation and county and local parks. Trail systems may be best developed by collaboration between private landowners.

ATV Positive Impacts

Accommodating ATV use could potentially have some positive impacts on the communities surrounding State Forests. Benefits that come from ATV use include individual recreational benefits and may include jobs, income to businesses, and tax income. Limited studies have shown evidence for trip-related spending by ATV enthusiasts (Karasin 2003).

Off road vehicles can also provide a means of access for recreationists who have impaired mobility. This use is accommodated by the DEC-issued Motorized Access Permit for People with Disabilities (MAPPWD) *(Refer to page 177)* which allows qualifying people with disabilities to use motor vehicles along specific routes for access to programs, such as hunting and fishing on state lands.

ATV Demand and Trends

Advertising in sportsmen/outdoor magazines and TV programs has resulted in a growing number of machines and riders seeking riding opportunities. It is expected that demand for this activity will continue to increase.

As the statewide landscape continues to become subdivided into fragmented private land parcels, State Forests, with a relatively large land area in public ownership, are expected to face greater pressure to accommodate ATV use. However, in the midst of these trends, State Forests also are becoming more valuable for the various ecosystem services (water quality, habitat, forest retention) and non-motorized recreational opportunities they provide. It is important to note that within the context of the statewide landscape, public lands make up approximately 18% of the total land area, whereas 82% is in private ownership with no public mandate for conservation. State Forests make up just 2.5% of the total land area in New York State.

STATE FOREST ATV POLICY

The mission of the DEC Division of Lands and Forests is "to care for and enhance the lands, forests and natural resources in the state of New York for the benefit of all through the care, custody, and control of state-owned lands, and promotion of the use and protection of all natural resources." This is a broad mission which reflects that DEC has many other responsibilities beyond satisfying public recreation desires. Rather, recreation opportunities are provided on DEC lands that are compatible with other multiple uses and the ecosystem management approach described previously in this plan.

> Upon evaluation of past efforts to accommodate ATV use and the many impacts and constraints associated with off road vehicles, the Department will not permit ATV use on State Forests, except;
>
> as may be considered to accommodate a "connector trail" through Unit Management Planning or a similar public process; and
>
> on those specific routes designated for use by DEC-issued Motorized Access Permit for People with Disabilities (MAPPWD).

ATV Trail System

An ATV trail system, minimum of 30-40 miles long and at least 5,000 acres or larger, that is sited wholly or substantially on State Forests cannot be accommodated.

Any smaller trail system will not meet the desire by ATV riders for a long-distance loop trail system and has proven to increase illegal use and natural resource damage and therefore cannot be considered.

Connector Trails

In the event another entity is establishing a legitimate public ATV trail system on lands adjacent to a State Forest, and a State Forest is needed to serve as a connecting link, or in the event that a State Forest road or trail could serve to connect already designated ATV trails open to the public, DEC will evaluate and consider the proposal. Any such trail proposal must comply with state law, department policy and regulations. If it is determined to be environmentally compatible, a connecting trail could be established on the State Forest. This would be dependent on the availability of sufficient funds to establish and maintain a sustainable trail. The State Forest based connector trail, if approved, must follow the shortest environmentally acceptable route available.

The inclusion of a connector trail in a UMP and the subsequent establishment of any such trail could only occur if it does not compromise the protection of the natural resources of the Unit, significantly conflict with neighbors of State Forests, nor interfere with other established recreational areas. Such designation shall only occur through the amendment or adoption of a UMP or another process which provides similar opportunities for public review and comments and full SEQRA review of the proposed designation.

Connector trails will be monitored to ensure that legal use does not lead to illegal off-trail use within State Forest lands or on neighboring private property. Should illegal use increase significantly adjacent to any connector trail, that trail will be subject to closure.

Vehicle and Traffic Law

A DEC legal opinion concerning ATVs as they relate to the Vehicle and Traffic Law §2405 was rendered in 2006 and has since been upheld in several court rulings. The legal opinion stated that ATVs and regular motor vehicle traffic could not share use on the same public highways except in specific, well-defined instances. Since the few trails remaining open on State Forests were linked by miles of Public Forest Access Roads that remained open to car and truck traffic, this led to the closure of all but one remaining trail.

"ATV" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

All Terrain Vehicle Use (ATV) Objective I – Limited ATV use will be accommodated via consideration of opportunities to enhance access to State Forest recreational programs under DEC's MAPPWD program in all UMPs

ATV Objective II – Limited ATV use will be accommodated on State Forests via consideration of requests for ATV connector routes on a case-by-case basis following criteria detailed above, including a formal public input process.

ATV SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, which in this case involves limited accommodation of ATVs and OHVs on State Forests with connector trails and as a necessary component of the MAPPWD program, following the criteria established above, has been chosen as the **preferred alternative**.

The alternative of closing State Forests to all ATV and OHV use has not been chosen since this option would not allow DEC to accommodate individuals with disabilities and would provide unreasonable barriers to the development of trail systems on neighboring private and municipal lands in regions where State Forests dominate the landscape.

The alternative of developing extensive ATV trail systems on State Forests has not been selected due to past failed experiences (many of which are recounted above), issues with illegal use and increasing budgetary and staffing constraints.

SEQR Analysis Thresholds: Limited ATV accommodations and related mitigations outlined in this section will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted.

MINERAL RESOURCES

New York State is rich in minerals which are extracted for industrial and construction uses throughout the state. Sand and gravel account for the vast majority of the state's 2,200 active mines. Oil, gas and solution salt-mining wells are also economically important in New York State with more than 75,000 wells drilled in the state since the late 1800s; about 14,000 of these are still active and new drilling continues.

The Division of Lands and Forests is responsible for managing surface impacts from Oil and Gas Exploration and Development on State Forests. These activities are regulated under a lease and permits which include special terms and conditions required by the Department to reduce overall impacts and include mitigation measures. A bond is always required to insure all terms are satisfied.

The regulation of subsurface impacts related to Oil and Gas development and protection of underground aquifers as well as the protection of correlative rights of all owners are the responsibility of the DEC Division of Mineral Resources and are not discussed in this plan. The Division of Mineral Resources acts as the oil and gas leasing agent for New York State.

There are currently 132 active wells on State Forest lands and 76 inactive wells located mostly in DEC Regions eight and nine. There are no commercial mines on State Forests. Management of mineral resources on State Forest properties is unique, in that the Division of Lands and Forests works in cooperation with others, most notably the Division of Mineral Resources, the Office of General Services and the Public Service Commission.

"Minerals" shall constitute any substance which is removed or extracted from beneath the earth's surface, in whatever form (solid, liquid, or gas). Mineral activity on State Forests falls into three categories.

- **Oil, Gas and Solution Mining** – Exploration and production of oil, natural gas, and solution salt and storage of natural gas
- **Mining** – Surface mining of sand, gravel, shale and other aggregate
  – Underground mining of "hard rock" minerals
- **Emerging issues** – Geologic sequestration of carbon is an emerging science where utility plants powered by fossil fuels are adapted to capture carbon that would have otherwise been released into the air. The captured carbon is then to be injected into depleted oil, gas or saline formations, or porous shale strata far below the surface.

Well drilling on State Forest land over the Trenton-Black River natural gas formation

Minerals and Property Rights – The "Split Estate" Case

Minerals, as with any other property right, can be severed from the fee estate. This is usually done by means of a mineral deed or mineral rights reservation, thus creating a split estate. (Leases do not confer permanent rights to the lessee. A deed or reservation, on the other hand, permanently transfers rights from the grantor to the grantee.) In these situations, mineral rights are considered the dominant estate, meaning they take precedence over other rights associated with the property, including those associated with controlling the surface. However, the mineral owner must show due regard for the interests of the surface estate owner and occupy only those portions of the surface that are reasonably necessary to develop the mineral estate.

"Split Estate" In split estate situations, the surface rights and subsurface rights (such as the rights to develop minerals) for a piece of land are controlled by different parties.

In some areas of the state, there are significant issues with "split estate" mineral control. In limited cases, the state only controls the surface and did not (or could not) acquire the mineral rights associated with the State Forest parcels. The mineral rights may be controlled by another government entity (usually US Department of the Interior – Bureau of Land Management) or a private party.

When another party controls the subsurface minerals, there is potential for impacts to the surface estate. The degree of impact depends on a number of factors:

1) What type of mineral development can be reasonably foreseen? Hard rock mining and surface mining are likely to have a greater surface impact than oil and gas development.

2) What does the mineral estate owner actually hold? The entire mineral estate? Only rights to oil, natural gas, and other fluid minerals? Only mineral rights within certain formations? Only rights to surface mine gravel deposits?

3) Are rights to the mineral estate time-limited? For example, in certain areas of the state, it is not uncommon for timber companies to sell a piece of property, subject to a 10-year reservation of timber rights and a like reservation of the rights to mine for sand and gravel (primarily for maintenance of interior roads serving the property).

In almost all situations the courts have held that the owner(s) of the mineral estate has the right to make "reasonable use" of their estate. Therefore, the surface owner is forced to negotiate when, where, and how much impact constitutes "reasonable use." DEC will prioritize acquisition of the mineral estate wherever it is split from a State Forest tract.

EXPLORATION AND PRODUCTION OF OIL, NATURAL GAS AND SOLUTION SALT

Oil, natural gas and solution salt drilling has been historically centered in the southern tier of western New York.

Natural gas production equipment on Hill Higher State Forest in Chautauqua County

Oil

The first commercial oil well drilled in New York was the "Job Moses #1" well, drilled in 1864, near Limestone, NY. The oil industry expanded rapidly in the late 19th century leading to the development of numerous oil wells across the landscape, especially in Cattaraugus and Allegany counties. In the early days of the industry, these wells were unregulated and un-inventoried. Many uncapped, inactive wells would later be transferred to the state during the acquisition of State Forest tracts.

Natural Gas

The natural gas industry went through a similar expansion with the 1930s exploration and development of the Oriskany Sandstone, the more recent exploration of the Medina natural gas play in the Southern Tier in the 1980s and exploration of the Trenton – Black River formation within the last decade. In general, the development of natural gas has trended eastward over time, from the western part of the state to the Hudson Valley. During this time, many gas wells have been developed on State Forest lands in DEC Regions 7, 8 and 9 under lease agreements.

Natural gas development has the potential to be a significant and growing source of development on State Forest and private lands due to new technologies that enable industry to effectively extract natural gas from the Marcellus shale play. The following pages contain more detail on these emerging trends, including development of the Marcellus Shale. DEC is inclined to consider natural gas development on State Forests due in part to the fact it is a cleaner burning energy alternative to other fossil fuels such as coal and oil, as shown on the table at right.

Fossil Fuel Emission Levels
Pounds per Billion Btu of Energy Input

Pollutant:	Natural Gas	Oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Carbon Monoxide	40	33	208
Nitrogen Oxides	92	448	457
Sulfur Dioxide	1	1,122	2,591
Particulates	7	84	2,744
Mercury	0.000	0.007	0.016

Solution Salt

Solution salt mining is a process whereby salt is removed from underground reservoirs using water that is pumped in and out. The first solution salt well in New York drilled to exploit salt as a mineral resource was drilled near Syracuse, NY. Solution salt mining is currently confined to

Regions 8 and 9, with historic sources in Region 7. Solution salt mining does not impact any State Forest properties, although solution salt is produced from the Carlton Hill Multiple Use Area (administered by the Division of Fish, Wildlife, and Marine Resources and not subject to this plan) in Region 9.

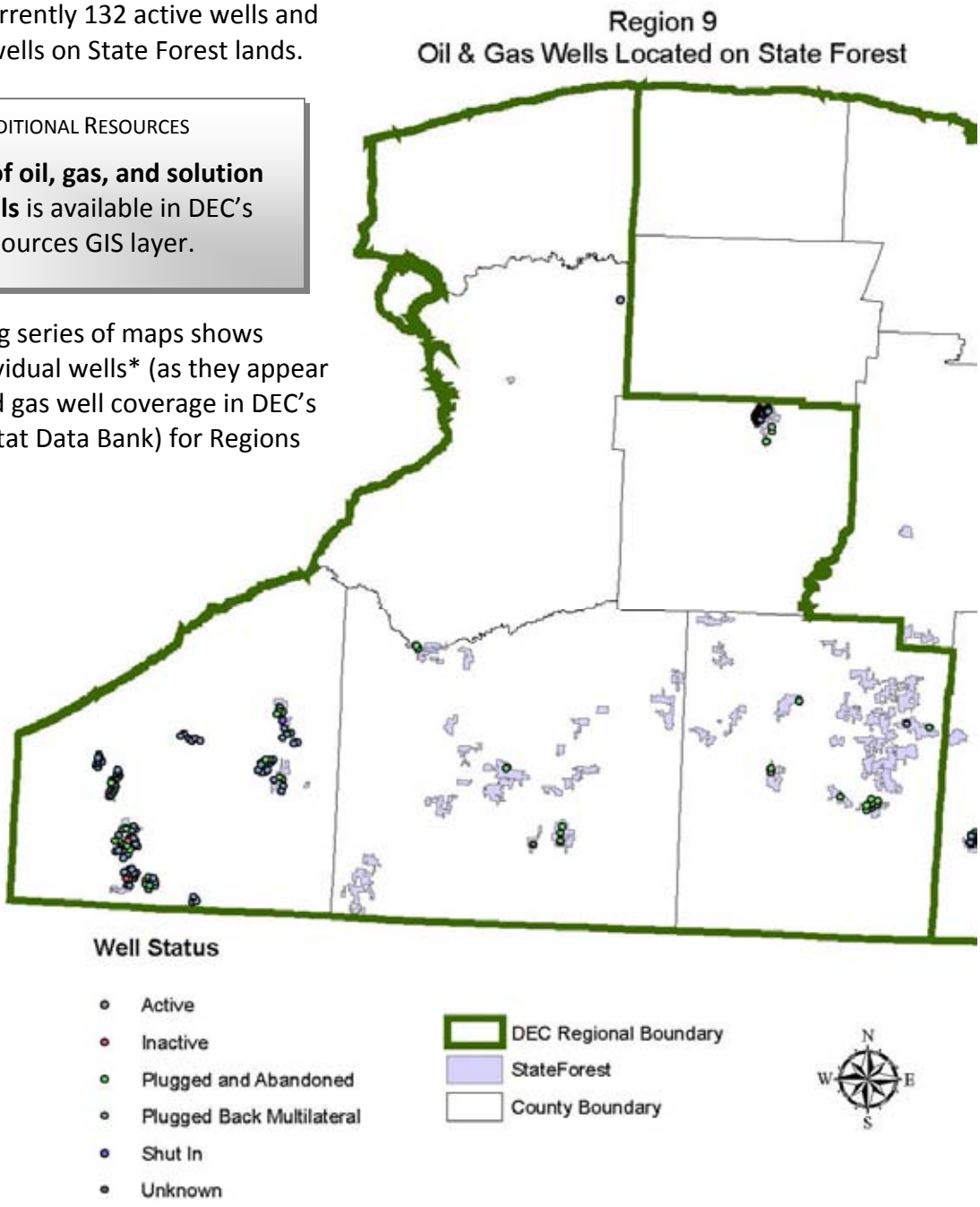
Existing Oil and Gas Development on State Forests

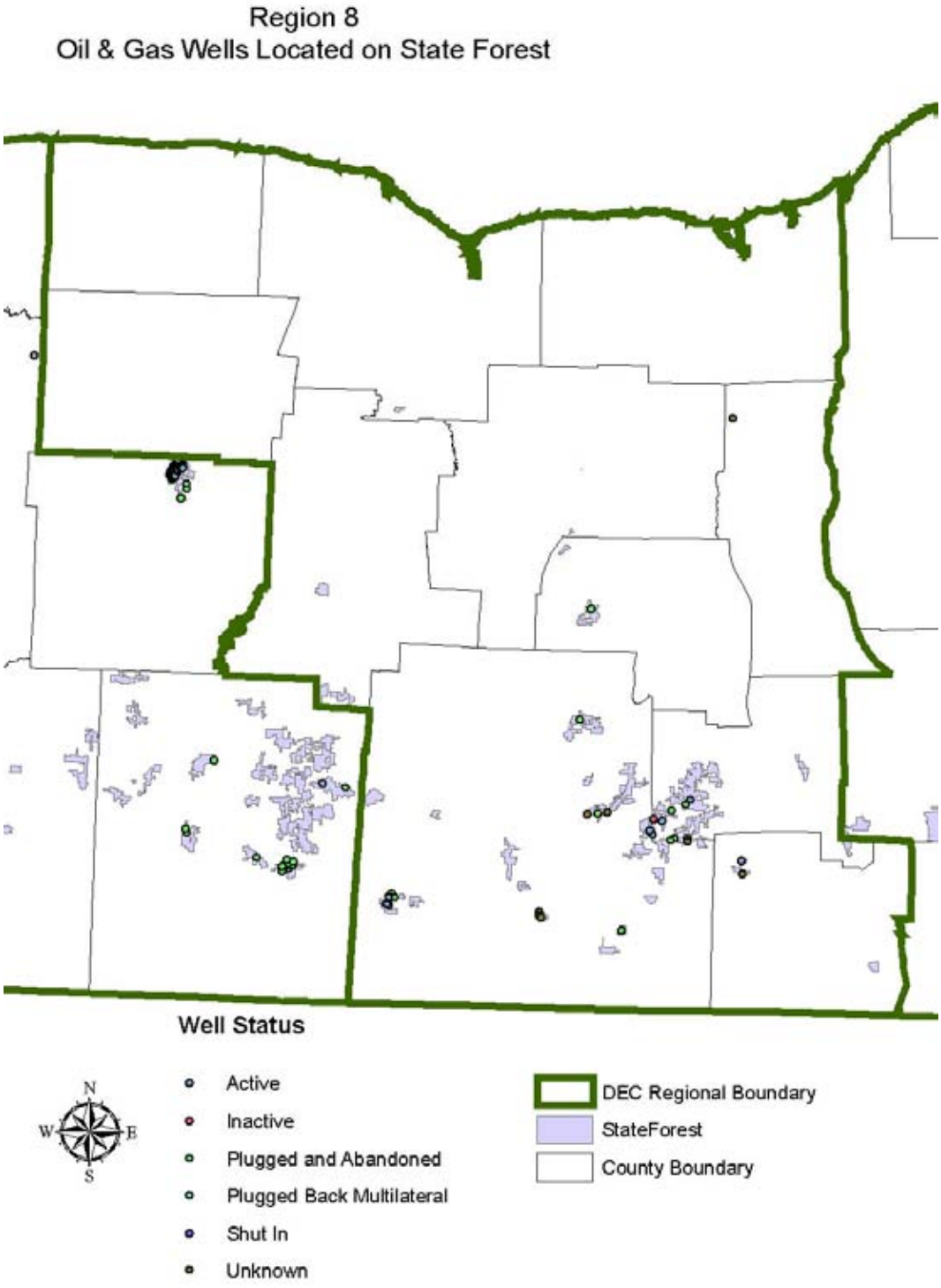
There are currently 132 active wells and 76 inactive wells on State Forest lands.

ADDITIONAL RESOURCES

Database of oil, gas, and solution mining wells is available in DEC's mineral resources GIS layer.

The following series of maps shows existing individual wells* (as they appear in the oil and gas well coverage in DEC's Master Habitat Data Bank) for Regions 6/7, 8 and 9.



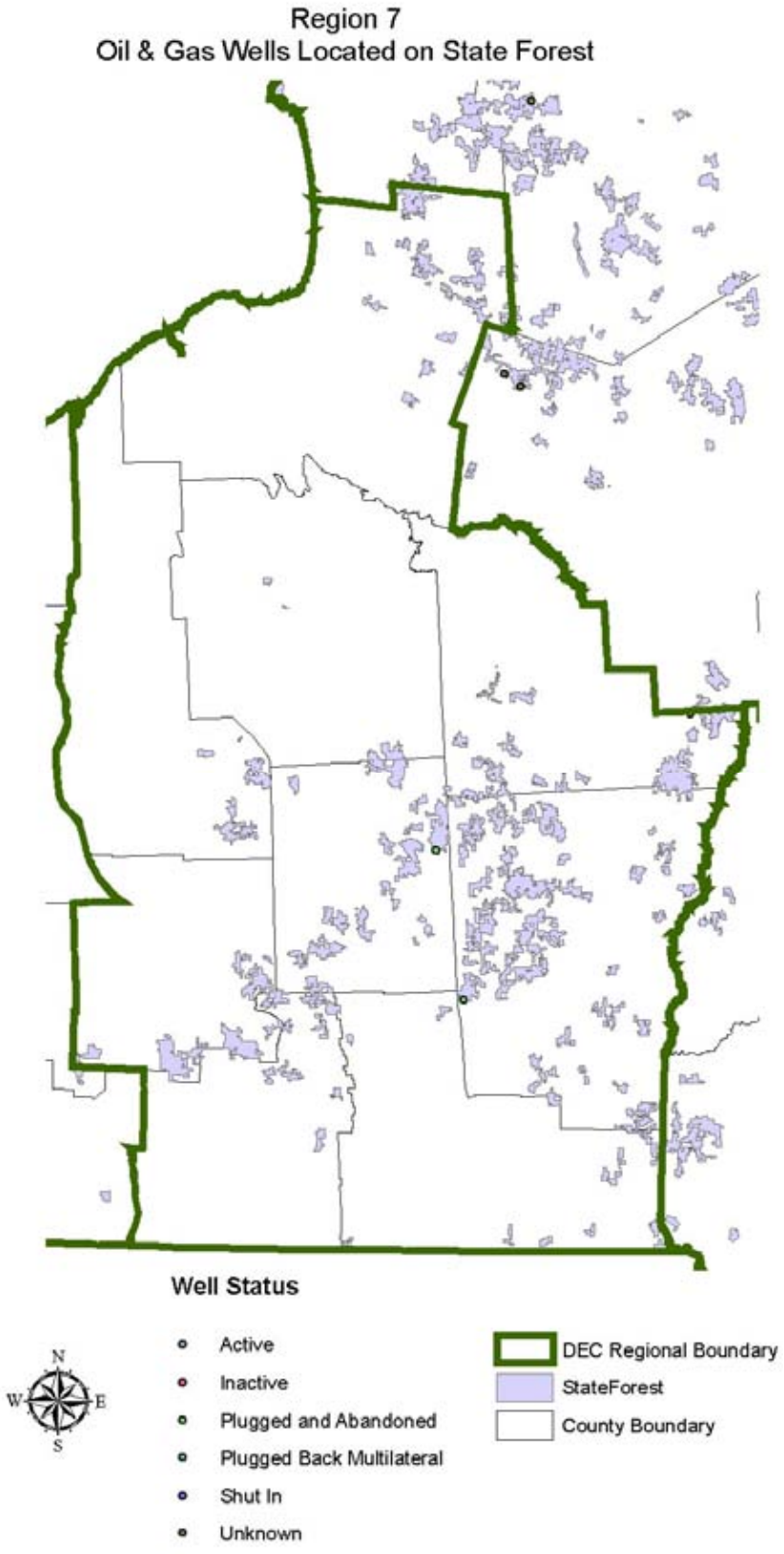


* **Please note:** these maps are only accurate where the well pads producing from state lands are located on state land parcels. They do not show wells which access "state" minerals from well pads located on adjoining private lands.

Oil and Gas Demand and Trends

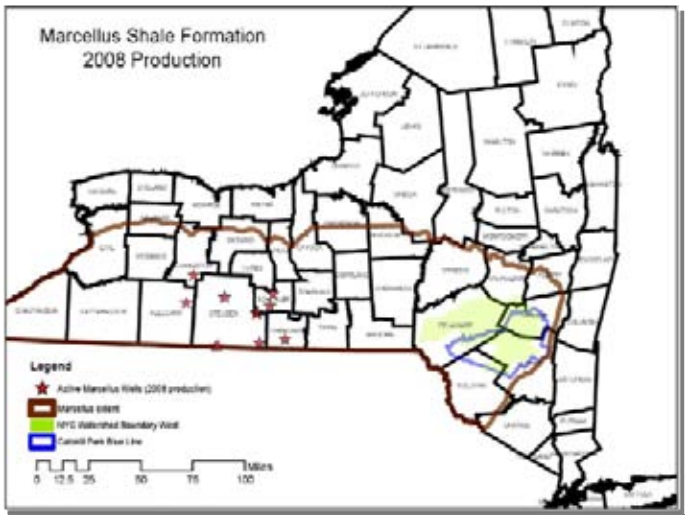
Demand for oil and gas varies, depending on general economic conditions and activity. To forecast demand is difficult, however it is important to note that the industry is currently (July of 2009) at the bottom of a business cycle with low wellhead prices and relatively low production. Peaks and valleys in price and production (and corresponding variance in demand for leasing State Forest parcels) should be expected over the term of this plan.

Recently, the technologies of horizontal drilling and high-volume hydraulic fracturing have created the conditions for industry to seek development of the **Marcellus Shale** formation. Questions have been raised about possible environmental and community impacts. Most concerns are related to water use and management and the composition of the fluids used for fracturing the shale. Marcellus shales are not naturally porous enough for gas to be extracted without employing horizontal drilling and high volume hydraulic fracturing.



Hydraulic Fracturing

A significant amount of concern with hydraulic fracturing has been expressed both within and outside DEC due to the high volume of water used (up to eight million gallons per well). This water is usually obtained from area water bodies and streams prompting concerns with impacts on aquatic life and stream dynamics. Other concerns have been raised with the chemicals added to the hydraulic fracturing solution. There are 12 classes of additives which could be added, including: 1) the proppant (used to hold the fractured shale open); 2) acid; 3) breaker; 4) bactericide/biocide; 5) clay stabilizer; 6) corrosion inhibitor; 7) cross linker; 8) friction reducer; 9) gelling agent; 10) iron control; 11) scale inhibitor; 12) surfactant; to form a solution of approximately 98% water with 2% additives. Following high pressure injection of this solution into the Marcellus shale a certain amount is withdrawn and must be properly treated and disposed. Significant concerns remain with the proper treatment of hydraulic fracturing solution after it is drawn back out of the well at the completion of the hydraulic fracturing process. Exploration interests are looking at recycling opportunities and treatment options to address these issues. The Division of Mineral Resources is currently (August of 2010) reviewing public comment on a supplement to their Generic Environmental Impact Statement to deal with the high volume hydraulic fracturing production procedures needed to access this natural gas resource. Any decision regarding hydraulic fracturing on State Forests will be deferred until current efforts to assess and analyze its impacts have been completed.



Natural Gas Development

Based on current information, the bulk of work associated with the Marcellus Shale is likely to occur in Chenango, Broome and Tioga counties in Region 7, Sullivan County in Region 3, and Delaware County in Region 4. Some smaller Marcellus Shale development could also take place in portions of Regions 8 and 9.

Exploration and development work in the Utica Shale in Regions 3, 4, 7, 8, 9 and possibly, the southern portion of Region 6 may also occur, although this is still considerably more speculative than the Marcellus Shale. Utica Shale drilling has occurred as recently as August 2009 in Delaware County. Work in other “black shale” formations may be undertaken. Surface impacts from development work in all the shales are likely to be similar.

Further development could also occur in the Trenton – Black River and Theresa formations, although low wellhead prices for natural gas may dampen enthusiasm for these deeper formations. These developments will, most likely, result in further nominations of State Forests for new leases. Exactly when or if additional lease sales may occur is unclear at this time.

Oil and Gas Policies and Guidance

Lease Agreements

Oil and gas production from State Forest lands, where the mineral rights are owned by the state, are only undertaken under the terms and conditions of an oil and gas lease.
As surface managers, the Division of Lands and Forests will evaluate any concerns as they pertain to new natural gas leases on State Forest lands, including exploration and development work undertaken in conjunction with the Marcellus Shale formation. **Prior to any new leases, DEC will hold public meetings to discuss all possible leasing options**, including: forgoing leases; leasing with no surface occupancy, and entering leases with proper environmental protections in place.

Construction activities associated with oil and gas development are usually regulated through the use of a Temporary Revocable Permit (TRP) and the terms and conditions of a permit to drill. Long term operation of the facilities constructed under the TRP is covered under the lease.

ADDITIONAL RESOURCES

"New York State Leasing of State Lands for Oil and Gas Development; 2009 Report" is available at www.dec.ny.gov/energy/1579.html

Listing of current State Forest leases is available at www.dec.ny.gov/lands/64567.html

Tract Assessments

Whenever lands are considered for leasing, DEC will conduct a comprehensive tract assessment process to determine where the lands are able to support or accommodate related surface impacts. The site specific conditions for limiting impacts on natural resources will be drafted by land managers in coordination with Mineral Resource staff and incorporated into contract documents. These conditions will include but not be limited to criteria for site selection, mitigation of impacts and land reclamation upon completion of drilling.

This service rig is an example of the heavy equipment that is needed to maintain a natural gas well and can significantly impact natural communities through its presence and related infrastructure

A number of factors will be considered during the "tract assessment process" to determine the compatibility of surface disturbance associated

with natural gas development including, but not limited to, proximity to wetlands, riparian areas, slope steepness, recreation trails, rare, threatened or endangered species, and other unique ecological communities. Compatibility will be determined during field inspection and the tract assessment process on a case by case basis.

Individual tract assessments for each forest within a Unit, and determinations made regarding exclusion zones will be completed prior to leasing, and will be incorporated into the lease agreement. Any parcel designated for non-surface entry in the lease will no longer be subject to the review process detailed above due to the prohibition of surface disturbance(s). Exceptions to the tract assessments are possible if additional analysis, protective measures, new technology, or other issues warrant a change in compatibility status of an area.

The process of locating well sites will be guided by a drilling hierarchy that incorporates stand management objectives. The hierarchy will first consider drilling in areas such as fields and conifer plantations. Drilling options will decrease as stand management moves from even aged to uneven aged conditions. The least favorable locations for drilling will be in stands managed for old growth characteristics. Upon completion of drilling, well sites will be reclaimed with native vegetation to a condition consistent with the surrounding stand management objectives.

DEC may consider well pad densities of greater than one well pad in 320 acres only when the additional impact can be addressed with heightened mitigation measures and well location restrictions. These will address well site placement, along with routing considerations for supporting roads and pipelines. An additional SEQR analysis will need to be conducted. In any event well pad densities of one well pad in 80 acres or greater cannot be considered, as this would result in unacceptable impacts to the resource and cause conflicts with other uses and goals for management of the property.

Sanford West lease road in DEC Region 9 was developed to support a natural gas well site

To ensure the compatibility with natural resources, land managers will review and evaluate all proposals for surface disturbance associated with gas leasing. This will determine the suitability of these activities and will include a review of the well siting and drilling pad development plans, well site disturbance and the location of distribution, collection and utility lines. It is recognized that DEC's review will result in reserving some sensitive State Forests (or parts thereof) from any oil and gas development impacts by use of "no-occupancy leases". Under this type of lease, well pads, access roads and gathering pipelines will not be located on the State Forest.

Access Roads

Access roads associated with well sites will not exceed 14' in width between ditches and will be designed to maintain closed canopy conditions, where appropriate. On turns and intersections roads will not exceed a total cleared width of 36 feet. Roads will be constructed with gravel over filter fabric to minimize soil disturbance. Upon completion of drilling, access roads may be closed to the public and will be reclaimed to a condition capable of supporting both vegetation and periodic access to maintain the well site. Site restoration will be a condition of the lease and will be authorized by a Temporary Revocable Permit (TRP).

Pipelines

The production of natural gas is not possible without a pipeline from the wellhead to the point of consumption. “Gathering” lines serve to collect natural gas from several different wells. “Transmission” lines generally begin at the point where two or more “gathering” lines intersect. Either of these types of pipelines may be subject to regulation by the Public Service Commission, depending on length and operating pressure. DEC does not have the legal authority to issue easements for pipeline or utility corridors, other than as granted by an active lease on the state-administered parcel.

The Sunoco Pipeline on Moss Hill State Forest in Steuben County, developed before State Forest land acquisition

The Frost Pipeline on South Bradford State Forest in Steuben County exhibits the significant surface impact that must occur with pipeline development

An important issue to consider is the amount and location of pipelines needed. Pipelines presently located on State Forests have created restrictions of forest uses due to the precautions which must be taken to cross the pipeline. DEC is regularly faced with requests to site transmission lines across State Forests. In most cases, Department staff are successful in routing these lines around State Forest lands. However, there are those

cases where routing across State Forest is the most "environmentally friendly" alternative. DEC's ability to respond to this type of request is currently extremely limited. There are many instances where this type of facility was historically authorized under a (long expired) Temporary Revocable Permit, leaving pipelines in place without legal authority. These situations will be identified in their corresponding UMPs with recommendations for their final disposition (closing or legislatively establishing real property rights for its continued use, on a case by case basis).

ADDITIONAL RESOURCES

DRAFT Guidelines for Pipeline Construction on DEC Administered State Lands – 4/19/07, can be found at www.dec.ny.gov/lands/64567.html

The Bureau of State Land Management has developed a draft guidance document dealing with pipelines. This pipeline guidance document will be expanded to include strategies for dealing with existing utility corridors and establishment of new utility corridors for transmission lines, as it is now focused on "gathering" lines. A complete solution to the pipeline and utility corridor issues may require legislative action.

The transportation of gas though pipelines and utility lines will be located adjacent to Public Forest Access Roads or the existing disturbed areas created to construct the well sites wherever possible. Exceptions must be approved by the Division of Lands and Forests. Additional surface disturbance associated with such construction will be considered in areas other than uneven-aged stands which are managed for closed canopy conditions. Surface disturbances such as pipeline construction will also be excluded from protected areas within these stands which are managed to exclude tree cutting and other disturbances such as pipeline construction.

Seismic Exploration

ADDITIONAL RESOURCES

Guidelines for Seismic Testing on DEC Administered State Land – 12/20/07, can be found at www.dec.ny.gov/lands/64567.html

Seismic exploration is the search for mineral deposits by the recording and interpretation of artificially induced shock waves in the earth. Shock waves are generated by shallow borehole explosives such as dynamite, or vibratory mechanisms mounted on specialized trucks (Pendleton 2008). These procedures are necessary to determine the extent and distribution of natural gas fields. The Bureau of State Land Management has developed a guidance document dealing with seismic exploration on State Forests.

Requests to use State Forest land to conduct geophysical (such as seismic survey), geochemical and/or surface sampling procedures will require an approved lease and a Temporary Revocable Permit. Sampling procedures are less invasive than development operations and will be subject to DEC's seismic testing guidelines. Only the lessee, or parties authorized by the lessee, can be issued a TRP. Seismic exploration on State Forest lands, including lands under public rights-of-way, will not be allowed without a current lease and TRP.

Public Involvement

This plan establishes statewide policy for the exploration and production of oil and gas, through a process of public involvement and review. As individual UMPs are developed, this policy will be included by reference.

Generally, the Division of Mineral Resources conducts public involvement activities prior to conducting a lease sale. Following the tract assessment previously mentioned, DEC's Division of Lands and Forests and Division of Mineral Resources will hold joint public meetings and solicit comments. Consideration of any new leasing on State Forests will be conducted in an open and transparent manner which will involve public meetings as part of the decision making process.

Storage of Natural Gas

Underground storage of natural gas in New York is, generally, undertaken in either depleted production formations or in salt caverns, either created by solution salt mining or purposely created for this use. There are currently six natural gas storage sites beneath State Forests; four in Zoar Valley MUA, one in Cameron State Forest and one in Greenwood State Forest/Rock Creek State Forest. Gas storage under State Forest parcels has been occurring since at least the early 1960s.

Natural gas storage well on Rock Creek State Forest in Steuben County

The northeastern portion of the country and New York State in particular, is already a very large consumer of oil and gas resources. The demand for natural gas storage is likely to increase through the period covered by this plan as the use of natural gas increases in relation to "dirtier" burning oil and coal.

ADDITIONAL RESOURCES

Listing of current State Forest leases including natural gas storage is available at www.dec.ny.gov/lands/64567.html

Storage Policy

DEC's current oil and gas leases do not permit storage (or at least not storage of gas produced elsewhere). In the case of a storage proposal, the proponent would need to come to the Department to obtain the necessary rights through a storage lease. A proposal may require a UMP amendment process, including additional public meetings and full compliance with SEQRA. Any proposal for gas storage development must be consistent with the objectives of this Plan.

Oil and Gas Laws and Regulations

The applicable laws relating to the exploration for and production of oil and gas from State Forests are:

- Environmental Conservation Law Article 23, Title 11, Section 23-1101
- Environmental Conservation Law Article 9, Title 5, Section 9-0507

Regulations applicable to state lands leased for oil and gas production are found on 6NYCRR Part 550 – 557.

Some pipeline/utility corridors may fall under the regulatory authority of the Public Service Commission, and as such are governed by a different set of laws:

- Public Service Commission Law, Article 7, Titles 120 through 130, inclusive.

Please note that facilities which are subject to an Article 7 review by the Public Service Commission are excluded, by statute, from the provisions of the State Environmental Quality Regulations (SEQR). The Article 7 review stands in place of the normal SEQR review.

Environmental impacts related to oil and gas exploration and development on State Forests have been reviewed in the 1992 GEIS for oil and gas activity and its supplemental findings for public lands; under the SGEIS being developed for activity in the Marcellus Shale formation; and within this plan.

A Memorandum of Understanding was established in 1986 between the Division of Lands and Forests and the Division of Mineral Resources establishing a framework for cooperation between the respective divisions on the management of mineral resources on state lands.

ADDITIONAL RESOURCES

MOU regarding management of mineral resources on state lands along with assembled laws and regulations pertinent to oil and gas development is available at www.dec.ny.gov/lands/64567.html

The applicable state laws relating to storage of natural gas on State Forest properties are:

- Environmental Conservation Law Article 23, Title 11, Section 23-1103
- Environmental Conservation Law Article 9, Title 5, Section 9-0507

In addition, should these storage facilities store, or propose to store fluid minerals which are involved in interstate transport, they would be subject to regulation at the federal level by the Federal Energy Regulatory Commission.

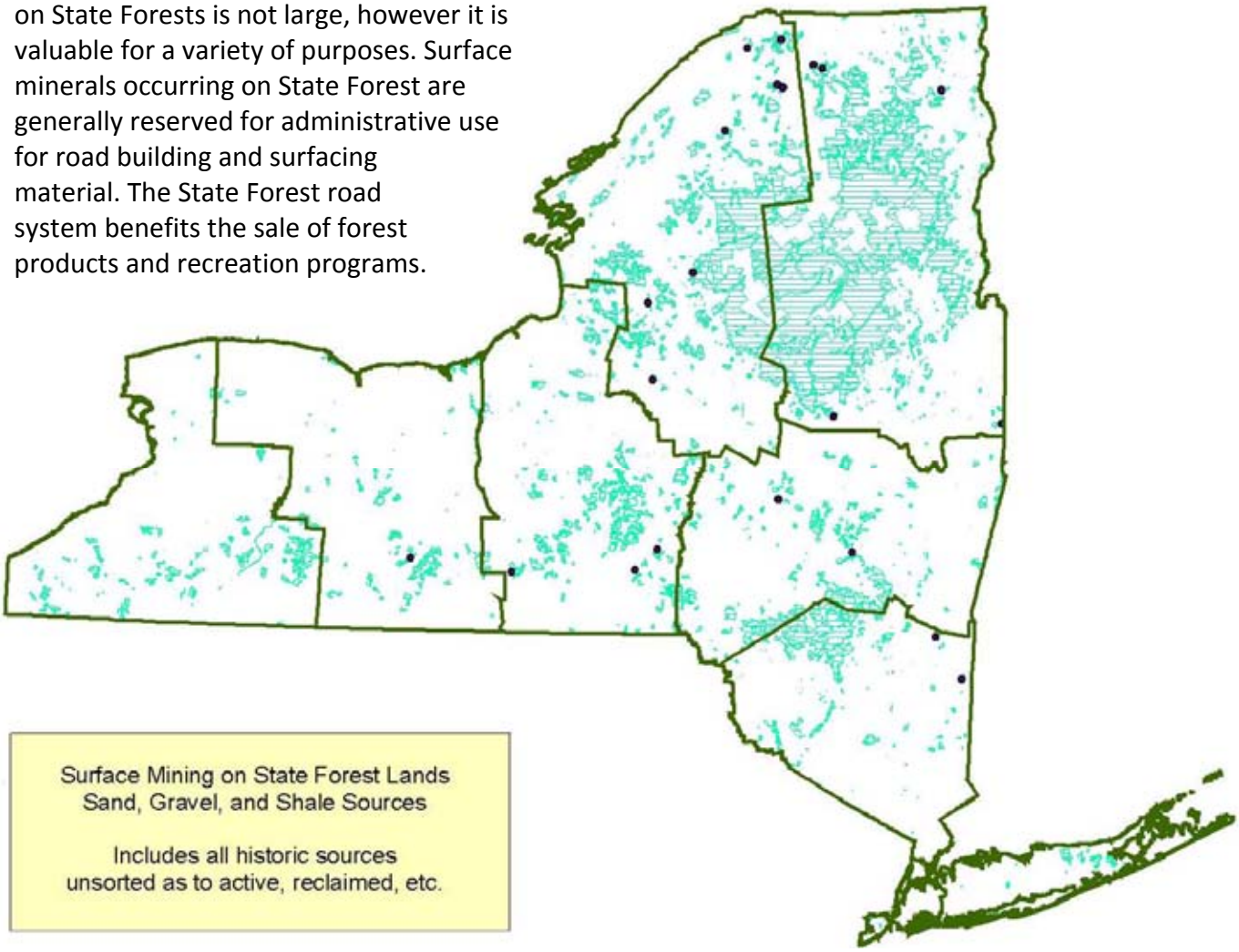
MINING

New York is rich in minerals which are mined for industrial and construction uses. Under Article 7 of the New York State Consolidated Laws, any citizen of the United States may apply for permission to explore and/or extract any mineral on state lands. At present, there are no mining contracts, permits or operations on State Forest lands across the state.

Surface Mining of Sand, Gravel and Shale

Historically "common variety" minerals including limestone, sand, gravel, shale and other aggregate materials have been produced, statewide, from State Forests, both for use in development projects within the forests and for commercial sale. The majority of commercial sales from State Forest properties occurred prior to state acquisition.

The type and amount of surface minerals present on State Forests is not large, however it is valuable for a variety of purposes. Surface minerals occurring on State Forest are generally reserved for administrative use for road building and surfacing material. The State Forest road system benefits the sale of forest products and recreation programs.



Surface Mining on State Forest Lands
Sand, Gravel, and Shale Sources

Includes all historic sources
unsorted as to active, reclaimed, etc.

Underground Mining of Hard Rock Minerals

Metal ores and gem minerals, such as garnet, are mined chiefly in mountainous regions. Salt is extracted from rich deposits in central and western New York where extensive mines occur; both active and historic. Zinc, fibrous talc, and wollastonite are still being actively mined in the North Country region. Underground mining of lead, iron (in several forms) and graphite also occurred in both the North Country and Hudson Valley regions. Historically, some limestone (for cement) was mined from underground locations in the Hudson Valley region.

There is no existing underground mining on State Forest lands and no known impacts from historical mining activity. Mine subsidence and collapse has been an issue with historic mines, particularly in central and western New York. The landslide situation in the Tully Valley brine fields and the Akzo salt mine collapse, near Retsof, NY are rather startling examples. Neither of these situations involved state lands, although there are state lands in close proximity.

Mining Policies and Guidance

Current Department policy is to decline any commercial mining application(s) pertaining to State Forest lands, as the impacts from these activities are not compatible with the purposes for which Reforestation Areas were purchased. In the rare cases of larger deposits, a land exchange procedure may be appropriate. This could be handled as a “land for land” exchange or a “minerals for land” exchange, depending on the specific situation. This should be analyzed on a case by case basis for each UMP.

Small-scale surface mining may be permitted if the Department deems it necessary for infrastructure purposes. This mining activity will remain below the thresholds established in ECL, above which a Mined Land Reclamation Permit is required (1,000 tons or 750 cubic yards, whichever is less, removed from the earth during twelve successive calendar months; this is approximately equal to 40-50 tandem-axle (10-wheeler) dump truck loads).

If DEC proposes future mineral resource extraction within any Unit, then the Regional Forester/Operation Supervisor and Mined Land Reclamation Specialist will determine if a mined land reclamation permit is required before excavation begins. If determined that proposed annual extraction requirements will be above present Mined Land Reclamation Law thresholds, then a mining and reclamation permit application will be prepared and submitted to the Regional Mined Land Reclamation Specialist for review and approval before any excavation takes place.

If it is determined that a mined land reclamation permit is not required, but mineral resources will be extracted for infrastructure maintenance and construction necessitated by DEC, the basic mining and reclamation standards will be followed. If extraction takes place at any level on State Forest lands, the exact location of the area to be disturbed will be mapped and be

incorporated in Unit Management Planning until all sites are closed and reclaimed according to Division standards.

Mining Laws and Regulations

The applicable state laws relating to the exploration for and production of common variety minerals from State Forest properties are:

- Environmental Conservation Law, Article 23, Title 27, all sections
- 6 NYCRR Section 190.8 (a), (g); also, if a Mined Land Reclamation Law permit is issued, 6NYCRR Part 420 would also apply

Underground mining is also regulated by the Federal Mine Safety and Health Act of 1977 (USC Title 30, Chapter 22) and the federal rules and regulations promulgated by the Mine Safety and Health Administration.

EMERGING ISSUES

Disposal by Injection

Injection into rock formations is a valid and viable disposal option for both:

- Produced fluids from an existing production / storage well
- Hydraulic fracturing waste water

In both cases, this type of disposal requires:

- A SPDES permit from DEC's Division of Water;
- Permission from US EPA to operate an Underground Injection Control disposal well;
- Permission from the Division of Mineral Resources to convert an existing well to this use (should an existing well be proposed for use).
- Written approval of the surface owner.

ADDITIONAL RESOURCES

Information on disposal by injection is available at www.dec.ny.gov/energy/1610.html

While there are several wells in New York permitted for disposal by injection, none are located on State Forest lands. As disposal becomes a more critical issue, proposals to use existing depleted production wells may arise. If and when such proposals are made, no decision will be made without an opportunity for public comment to be presented.

Carbon Capture and Sequestration

Carbon capture and storage is a means of mitigating fossil fuel emissions, based on capturing carbon dioxide (CO_2) from large point sources such as fossil fuel power plants, and storing it away from atmosphere by different means. Although CO_2 has been injected into geological formations for various purposes, the long term storage of CO_2 is a relatively new concept.

This emerging technology is yet to be comprehensively developed but is a potential activity for consideration. This technology is very early in the development process, with even a pilot project some distance in the future.

The impacts of this technology are as yet unknown, as there have not been any long-term studies completed. Useful rock formations, including areas with wells that reach depleted production formations, could be the subject of this type of proposal.

ADDITIONAL RESOURCES

A DEC pamphlet explaining **Carbon Capture and Sequestration** is available at www.dec.ny.gov/lands/64567.html

Production leases currently in place may not be sufficient for this use. Any proposals of this type would be predicated on obtaining a storage lease for the property in question.

"MR" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Mineral Resources (MR) Objective I - Provide for natural gas and other mineral resource exploration and development while protecting natural resources and quality recreational opportunities.

MR Action 1 – Apply a hierarchical approach that classifies areas of each State Forest into four categories as part of a tract assessment to be conducted prior to leasing.

Category A - Compatible with well pad, road, and utility development.

Category B - High Forest Canopy Areas with one well pad per State Forest.

Category C - 250 foot stream and designated recreational trail buffers. Not compatible with well pad development; may be compatible with road and utility development.

Category D – Infrastructure Exclusion areas. Not compatible with well pad, road, or utility development.

MR Objective II – Clarify DEC's position on outstanding issues affecting the management of mineral exploration, extraction and transportation on State Forests.

MR Action 2 – Adapt the draft guidance for pipelines on State Forests to the DEC policy system and expand it to include guidance on strategies for dealing with existing pipeline corridors and establishment of new pipeline corridors by 2014. If the issue of existing unauthorized pipelines cannot be sufficiently addressed at the policy level, propose legislation to resolve the issue.

MR Action 3 – Finalize and adopt the current draft policy on seismic exploration by 2011.

MR Action 4 – Adopt policies addressing disposal by injection and carbon capture and sequestration by 2020.

MR Action 5 – Adopt a policy on tract assessments for oil and gas leasing, based on mineral character and expected mineral activity, site condition, and public use by 2015.

MR Action 6 – Adopt a policy on water use for oil and gas extraction, based on information in the Division of Mineral Resources GEIS.

MR Objective III – Prioritize acquisition of the mineral estate wherever it is split from a State Forest tract.

MR SEQR Alternatives Analysis and Thresholds

The **preferred alternative** (also the **no-action alternative**) is for DEC to consider any nominations from the oil and gas industry for leasing on a case-by-case basis, conducting a tract assessment and public input meeting(s) prior to granting any new lease. The analysis process and mitigations detailed above in this section will be followed.

Another alternative would be to close State Forests to all future leasing. This alternative has not been selected because minerals leasing provides economic benefits and resources needed by society. Development on public lands, with heightened protections and oversight, has proven to be a compatible use of State Forests.

SEQR Analysis Thresholds: The action of leasing any lands in New York State for oil and gas development has been addressed by DEC's Division of Mineral Resources in the following Generic Environmental Impact Statements (GEIS) which each provide SEQR analysis thresholds:

- Final GEIS on the Oil, Gas and Solution Mining Regulatory Program (July 1992)
- Draft Supplemental GEIS regarding Well Permit Issuance for Horizontal Drilling And High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs

This plan assesses impacts and establishes mitigation measures and further analysis of oil and gas developments as it applies specifically to State Forests. Compliance with the guidelines of this section will avoid and minimize potential impacts resulting from mineral resource activities. Further SEQR analysis will be required for well drilling plans and for any development which exceeds well pad densities of greater than one well pad in 320 acres or which does not comply with limitations identified through a tract assessment. In addition, any proposals for carbon injection and storage or for waste water disposal will require additional SEQR analysis.

SUPPORTING LOCAL COMMUNITIES

TOURISM

State Forests can be an economic asset to the local communities that surround them. It is estimated that more than three out of every four Americans participate in active outdoor recreation of some sort each year (Outdoor Industry Foundation 2006). When they do, they spend money, generate jobs, and support local communities. When recreationists travel to visit State Forests, they often spend money for such things as gas, food, lodging, supplies and equipment. The amount they spend depends on how far they have travelled to reach their destination, how long they stay, and what activities they undertake while they are there.

Nelson Swamp Unique Area in Madison County has accessible hardened trails, a viewing platform and signage that helps provide a positive experience for visitors and greater potential for interpretive tours

The size of this economic contribution is difficult to determine without direct surveys of State Forest users. There are many estimates of how much money outdoor recreationists spend each year. The Outdoor Industry Foundation estimates that active outdoor recreation generates nearly $800 million in annual state tax revenue and produces $11.3 billion annually in retail sales and services in New York. Unfortunately, there is no way to tell what portion of that amount should be attributed directly to the existence of State Forest lands.

Local communities can take advantage of the presence of State Forests by encouraging businesses to cater to State Forest users as part of their business planning. Local chambers of commerce or regional RC&D councils might undertake surveys of State Forest recreationists to find out what goods and services they would be most likely to purchase during their stay in the area.

TAXES PAID

The New York State Real Property Tax Law provides that all Reforestation Areas (96% of all State Forests) are subject to taxation for school and town purposes. Certain reforestation areas

are also subject to taxation for county purposes. Most Unique Areas and Multiple Use Areas (4% of all State Forests) are exempt from taxation. All of these lands are assessed as if privately owned.

FIREWOOD

The provision for local individuals to enter State Forests under a timber sale agreement to cut firewood for their use has been an important longstanding tradition in many rural communities. This tradition, as well as the opportunities it presents for collaboration, education, outreach and community support, is supported by the Division. Unfortunately, as staffing levels continue to decrease these programs have been cut back. The DEC will make an effort to continue this program, though delivery of the program may be inconsistent and difficult to maintain at current staffing levels.

COMMUNICATION AND EDUCATION

It is important that local governments and stakeholders are notified of UMP meetings and included in the long-term planning process to integrate their concerns and desires whenever possible. Communication and education would be enhanced by the employment of more seasonal stewards, as mentioned elsewhere in this plan.

"LC" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Supporting Local Communities (LC) Objective I - Provide revenue to New York State and economic stimulus and jobs for local communities and businesses.

LC Action 1 – Increase the level of timber harvesting on State Forests at least to 1990's levels, not to exceed the statewide sustainable threshold.

LC Action 2 – Support local governments and school districts through payment of property taxes according to law.

LC Objective II – Improve local economies through forest-based tourism.

LC Action 2 – Provide local chambers of commerce and regional RC&D councils information about State Forests and the opportunities they present.

LC Objective III – Protect rural character and provide ecosystem services and open space benefits to local communities.

LC SEQR Alternatives Analysis

Preferred alternative: Continuing to support local communities on an economic and environmental basis (the **no action alternative**) has been chosen as the preferred alternative. The vast majority of the goals in this plan directly or indirectly support local communities by enhancing local economies and quality of life.

CHAPTER 6

FOREST MANAGEMENT AND HEALTH

FOREST PRODUCTS

TIMBER

Early forestry activities on State Forests focused on planting and growing trees rather than selling them, as much of the land acquired was abandoned farmland (hence the category of Reforestation Areas). The Civilian Conservation Corps (CCC) planted millions of seedlings on State Forests during the 1930s. Non-forested areas that were not planted by the CCC reverted naturally to forest. Many of the properties acquired did have some forested areas, as most farms had a woodlot which served as a source of heating fuel for the home.

During the 1940s and 50s, the sale of timber from State Forests dealt primarily in firewood, fence posts, poles, and Christmas trees, due to the fact that the majority of the stands available for management were of smaller diameter classes. Available markets and staffing were a boon to forest management efforts, since thinning and tending operations of relatively young stands could be accomplished through commercial sales, rather than having to pay contractors to do the work.

Over time the acreage of larger timber increased and with it the proportion of sales that were comprised primarily of sawtimber. It was not until the mid-1990s that sawtimber sales comprised more than half of the acreage harvested in a given year. The demand for smaller wood continued to exist, in the form of firewood and pulpwood markets, and to a lesser extent, post and pole sales.

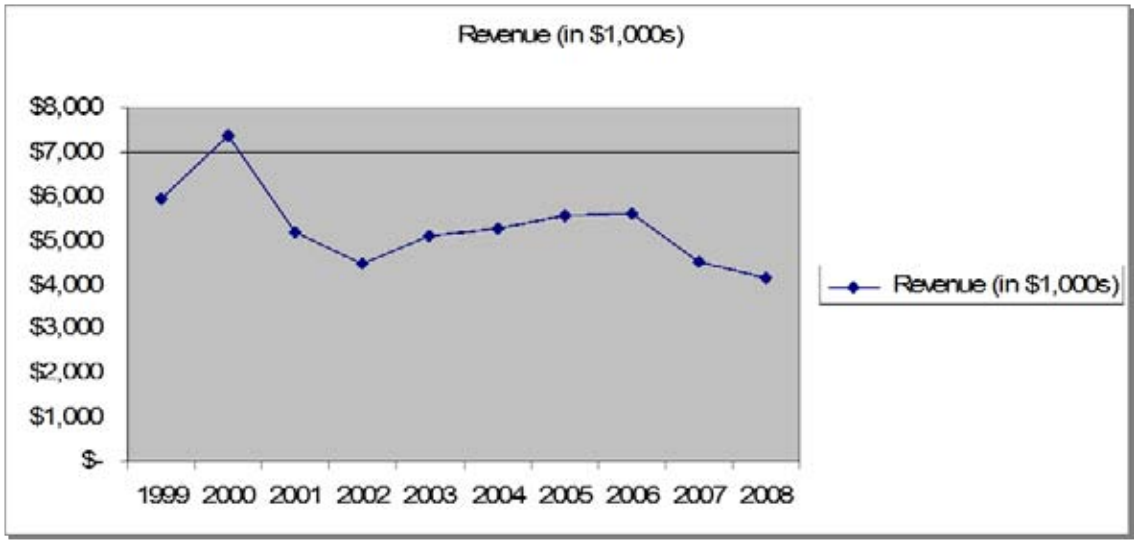
Cut logs produced from State Forest lands

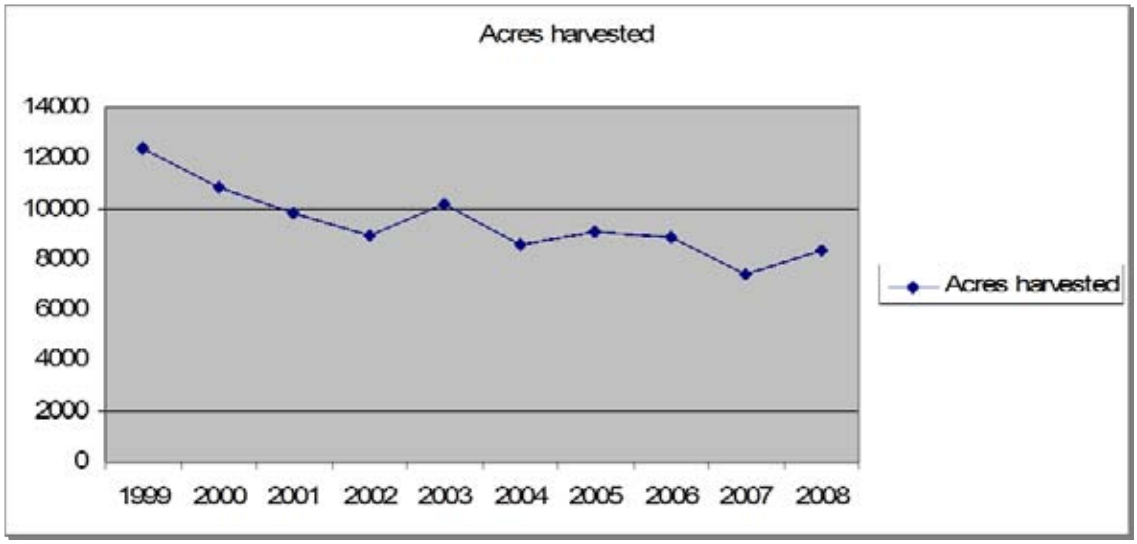
Existing Conditions and Trends

During the ten-year period between Fiscal Year (FY) 1999 and FY 2008, sales of forest products from State Forests generated **average revenues of $5,317,564 per year**. This represents roughly 2% of the total value of forest products harvested from public and private lands in New York State each year. The highest amount of revenue from forest product sales on State Forests for any one year during that period was $7,354,224 in FY 2000, and the lowest was $4,140,788 during FY 2008. (Note: The state fiscal year runs from April 1 through March 31.)

The acreage harvested during that same period exhibited a relatively steady decline, with the exception of FY 2002-03. The highest area harvest was 12,372 acres harvested in FY 1999-2000, and the lowest area was 7,427 acres harvested in FY 2007-08. The **average number of acres harvested per year was 9,439**. This average is just over 2% of the total forested acreage on public and private lands that receives some form of harvest each year.

Interestingly, the increase or decrease in area harvested did not necessarily correspond with a similar decrease in revenue, although the general trend of both is slightly downward. The following two graphs depict the changes in revenue and acres harvested from FY 1999 to 2008.





In FY 2009-10, the total harvested area was 7,221 acres, reflecting a downward trend in acreage harvested that is projected to continue with the decline in staffing. This represents just under 1% of State Forest acreage harvested (majority of harvests are thinning cuts) per year.

The timber market in general has seen a downward trend during the recent recession, but this is reflected more in the revenue figures than in the acreage figures. Obviously, as timber prices have dropped, the amount of revenue received by the state from the sale of timber has decreased accordingly, even in the face of a slight increase in harvesting activity.

Some further data provides additional context when considering the above-referenced figures. In terms of direct impacts only, the total statewide economic contribution of the forestry/logging and wood products manufacturing industries (including paper production not associated with a NYS pulp mill) is as follows:

- $9 billion value of shipments
- $3.7 billion contributed annually to state gross product
- $8.2 billion total value of shipments (6% of NYS manufacturing value of shipments)
- $1.6 billion in forest-based recreation as tourism expenditures

The total payroll for the forestry/logging and wood products manufacturing industries (including paper product production not associated with a NYS pulp mill) is $1.7 billion. The manufacturing portion of this number ($1.6 billion) represents about 7% of total NYS manufacturing payroll.

The total employment for forestry/logging and wood products manufacturing industries (including paper product production not associated with a NYS pulp mill) is over 55,000. The manufacturing portion of this number (51,000) represents about 8% of total NYS manufacturing employment.

Timber Harvesting and Staffing

The number of acres harvested in a given year is affected most by staffing levels and the occurrence of events that necessarily take staff time away from timber sales. Similar to revenue and acreage, the Bureau of State Land Management has experienced a general **downward trend in the number of staff** over the past decade. This decline is likely to continue, given the state's fiscal climate, and the number of foresters likely to retire in the next few years. A proposal has been offered to the Division of Budget, requesting permission to hire two new foresters, based on the recommendations in the 2006 Comptroller's Audit. The audit noted that hiring staff to mark and administer timber sales was a revenue positive action; that is, the amount of revenue generated by the additional timber sales staff would be greater than the cost of hiring those staff. Specifically, the report estimated that, over the three-year period studied, an increase of 17 foresters would have created a net revenue increase of $3.7 million per year.

Growth Versus Removal

Another factor that is likely to affect the amount of timber harvested in future years is the report prepared by SUNY-ESF estimating the periodic annual growth increment on State Forests. The report indicates that approximately 41% of the timber added through annual growth is not removed through harvesting. (To be clear, Forest Preserve lands were not factored in this study.) The report concludes, among other things, that "forest growth on State Forest lands has a positive net production of 0.119 MBF/ac/yr, equivalent to 72,866 MBF per

year." (Note: MBF stands for thousand board feet.) This means that ***after*** accounting for mortality and harvest removals, the volume of timber on State Forests is increasing by over 72 million board feet per year. Current harvest totals have averaged roughly 43 million board feet per year over the past 10 years. This is a rough approximation, as certain forest products are reported in tons or cords, and converting these amounts to board feet cannot be done exactly.

Comparing harvest rates to the net growth rate of the forest provides a valuable yardstick to measure sustainability. However, it must be recognized that sustainable management relies more on promotion of biodiversity, high-quality habitat and forest resiliency than a simplistic approach of cutting below the net growth rate. Therefore, on a year-over-year or unit-level basis, removals may need to temporarily exceed the growth rate to create the desired future conditions or to respond to natural disasters and invasive outbreaks. An example would be the ice storms and blowdowns of the late 1990's that necessitated large-scale salvage harvests.

Public Input

Overall public input regarding the State Forest timber sale program is mixed, and varies widely based on the geographic location in question. Not surprisingly, in areas closer to urban population centers, public comments demonstrate that a higher value is placed on the availability of public land for recreation, whereas comments in more rural areas typically show a propensity to place more worth on the jobs and economic input that State Forest lands can generate for local communities.

Public comments in most areas also indicate that people want to know that timber harvests are conducted in an environmentally responsible and sustainable manner. Some of the specific areas of concern expressed are:

- Water quality
- Soil erosion
- Wildlife habitat
- Biodiversity
- Effects on recreational facilities
- Impacts on adjacent public lands
- Visual impacts

These recently harvested logs are stacked among residual trees

One common theme is that many members of the general public are willing to accept timber harvesting on public land, but would like to know that controls are in place to make sure the harvesting is done responsibly, and would also like to know that there are areas of state land that will not be logged.

Comments are received from time to time, indicating opposition to all timber harvesting on State Forests. In some cases, these individuals have a change of mind if they have an opportunity to discuss their concerns directly with DEC Foresters, and gain a better understanding of the ecological goals behind the harvest.

While there is a small number of comments received from time to time indicating opposition to all timber harvesting on State Forests, comments opposing specific harvesting practices such as clearcutting are more common. Further discussion regarding clearcutting and other forest management tools is found under Active Forest Management on *page 81*.

There is also a segment of the population that strongly supports timber harvesting on State Forests. This obviously includes members of the timber industry, but also encompasses those people who understand that conservation of natural resources allows the use of those resources so long as they are not being depleted.

Timber Harvesting Standards and Guidance

Guidance pertaining to timber sales has been somewhat inconsistent as far as format, but has been issued steadily over the years. Previously, Title 8400 of the Policies and Procedures Manual still constituted the main body of guidance for the management of State Forests. The manual was issued in 1977, but has since become outdated. Guidance memos have been issued and are summarized and compiled in the Summary of Sales Memoranda. This compendium is updated regularly on an approximately semi-annual basis.

Proposed changes to policies, standards and guidance

The primary alteration to the timber sale program will be the use of the "Quick Contract" process, whereby the Office of the State Comptroller (OSC) approves standardized language in the documents that are used in the sale process. By using this process, it is anticipated that the time necessary for contract approval will be reduced by as much as four weeks or more.

Legislation has also been proposed raising the contract amount at which OSC approval is required. Currently, sales over $10,000 must be approved by the OSC. The proposed legislation, if approved, would raise this amount to $50,000. Contracts under this amount would still need to be reviewed and approved by the Contract & Grant Development Unit in the DEC Central Office.

The purpose of these two proposals is to streamline the timber sale process, resulting in greater potential revenue to the state.

In addition, the 2009 annual surveillance audit included a discussion regarding logging damage to residual stands. No formal guidance has been provided to regional staff directing them to include

language concerning residual damage in timber harvesting contracts, nor has any guidance been provided as to what language would be appropriate if it were included. Such guidance will be developed and provided to regional staff as part of the implementation of this plan.

Laws, regulations and policies

Environmental Conservation Law (ECL) § 9-0505 authorizes DEC to "sell the trees, timber and other products" from State Forest lands. Trees to be sold must be designated before the sale, and must be sold for not less than fair market value. Sales over $10,000 must be approved by OSC. Any sale for more than $500 must be made to the highest responsible bidder through an open public bidding process. Sales of products valued at less than $500 may be conducted without bidding the sale, so long as Department staff can provide that the state receives fair value for the product being sold.

Timber Harvesting Impacts and Mitigations

The practice of timber harvesting inherently includes the potential for significant environmental impacts if specific mitigation measures and BMPs are not properly employed. Resources that are potentially impacted and related mitigations are listed below.

- Forest soils
- Water quality
- Aesthetics
- Rare and endangered species and unique natural areas
- Cultural and historic sites
- Recreational facilities and assets

An increase in the size of the program would likely increase the potential for water quality impacts, but the use of Best Management Practices and adherence to the Special Management Zone Rules should adequately ensure that water quality impacts would be minimal. Standard reviews of the Natural Heritage Database should minimize potential impacts to known instances of protected species and sensitive habitats. Visual impacts could increase, particularly in association with even-aged management systems, but could be mitigated using appropriate screening measures and configuring sale layouts to minimize such impacts. A larger number of timber harvests could result in greater conflict with recreational users. This impact could be mitigated by better communication with the public on upcoming harvests, and better education about benefits of timber management.

NON-TIMBER FOREST PRODUCTS

Non-timber forest products have been a very small part of the sales program. The following products have been sold from State Forests at one time or another:

- Maple Sap
- Hay
- Shrubs for landscaping
- Scrap metal (such as derelict vehicles, unusable metal structures, etc.)

Demand for most non-timber forest products has historically been very limited. Those sales that have taken place have been conducted using the local sale process (i.e., the value of the sale has been less than that which would require OSC approval). There is very little change anticipated in the level of activity in this area, with the exception of maple syrup tapping, which is addressed below.

Perishable items, such as mushrooms, ginseng, and other plants or fruits, could be sold under the authority of ECL § 9-0505, but have not been because of logistical limitations. Existing staff levels do not permit the close sale supervision that would be required to ensure that contractors only removed the amount of material agreed to in the sale contract.

Support for selling non-timber products has been quite localized. There was a brief time during which comments were received supporting the picking of mushrooms on State Forests, mainly related to proposed regulations that would allow a minimal amount of such gathering.

Hay

Over the years, a number of fields on State Forests have been managed to provide hay for use by local farms. In all cases, these were fields that were present at the time of acquisition and were considered important for the support of area agricultural business. Over time, management of these open fields has evolved to use the sale of hay as a means of maintaining grassland habitat. All hay sales are now managed with input from DEC biologists to prohibit hay cutting and harvesting during peak nesting periods.

To protect soil productivity and fertility, hay will only be sold under multi-year contracts which include requirements for soil testing and any indicated liming or fertilization needs. When resources are available and soil fertility and habitat quality are in decline, DEC may hire contractors to manage grassland in order to rebuild and maintain fertile soils by; cutting and mulching or allowing the grass to remain on site; liming and fertilizing in accordance with soil tests; or replanting.

Maple Syrup

Limited tapping of maple trees for sap, using buckets, has been permitted on State Forests under forest product sales contracts for over 60 years, as authorized by ECL § 9-0505. In the 2006 Legislative session, an amendment was made to ECL § 9-0505 which specifically listed

maple sap as a forest product. Although this amendment did not actually grant new authority to the DEC to sell maple sap, it has sparked interest from maple syrup producers.

Existing Conditions and Trends

Since the amendment to ECL § 9-0505, interest in producing maple sap from State Forests has increased. The Empire State Forest Products Association has expressed support for tapping on DEC lands, under certain conditions, and the New York State Maple Producers Association has also urged DEC to implement a tapping program.

Roadside tree tapping with buckets continues on State Forests to this day, serving smaller producers and hobbyists. To date, DEC has not permitted large scale tapping with tubing collection lines on State Forests due to concerns with impacts on other users, contract term limits, economics, limited staffing and the potential for resource damages, as further explained below.

Economic Considerations

Tubing collection systems are very expensive for maple producers to install, costing in the vicinity of 14 to 15 dollars per tap. The tubing and associated support wires must remain in the woods year-round for at least a ten year period to give the producer a return on their investment. DEC does not have the authority to enter into forest product sales contracts with a term exceeding five years, which is not long enough to satisfy the economic need of maple syrup producers.

The economic impact of tapping on the resource must also be considered. When a maple tree is initially tapped, income from tapping runs between 75 cents and $4 a tree. Income is strongly dependent on the size of the trees being tapped. Offsetting this income is the effect on the value of the tree. The holes drilled for the taps cause staining of the wood above and below the holes. This staining can drastically decrease the value of the lumber or veneer produced from the tree. It is therefore extremely important that trees selected for tapping are those that are of such quality that they are not likely to produce high quality lumber or veneer.

Staffing levels in the Division of Lands and Forests have dropped 20% over the past eight years while the Division's land management responsibilities have grown with the addition of over a million new acres of fee and easement property. This constraint alone makes it difficult to take on a new and labor intensive program.

Multiple Use Management Concerns

The extensive sap collection systems have the potential to impact other forest recreationists, especially on more popular properties and those with developed formal trail systems. Tubing systems must connect every tap and tree to a mainline pipe using gravity to feed the sap to a bulk storage tank, usually of at least two thousand gallons in capacity. Tubing lines are supported by wires connect to adjoining trees, which must be attached properly to reduce damages. The tubing/wire system is set at a height that precludes most other uses of the area.

Resource protection concerns also extend to the access roads used to service the operation. Maple tapping occurs in early spring when forest access roads are normally saturated with water and least able to support vehicle use. This is the time of year when most logging operations on State Forests are shut down by DEC. Yet these are the times the sap is running and access is required. Additionally, many maple stands do not have adequate access to allow tapping.

Potential for Maple Tapping on State Forests

There are areas on State Forests which could be considered for tapping if additional staffing resources were available and the necessary access roads were to be well drained and stable during spring thaw. There are areas of State Forests which are reserved from harvesting; therefore the economic losses (to timber value from tapping) would not have to be considered. Potential stands would be dominated by sugar and red maple trees and located on steep slopes, growing in poor soils, or dedicated to other goals such as the development of late-successional habitat (*refer to page 48*). There are also some maple stands, composed mainly of trees which have developed in relatively open growing conditions, and which as a result, have little potential for developing high quality sawtimber or veneer values.

State Forests are legislatively dedicated to multiple uses. It is unlawful for DEC to allow any use that by its nature excludes all other uses. Semi-permanent installation of tubing lines, lasting through multiple seasons or years, prevent other users, such as hunters from utilizing an area. This would be considered an exclusive use. Therefore, DEC can only consider maple tapping that involves collection of sap with buckets or tubing that is removed after each collection season.

The UMP process will be used to identify potential maple tapping stands, considering the above criteria and staff availability. This approach provides a transparent decision-making process and allows other user groups to express their viewpoints.

"FP" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Forest Products (FP) Objective I – Sustainably manage State Forests such that no forest resource is used or removed at a rate greater than the rate at which it is produced, and such that the overall quality of all resources is maintained or improved.

Actions related to timber management:

FP Action 1 – Harvesting on State Forests will be conducted at a rate which does not exceed annual net growth rates as established by the 2010 SUNY College of Environmental Science and Forestry study of the periodic annual increment on State Forests, until such time as additional data is collected and analyzed. Harvesting rates will be established on a regional basis by the Bureau of State Land Management and incorporated into annual work plans.

FP Action 2 (also AFM 2) – Re-establish a statewide system of permanent sample plots on State Forests to provide an accurate and detailed picture of forest growth, mortality and removals (harvests) following the same protocol and methodology as used to develop the forest statistics for New York's forests by the US Forest Service Forest Inventory and Analysis Unit. Plots are to be established by 2013.

FP Action 3 – Using data from the permanent sample plots established under FP Action 2, calculate the sustainable harvest threshold once every five years. The first calculation will be completed in 2014.

FP Action 4 (also AFM 1) – Manage forests using timber sales to improve forest health, increase the diversity of species, enrich habitats and diversify forest stand structure in order to enhance the resiliency of ecological systems and forest sustainability. Harvests will be planned in such a way as to develop a wider range of forest successional stages. To accomplish this action, UMPs will develop harvesting plans and schedules.

FP Action 5 – Develop invasive species BMP language to be included in all forest product harvest and construction contracts, to protect State Forest lands from the introduction, establishment and spread of invasive species. Language to be completed by 2011.

FP Action 6 – Develop guidance for regional staff regarding contract language addressing damage to residual stands. Guidance to be completed by 2012.

Actions related to non-timber forest products:

FP Action 7 – Through the UMP process, identify stands which may be considered for producing maple sap, using criteria described above.

FP (Timber Harvesting) SEQR Alternatives Analysis and Thresholds
In the most basic terms, there are three possible alternatives to the current timber harvesting program: increase harvesting to the sustainable levels that occurred in the 1990's, discontinue or decrease the size of the program, and continue the harvesting program in its present form (the **no-action alternative**).

Another alternative; discontinuing or decreasing the size of the program, would reduce DEC's ability to meet ecological objectives such as: improving the biodiversity, health, productivity, and sustainability of State Forest lands; increasing recreational opportunities; soil conservation; water quality protection; carbon sequestration; and wildlife and fish habitat improvement. The economic consequences of not conducting timber sales are foregoing revenues to the state and missing opportunities to stimulate local economies. For these reasons, this alternative has not been chosen.

The **no-action alternative;** continuing the program in its current form and at its current activity level is not likely to produce any adverse environmental impacts that are not addressed in other sections of this plan. However, similar to the alternative of reducing the program, this alternative would forego the opportunities to meet ecological objectives and stimulate local economies.

Preferred alternative: Increasing the size of the program to the sustainable levels that occurred in the 1990's would obviously mean a larger volume of wood being harvested and an increase in net revenue. According to the SUNY-ESF report referenced above, current harvest volumes could be doubled without exceeding growth. In addition harvesting levels will need to increase in order to accommodate ecological goals established in this plan, such as dealing with aging plantations, invasive species, and the need for maintained biodiversity.

SEQR Analysis Thresholds: Timber management and harvesting procedures, levels and strategies, as established in this section will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted, except as discussed elsewhere in this plan. SEQR analysis and thresholds for specific harvesting methods and use of pesticides to accomplish plantation management goals have been addressed in the Active Forest Management section. Timber harvests shall be conducted only where DEC foresters can ensure that harvest activity conforms to the sustainable management guidelines described herein.

FP (Non-timber Forest Products) SEQR Alternatives Analysis and Thresholds

The alternatives for the sale of non-timber forest products are similar to those for the timber sale program: increase the size of the program, discontinue or decrease the size of the program, and continue the program in its present form (the **No Action alternative**). Given the extremely small size of the program, discontinuing it and continuing it in its present form are nearly identical options, and will be treated as such for the purposes of the following discussion.

Increasing the size of the program is not likely to have significant environmental impacts, so long as the program is not increased to the degree that the amount of products being sold is greater than the amount being produced. Since the program is miniscule at present, a substantial increase would be necessary to reach a point where resources were being unsustainably extracted. This alternative has not been chosen due to staffing constraints and potential impacts on other uses.

Preferred alternative: Continuing the program in its current form (no action) will have no significant environmental impacts, due to the small extent of operations undertaken in the program, the small volume of resources being harvested, the renewable nature of those resources, and the small size of the equipment used to harvest them.

SEQR Analysis Threshold: Management strategies established in this section for non-timber forest products, under the preferred alternative will not create significant adverse impacts and no further SEQRA review will be necessary.

PLANTATIONS

Beginning in 1929, to solve the serious problem of soil erosion on newly acquired Reforestation Areas, a massive tree planting campaign, using labor provided by the Civilian Conservation Corps (CCC), was used to establish vast plantations. The CCC planted millions of trees on hundreds of thousands of acres of reforestation areas in the 1930s and 40s. Department work crews and crews from correction camps planted trees in the 1950s, 60s and 70s on reforestation and multiple use areas. Plantations have helped provide landscape-scale species diversity on State Forests that is seldom found on private land. The mix of natural hardwood stands and conifer plantations found on State Forests have created diverse wildlife habitat as well as aesthetically pleasing forest landscapes.

In the early years after initial establishment, conifer plantations provided excellent habitat for a variety of wildlife such as snowshoe hare. As the plantations grew, wildlife species utilizing the conifer cover changed to include red squirrels, grouse and a variety of song birds and hawks. In some cases the conifer cover was used by deer as wintering areas, and in others oak plantations provided hard mast that would otherwise not be found on the landscape.

Management activities in the early years included establishing and maintaining fire lanes around the perimeter of the plantations as well as releasing them from competing vegetation. Eventually, easily accessible stands were treated through non-commercial thinning and, less commonly, pruning of crop trees.

When the original plantations were established, the trees were planted in rows. A row thinning operation involves removing rows of trees. Usually a number of adjacent rows are removed in order to attain the desired result. Single tree selection involves removing individual trees on an even basis across the whole plantation. Small-group selection occurs when small groups of trees are selected for removal on an even basis across the whole plantation. Many of the early treatments were row thinnings to help establish access to and within the plantations for future management activities. Early treatments were accomplished with labor provided by Department work crews. The more remote plantations usually received no treatment at all.


Row thinning on Sugar Hill State Forest in Schuyler County

Commercial Development

In the 1970s, markets for softwood pulpwood developed in parts of the state. These markets were predominately for spruce. As a result

many of the easily accessible stands were commercially thinned for the first time. As with most first plantation treatments, many of the pulpwood sales were row thinnings to help establish access. Once access was established in these plantations subsequent treatments were primarily single tree selection thinnings. Over time, markets for softwood pulpwood, sawtimber, cabin logs, landscape timbers, utility poles, and wood chips have developed, resulting in increased demand for softwoods grown on State Forests. The increased demand has resulted in the development of numerous softwood timber buyers and loggers that rely almost solely on State Forest plantations as their source of raw material. In other areas of the state, where softwood pulpwood markets did not develop in the 70s, softwood plantations were left unthinned.

Equipment and Technology

Some of the early commercial thinnings were accomplished by removing four-foot-long pieces of pulpwood from the woods using a farm tractor and cart. Continuing advancements in equipment technology have seen a progression from this simple system to more complicated systems. Today, many logging operations utilize machines to do most of the work. Harvesting machines can be used to cut and delimb the trees, while other machines such as forwarders and skidders are used to bring the trees out of the woods. Some logging operations still consist of one person with a chainsaw and farm tractor, but with the trend towards mechanization of tree harvesting, these smaller operations are becoming rare. Plantation management has changed and will continue to evolve as demand and technology change over time.

A conifer plantation tree canopy viewed from the forest floor

Ecosystem Value of Conifer Plantations

Since the establishment of the State Forest system, plantations have helped control erosion and improve water quality, provided species and habitat diversity on the landscape, and contributed to local economies by helping to establish a segment of the forest products industry that utilizes softwood species (softwood plantations provide unique forest products such as utility poles and cabin logs). Most of these benefits were goals outlined in the Reforestation Law. DEC has met these goals in the past and will continue to meet these goals through sound forest management, following established standards and procedures for managing plantations.

Conifer plantations are invaluable on State Forests as a source of forest products and because they provide a type of habitat that is not commonly found on the landscape. Maintaining conifer/conifer-hardwood mixed stands is an extremely important component of ecosystem management. Conifer stands, whether natural or planted, satisfy a variety of wildlife needs.

Some species derive most or all of their year-round requirements from conifer stands, while an even greater array of species incorporate conifers as an essential or highly sought-after component of their habitat on a year-round or seasonal basis. Examples of such species include snowshoe hare, spruce grouse, pine martin, fisher, oven bird, Cooper's hawk, and northern saw-whet owl. Conifers provide thermal cover in the winter and escape cover year-round. The potential value of plantations becomes particularly important because of the extensive loss of native conifers due to past demands and harvesting practices. The limited amount of early-stage growth of native conifers, particularly of hemlock, limits the abundance of many wildlife species. Management programs that provide for the creation and maintenance of several stages of conifer growth (both natural and planted) are essential to the needs of many wildlife species and desirable for the maintenance of a high wildlife species richness (Chambers 1983).

CURRENT CONDITION OF PLANTATIONS

Currently, most of the softwood plantations on State Forests are original plantations that were established in the 1930s and 40s or second generation plantations that are a result of the removal of the original plantations over the past 20 years or so. These two types of plantations represent opposite ends of the life cycle of a softwood plantation. The original plantations are reaching or are at biological maturity, while the second generation plantations are young. A third type consists of plantations that were planted in the 1950s, 60s, and 70s. These plantations are closer to what can be considered the middle of the life cycle of a softwood plantation.

The original plantations are between 70 and 80 years old and are usually comprised of softwood species such as Norway spruce, white spruce, red pine, Scots pine, white pine, jack pine, European larch, and Japanese larch. Some plantations are purely of one species, while others are combinations of two or more species. Small plantations of other softwood species such as Austrian pine, balsam fir, Douglas fir, Dunkeld larch, red spruce, white cedar, and pitch pine may occasionally be found. In some areas, there are experimental plantations of species such as lodgepole pine, limber pine, and others.

In accordance with the Environmental Conservation Law, most of these plantations have been actively managed to produce pulpwood and timber. The periodic removal of the smaller, unhealthy, or damaged trees through thinning operations has allowed the larger, healthier trees left behind to grow more quickly. In many cases, it has also allowed softwood and hardwood seedlings and saplings to grow on the forest floor. There are different types of thinning operations, including row thinning, single tree selection, small-group harvesting, or some combination thereof.

All three types of thinnings have been practiced in many of the original plantations on State Forests. Some of the more accessible plantations have been thinned two or three times. In plantations that were row thinned, strips of mature softwood trees alternate with strips of

much younger softwood and hardwood seedlings and saplings. Plantations that received single tree selection now contain large-diameter trees that are more evenly spaced than in stands that were row thinned. Often in these plantations there is a carpet or dense understory of hardwood and softwood seedlings and saplings, but sometimes there is very little understory. Plantations that were thinned through small-group harvesting contain open patches that are usually occupied by hardwood and softwood seedlings and saplings.

In areas of the State where pulpwood markets did not develop in the 1970s, most of the original plantations were not thinned. Plantations that are not accessible, either because of wet ground conditions or their distance from a good road, were also left unthinned. The trees in these plantations are tightly spaced, small in diameter, and have small crowns. The health of these trees is usually very poor because there are a large number of trees on the site competing for limited resources. These unthinned plantations demonstrate very clearly how much improvement in tree growth and health can be achieved through thinning operations. Usually, very little sunlight reaches the forest floor in these plantations because of how closely spaced together the trees are. As a result, there are very few hardwood or softwood seedlings or saplings growing under the plantation trees.

Another potential problem in unthinned plantations is overcrowding, which leads to tall trees with very little live crown. When the ratio of the tree's height to its diameter gets too large (due to lack of timely management), the tree's ability to remain upright declines dramatically. Research at Bartlett Tree has shown that tree stability is best at ratios of 50:1 or less. Plantation trees can reach ratios of up to 100:1.

Both the thinned and unthinned original plantations have begun to reach biological and economic maturity. As the trees reach biological maturity, they become less vigorous and their ability to thrive on marginal sites begins to decline. As trees grow older their ability to fend off disease and recover from physical injuries lessens. Their large crowns and sometimes shallow root systems make them susceptible to damage from weather events such as high winds, snowstorms and ice storms. The main types of weather-related damage to softwood plantations are as follows:

- **Windthrow**. Also called blowdown, windthrow occurs when high winds cause the trees to fall over. During a high wind event, the large crowns of the trees catch the wind, causing them to bend and sway. This puts a tremendous amount of strain on the root systems of the trees. On sites with shallow, rocky, or wet soils, the root systems aren't strong enough or deep enough to anchor the trees against the force of the wind. As a result, the trees tip over, frequently taking neighboring trees with them.
- **Ice and snow damage.** The many branches and needles of softwood trees can accumulate large amounts of ice and snow. As ice and snow accumulates, it puts stress on the trunks of the trees. If a tree develops a heavy enough ice or snow load, the trunk of the tree can snap. Sometimes the trunk will snap close to the top of the tree,

resulting in the tree losing only a small portion of its crown. Other times the trunk will snap at a point closer to the ground, resulting in the tree losing most or all of its crown. The ice and snow load in the crown of the tree can also cause the entire tree to tip over, resulting in damage similar to the windthrow damage described above.

Usually, ice and snow damage occurs in conjunction with wind. The action of wind combined with the weight of ice or snow in the crowns of the trees results in the trees either snapping off or tipping over. Regardless of how the damage is done, once a portion of a plantation is damaged, the remainder of the plantation is more susceptible to similar damage. This is because the root systems and crowns of plantation trees are intertwined, causing the trees to act as a unit in response to wind. As the trees sway in the wind, each tree relies on and assists its neighbors to resist the force of the wind. Once trees start to fall over or snap off, an opening is created, which allows stronger winds into the plantation. During subsequent weather events, the trees around the edges of that opening don't have as many neighbors to support them, so they are more likely to fall over or snap off. Another factor is a domino effect that occurs when trees that tip over fall on neighboring trees, causing them to fall over as well.

Because many plantations were established on the less fertile, shallow, rocky or wet soils found on hilltops and mountaintops across the State, these plantations are much more susceptible to storm damage than plantations that are located on deep, well-drained soils. This is because the shallow, weak root systems that are developed by trees growing in poor soil conditions are less able to support the trees during storm events. The trees in plantations that are on good, well-drained soils develop deep, strong root systems that are better able to handle the stresses produced by a storm event.

There are also some areas where hardwood trees were planted when certain State Forest lands were acquired. Plantations of red oak, sugar maple and white oak can be found on some State Forests. Some of these experimental plantations have not fared well, while others have thrived, depending on site/species compatibility. There are also a small number of plantations of white cedar and black locust that have been managed over the years to produce fence posts.

In recent years, attempts have been made to establish new plantations of red and white oak on State Forests. The presence of white-tailed deer can make it difficult for these plantations to succeed. The deer eat the buds that form on the seedlings, hindering their growth. Tree shelters and fences have been used to prevent the deer from browsing on the seedlings, but such measures are expensive and difficult to maintain.

PLANTATION MANAGEMENT

Regardless of the thinning methods that are used, a softwood plantation can only be thinned so many times before it becomes necessary to remove the overstory trees altogether. When a plantation gets to the point where removing more trees through thinning would leave an

insufficient number of trees behind, it becomes necessary to remove the overstory trees. This type of operation is called either a clearcut if regeneration is not established, or an overstory removal if there is sufficient regeneration present.

Clearcuts are also sometimes necessary in plantations that are either highly susceptible to storm damage or have already been damaged by storm events. In addition, plantations that were never thinned due to inaccessibility or lack of pulpwood markets usually have to be clear-cut. Unthinned plantations that are 70 to 80 years old are usually in poor health or are not vigorous enough to respond to a thinning operation. More information and SEQR analysis of the use of clearcuts can be found in the Active Forest Management section on *page 81*.

When a plantation is removed, either through natural events or timber harvest, a decision must be made to either retain the site as a softwood plantation or allow it to convert to natural forest (either hardwood or softwood, depending on the natural regeneration that is present).

Conversion from a plantation to a natural forest can occur if advanced regeneration is in place. Advanced regeneration is seedlings and/or saplings that have naturally seeded in under the plantation. Frequently, depending on the size and shape of the plantation, the proximity of hardwood trees, and past management activities, there can be a large amount of hardwood advance regeneration on the site. If the advanced regeneration is composed primarily of desirable species, often the decision is made to allow the regeneration to take over the site after the original plantation is removed. On well suited sites, softwoods may be replanted.

The "**desirable tree species**" will be different in each site and situation. Undesirable hardwood advance regeneration would consist of species that won't provide sufficient economic or biological value as the next forest stand.

Artificial Regeneration

Frequently there is inadequate softwood advance regeneration to occupy the site after the clear cut, and often there is undesirable hardwood advance regeneration. In these situations, softwood seedlings are planted on the site to establish a second generation plantation. The original plantation is harvested by clear cutting, and if necessary the site is prepared for planting by removing competing vegetation, either through herbicide application or mechanical means. In the spring or fall following a herbicide application, softwood seedlings are planted across the site on a specified uniform spacing. The seedlings are planted by hand, using hand tools such as a hoe-dad or dibble. Norway spruce is the most commonly replanted softwood species, due to its ability to thrive on many different types of sites, its greater wood volume production in comparison to other species, its resistance to deer browsing, its importance for habitat diversity, and its relatively low susceptibility to insect and disease problems. Other species that are planted include white spruce, European larch, Japanese larch, red pine, and white pine.

Site preparation and plantation re-establishment are often done as post harvest requirements under state timber sale contracts.

Site preparation prior to tree planting often includes herbicide applications that target specific vegetation that will compete with the new plantation. Application methods will use the safest products available that have the least environmental impact. Herbicide applications are always performed under the supervision of a licensed herbicide applicator. As with timber harvesting activities, the herbicide application and tree planting activities are overseen by a DEC Forester.

This plan serves as the Generic Environmental Impact Statement for the application of herbicides on State Forests associated with silvicultural activities. (*Refer to the Active Forest Management topic "Pesticide/Herbicide Use" on page* 81 *of this plan.*)

After several years of slow growth and root establishment, seedlings begin to grow at a faster rate. However, depending on site conditions, competing vegetation will frequently seed into the area and rapidly out-compete the planted seedlings. At this time it may be necessary to remove the competing vegetation either through mechanical or chemical means. This may have to be done more than once before the planted seedlings grow large enough to fully occupy the site, thereby preventing undesired woody vegetation from seeding in.

In an average year, approximately 150,000 seedlings are provided by the Saratoga Tree Nursery to be planted on State Reforestation Areas. This translates into approximately 200 acres planted annually statewide.

Natural Regeneration

As discussed above, advanced regeneration may be present, allowing the establishment of natural forest. Plantations may also be converted to natural forest by clearcutting in the absence of advanced regeneration, so long as adequate seed source is available in adjacent stands and site conditions do not pose a risk of erosion.

PLANTATION MANAGEMENT GUIDANCE

The following management recommendations will apply to both existing plantations and plantation species that have been regenerated naturally. Some State Forests currently are managed under the guidance of a completed UMP. In this case many of the management decisions may have already been made. For State Forests where no plan exists, these management recommendations can help land managers in establishing a long term management direction for plantations on State Forest Lands.

Within UMPs, the landscape assessment will determine the appropriate goals of conifer cover on the specific State Forests within the unit.

The conifer component will be made up of:

- Naturally regenerated conifers
  - Artificial planting of conifers may be chosen as appropriate when natural regeneration is not feasible to meet the UMP objectives
- Planted non-native and native species
  - Native species will receive first consideration
  - Only approved non-native species, which are non-invasive may be used
- Species selection will be based on:
  - soil compatibility
  - insect and disease resistance.
  - forest product marketability
  - growth rates
  - value as wildlife habitat
  - ability to naturally regenerate
  - availability of seedlings for planting

ADDITIONAL RESOURCES

Program Policy: Plantation Management on State Forests – Developed by the Bureau of State Land Management.

Program Policy: Clearcutting on State Forests – Developed by the Bureau of State Land Management.

Rules for Establishment of Special Management Zones on State Forests – June 2008. Developed by DEC Division of Lands and Forests.

Rutting Guidelines For Timber Harvesting and TRPs on State Forests – May 2008. Developed by the Bureau of State Land Management.

All of these resources can be accessed at www.dec.ny.gov/lands/64567.html

Stand Treatments

Pre-commercial and commercial treatments can both be used to manage plantations. Pre-commercial treatments may be necessary to improve younger stands; however commercial treatments are the preferred mode of treatment. As with all forest management activities, stand analysis should be conducted first, in order to determine if treatment is necessary. The type of treatment shall be determined using the appropriate stocking guide for the species chosen as crop trees. A stand diagnosis and prescription shall be prepared for all treatments.

A commercial treatment on Bush Hill State Forest in Cattaraugus County

ADDITIONAL RESOURCES

Stocking Guides for Plantation Management:

Gilmore, Daniel W. and Briggs, Russell D.; NJAF 20(1) 2003; A Stocking Guide for **European Larch** in Eastern North America.

Gilmore, Daniel W. and Palik, Brian J.; NC-246 2005; A Revised Managers Handbook for **Red Pine** in the North Central Region.

Halligan, J.P. and Nyland, R.D.; NJAF 16(3) 1999; Relative Density Guide for **Norway Spruce** Plantations in Central New York.

Lancaster, Kenneth F. and Leak, William B.; NE-41 1978; A Silvicultural Guide for **White Pine** in the Northeast.

New York State Department of Environmental Conservation, Division of Lands and Forests, Bureau of State and Private Forestry, State Forest Timber Management Handbook Volume I, September 1976.

New York State Department of Environmental Conservation, Timber Management Handbook, July 24, 1985.

Commercial Treatment

Given the increase in demand for low grade forest products in many areas of the state, commercial treatments are now feasible in a majority of the State Forest plantations. Commercial treatments are preferred over pre-commercial treatments. Plantations to be treated commercially will receive either an intermediate thinning or be regenerated. Commercial treatments provide raw materials to the forest products industry, help stimulate the economy by providing jobs and revenue to the state of New York and contribute to meeting land management goals. Therefore, if feasible, treatments in State Forest plantations will be done commercially.

Pre-commercial Treatment

Some planting has been done in recent years. These younger plantations may need pre-commercial treatment prior to the trees reaching a diameter suitable for a forest product. Harvest access and technique during intermediate treatments should be designed to minimize residual stand damage in canopy and sub-canopy trees and minimize ground disturbance and soil compaction in the general harvest area. The upper threshold of acceptable damage to the residual stand will be established by the sale administrator and added as a contract term in the Notice of Sale.

During intermediate treatment and regeneration cuttings efforts should be made to protect advanced regeneration where possible by employing harvesting techniques to minimize impacts (through directional felling or by utilizing mechanical harvesting equipment and appropriate sale layout) and, when possible, by harvesting during winter months when snow levels are sufficient to provide protection from felled trees and harvesting equipment.

- Release of planted or naturally regenerated seedlings may be necessary if 50% or more of the crop trees are overtopped by interfering vegetation. Release may include cutting overtopping interfering vegetation or herbicide treatment of broadleaved species of overtopping vegetation (if herbicide, treatment must follow the guidelines and SEQR analysis thresholds established in this plan).
- Non-commercial thinning may be the first treatment in both planted and naturally regenerated stands. Thinning should occur when interfering vegetation threatens to out compete the crop trees or the stocking level has reached the A-line on the appropriate stocking guide. Some naturally regenerated softwood stands may attain a very high level of stocking soon after establishment. These stands may require some form of thinning in the early stages of development. Strip cuts or mechanical thinning may be the only practical method of treatment in very dense seedling-sapling stands. As with any first treatment in a stand, access for future forest management activities should be considered.
- Pruning of softwood trees is not currently economically viable.

Perpetuating Plantations or Converting to Natural Forest Conditions:

Many of the plantations on State Forests have matured and are in various levels of declining health and vigor. As with any forest in this condition, these plantations have reached or passed economic maturity. The most severely declining plantations should be identified and regenerated first before mortality negatively impacts the stand.

There are two primary methods of stimulating regeneration under plantations: 1) natural regeneration of plantation species of trees or naturally occurring tree species from surrounding forests which would result in conversion to a natural forest type; and 2) artificial planting of trees appropriate for the site which would continue or perpetuate the plantation. Each regeneration method is most appropriate under certain conditions. As an example, natural regeneration, when a seed source of preferred species are present and environmental conditions – soil type, slope and aspect, and low deer densities to name a few - are right, is most cost-effective because the land manager does not have to purchase and plant seedlings. Most plantations on State Forests may fall within this category.

However, some species of conifers may not be prevalent in the landscape and may also be difficult to regenerate naturally without significant site preparation. Therefore, natural regeneration of some species may require intensive site preparation to prepare a seed bed that

will allow regeneration to become established. Therefore, planting on specific sites might be the best ecological decision if maintaining a softwood component in the landscape is the desired goal for biological diversity of habitat types.

Converting to Natural Forest Conditions through Even-aged Silviculture

As the forester evaluates each declining plantation for management considerations she typically has a number of options to choose from her silvicultural toolbox. In general, it is the Bureaus policy to manage plantations on State Forests in such a way as to move towards a more natural forest succession by weighing all options (including but not limited to thinning, conversion cuttings, or doing nothing) and to promote natural regeneration over artificial regeneration .

Converting a plantation stand to a natural forest condition through even-aged silviculture can be accomplished in a number of ways. The plantation can be managed over time to stimulate desired regeneration to establish under the mature plantation trees. This regeneration may germinate from the plantation overstory or from trees in nearby stands. There are many techniques foresters use to stimulate this regeneration potential including thinning the plantation overstory by removing poorly formed and stressed trees to allow sunlight down to the forest floor and, in certain conditions, by weeding out undesirable trees and vegetation in the understory. Silviculturally, the two methods of overstory preparation for regeneration include seedtree and shelterwood cuts. Eventually, the plantation should develop a dense "carpet" of seedlings ready to be released. At this point, an overstory removal may be conducted to release the newly established regeneration.

Clearcutting in Plantations

In rare circumstances plantation trees should be removed before advanced regeneration has been established. This removal, essentially clearcutting, may occur in one of two cases; either the action has been identified in a UMP or other formal public process or the action becomes necessary when the condition of the majority of plantation trees meets one or more of the following criteria:

- More than 75% of the plantation species basal area (BA) exhibits declining health and vigor, caused by one or more biotic or abiotic factors;
- More than 75% of the plantation species BA is susceptible to excessive wind and weather damage or insect and disease damage within the next five years;
- More than 75% of the plantation species BA exhibits excessive wind and weather damage or insect and disease damage;
- A combination of decline, susceptibility and damage affects more than 75% of the plantation species BA (ex. 25% showing signs of decline, 25% susceptible to wind throw, and 30% with broken tops);

- The plantation poses a forest health or public safety risk.

Evidence of decline, susceptibility, or damage must be documented in the stand prescription with justification of why alternatives (i.e. do nothing, thinning, herbicide, or other alternative option) are not appropriate.

Artificially Regenerating a Plantation

As discussed earlier, the Bureau recognizes that conditions may require planting seedlings after a clearcut. This is called artificial regeneration. Conditions that may result in the decision to plant trees may include the presence of undesirable vegetation in surrounding stands, high deer browse hindering the success of natural regeneration, the lack of a seed source for desirable species, evidence of repeated intermediate treatments that have not resulted in adequate desirable regeneration, or other unique conditions.

An artificially regenerated (replanted) plantation after one growing season with seedling shelters

If the forester decides to artificially regenerate a stand after a clearcut she should consider establishing native species over non-native species and a mixture of species types over a mono-type (single species). However, in clearcuts where high deer browsing has prevented natural native species from regenerating successfully foresters may decide to choose non-native, non-invasive species that are less palatable by deer and are more likely to successfully grow.

Artificial regeneration of approved non-native species (species not native to North America prior to European settlement) may be considered only if it is determined the non-native species does not have invasive properties (outcompetes native species in a natural state), has a New York invasive risk assessment of medium or less, is more suited for the site due to soil and other properties, is resistant to wildlife impacts, can outcompete undesirable vegetation, is most appropriate to reach desired ecological goals, and is available.

List of approved non-native species - January, 2010:

- Norway Spruce (*Picea abies*)
- Scotch Pine (*Pinus sylvestris*)
- Japanese larch (*Larix kaempferi*)
- European larch (*Larix deciduas*)
- Hybrid larch (*Larix x europlepis* Henry)

Uneven-aged Management in Plantations:
Uneven-aged management may be used to manage plantations of native softwoods, Norway spruce or to convert even-aged plantations into uneven-aged hardwood stands over time. Uneven-aged management may be desirable in highly visible stands or stands adjacent to high use recreation areas.

FUTURE NEEDS FOR PLANTATION MANAGEMENT

Non-commercial treatments such as site preparation, tree planting, release and non-commercial thinning have been accomplished through sale related work due to lack of staff and funding. Release and non-commercial thinning can be done with acceptable success through sale related work. However, in some areas of the state site preparation and tree planting have only a moderate to poor success rate when accomplished through sale related work.

Also, if DEC is dedicated to maintaining plantations on State Forest Lands, the Saratoga Tree Nursery must remain open as a reliable source of quality tree seedlings.

Plantation Management (PM) Objective I – Provide guidance to regional staff regarding the management of plantations on State Forests.

PM Action 1 – Adopt proposed Program Policy ONR-DLF-1 Plantation Management on State Forests.

PM SEQR Alternatives Analysis and Thresholds

The **no-action alternative** as regards plantation management, would involve a "business as usual" approach. This approach has not been adopted because there is a wide variation in management approaches between DEC regions where some regions are converting a majority of plantations to natural forest cover while others are re-establishing new plantations, and a more balanced approach is preferred.

Another alternative is to allow plantations to naturally decline, without active management, and transition to natural forest cover. This alternative has not been adopted because this would elevate risks from disease and insect infestations as well as introduce some risk of wildfire due to poor health in overmature stands. Also, the failure to produce forest products would affect local economies and would drive many small sawmills, which specialize in softwoods, out of business. An indirect impact would result from shifting existing demand to other forests, regions or countries where harvesting methods may not be sustainable. Another impact would be our failure as a State to complete the restoration of State Forests, which were originally acquired for reforestation.

The **preferred alternative** is to establish formal program policies for the management of plantations on State Forests. Under this alternative, plantations will be more uniformly managed across the state to protect sensitive sites, rare and endangered species and to meet other ecological goals while continuing to produce forest products and stimulate local economies; following retention standards, a clearcutting policy and an overall plantation management policy.

No other alternatives have been considered.

SEQR Analysis Threshold: Plantation management strategies established in this section will avoid and minimize potential impacts to the maximum extent practicable and no further SEQRA review will be conducted. However, SEQR analysis and thresholds for specific harvesting methods and use of pesticides to accomplish plantation management goals have been addressed in the section titled Active Forest Management.

FOREST HEALTH

Threats and challenges to New York's forest health are principally: global climate change, invasive plant and animal species, loss of habitat connections across the landscape, and poor reestablishment of desired trees and plants following natural or human caused disturbances.

Change is inevitable. Scientists have come to understand that disturbance is necessary for many kinds of forests and that it is the frequency, kind, degree and rate of change that is important, not necessarily the change itself (Botkin 1990). Not all changes are beneficial, especially those not integral to natural processes. Human introduced changes, such as those caused by the introduction of invasive species can cause drastic, sudden and permanent changes to the ecosystem and seriously disrupt forest health.

New York's forests are remarkably resilient, as demonstrated by how well they have reestablished themselves following large scale land clearing associated with European settlement. However, trends in economic globalization combined with exponential growth in human population continue to significantly impact the species composition, resiliency and function of New York's forest ecosystems.

Forest health will be pursued with the goal of maintaining biodiversity. Any agent that decreases biodiversity can have a deleterious effect on the forest as a whole and its ability to withstand stress.

Forest health in general should favor the retention of native species and natural communities or species that can thrive in site conditions without interrupting biodiversity.

The ecological health and function of forests is dependent on a carefully balanced interdependence of species. Degradation caused by a disturbance such as invasive insect activity or improper forest management can leave forests prone to further mortality. New York's forests are under constant stress from native pests such as pine beetles and tent caterpillars. These stresses are increasing due to changing site conditions caused by climate change, as well as the threat of damage from invasive species.

INVASIVE SPECIES

Economic globalization has brought tremendous benefits to many people. Unfortunately, those benefits have also come with a high cost. As global trade and travel have increased, so have the introduction of non-native species. While many of these non-native species do not have adverse effects on the areas in which they are introduced, some become invasive in their new ranges, disrupting ecosystem function, reducing biodiversity and degrading natural areas.

FOREST HEALTH

Invasive species have been identified as one of the greatest threats to biodiversity, second only to habitat loss. Invasive species can damage native habitats by altering hydrology, fire frequency, soil fertility and other ecosystem processes. Some invasive species can also be harmful or poisonous to humans or livestock and can have negative impacts on agriculture.

In addition to causing environmental damage, invasive species can have a tremendous economic impact as well. It is estimated that invasive species cost the US over a hundred billion dollars a year in agriculture losses and control costs. Invasive species can also hamper recreational opportunities by reducing access, degrading the quality of recreational areas and altering the aesthetic beauty of scenic natural areas.

The leafless trees in this photo are dead ash trees, infested by the Emerald Ash Borer. A forest that is composed of a single species majority is more prone to attack

Newly found populations of invasive species may be controlled or even eradicated. If an invasion is detected when the population is small and manageable, eradication may be possible. However, if an infestation goes undetected and the population becomes well established, the best option may be to enact control efforts with the goal of lessening its impact or preventing its spread.

Insects and Disease

When a non-native insect or disease is introduced from another country, the natural controls in its native range are often lacking in its new "home" causing epidemic population levels and rampant infestations. The introduction of American chestnut blight fungus *(Cryphonectria parasitica)* in the United States illustrates this point. "The blight fungus disease was first observed in the U.S. [at the Bronx Zoo] killing American chestnuts *(Castanea dentata)* in 1904… after being imported … to the US from Asia on imported chestnut trees. …The disease spread like fire throughout the eastern states, and across the entire natural range of the American chestnut. By the 1920s, the disease had even reached southern Ontario, and by the 1930s, the entire stock of American chestnuts was infected, with most of them dying. By 1940, over three and a half billion American chestnuts had been lost to the fungus. In less than four decades, a dominant American tree species had been converted to a threatened species." (Rellou 2002).

Over the past 80 years similar situations with exotic diseases and insects have dramatically altered New York State Forests including:

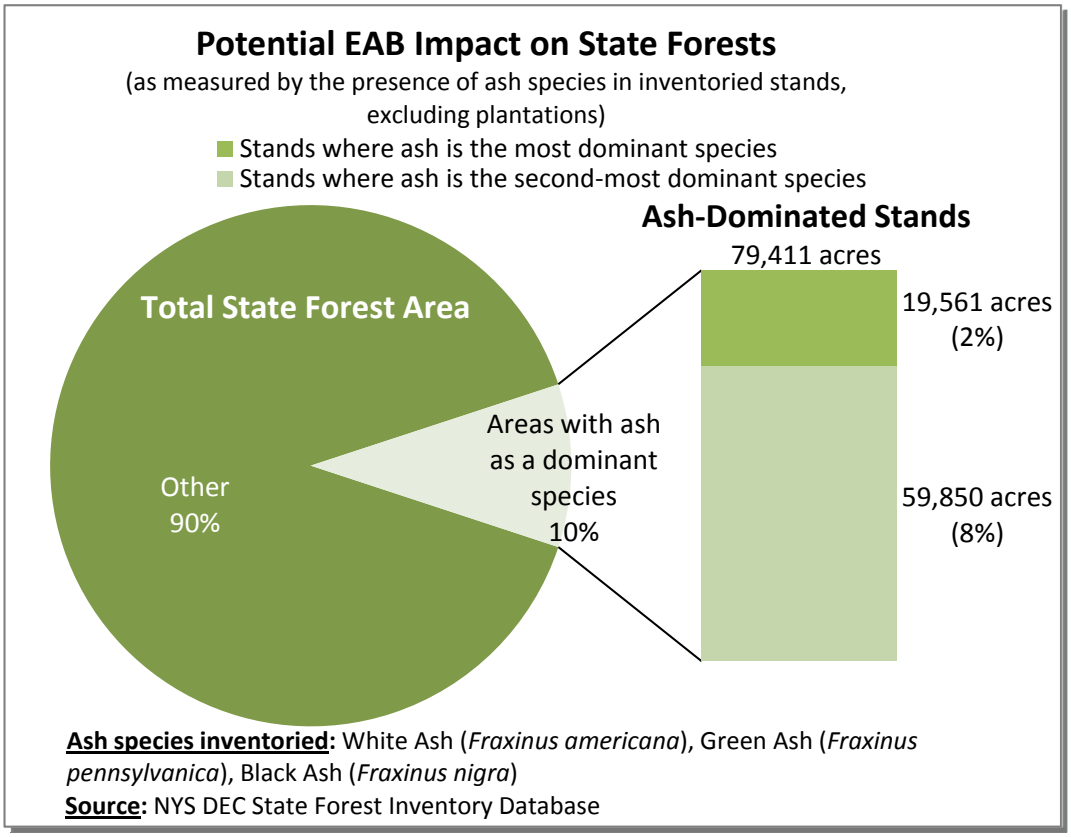
- Dutch elm disease *(Ophiostoma novo-ulmi)* devastated American Elm *(Ulmus americana)*;

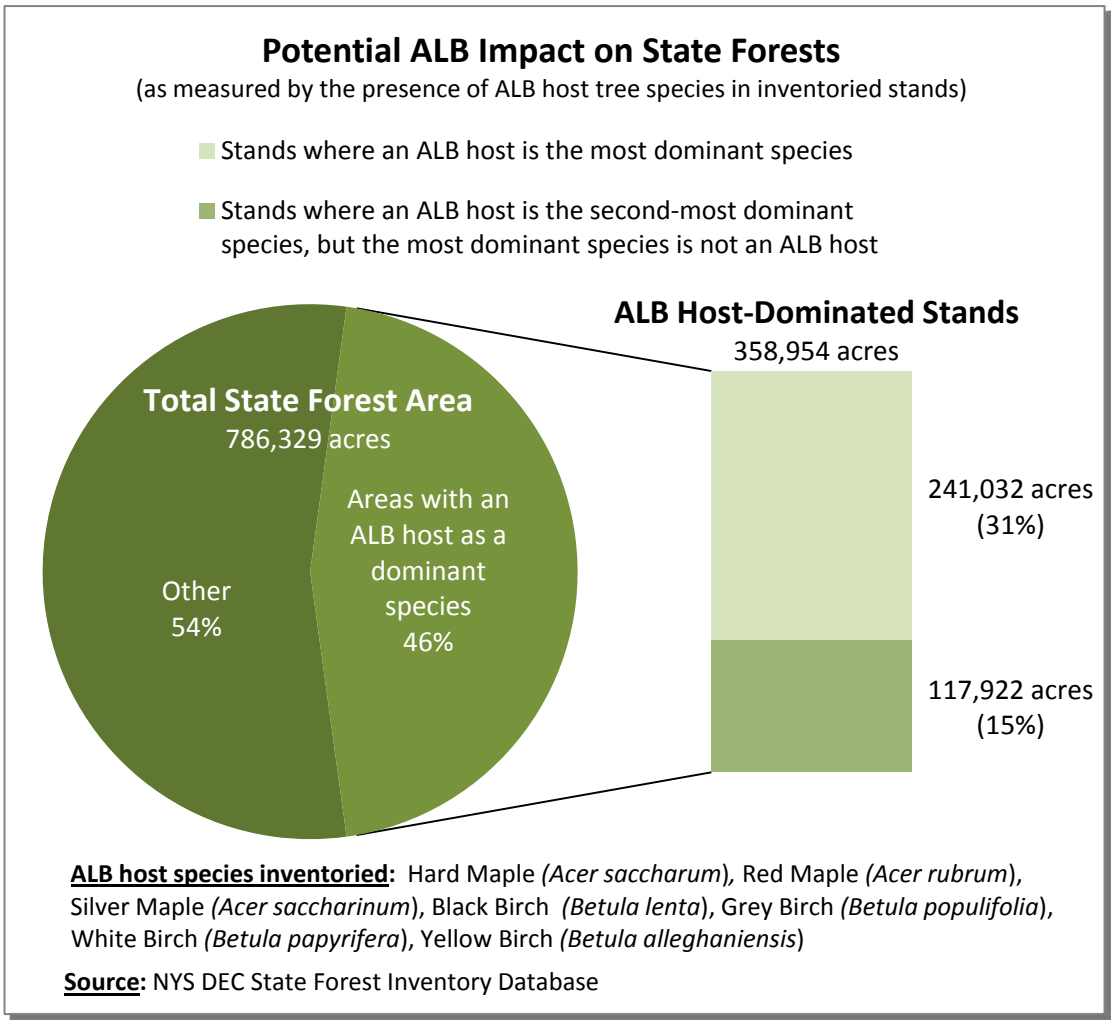
- Beech bark scale (*Cryptococcus fagisuga*)/ nectria fungus complex (*Nectria galligena* and *N. coccinea* var. *faginata*) has caused a dramatic dieback of American beech trees;
- Butternut canker caused by an exotic fungus (*Sirococcus clavigignenti-juglandacearum)* is pushing Butternut (*Juglans cinerea*) into a threatened status.
- Gypsy Moth (*Lymantria dispar)* caterpillars' repeated defoliation of oaks, apple, basswood, birch, poplar and willow trees can lead to widespread mortality.

More recent introductions threaten New York State Forests as well, including;

- Asian Long-horned Beetle (ALB), *Anoplophora glabripennis,* which kills all maple varieties, alder, birch, elm, horse chestnut, poplar and willow;
- Emerald Ash Borer(EAB), *Agrilus planipennis,* which kills all ash species;
- Hemlock woolly adelgid (HWA), *Adelges tsugae,* which kills eastern hemlock (*Tsuga canadensis)*;
- Sudden Oak Death, *Phytophthora ramorum,* which infects all oaks, Douglas fir and rhododendrons among its hosts.

Tunneling damage caused by the Emerald Ash Borer





Plants

It has been estimated that about 1/3 of all the plant species presently known to occur in New York are non-native. Of these, some have demonstrated the ability to crowd out native vegetation, alter local ecology, or cause harm to people or animals. Some examples include:

- Purple loose-strife (*Lythrum salicaria*), which displaces native wetland vegetation;
- Japanese barberry (*Berberis thunbergii*) , which inhibits regeneration of native species;
- Japanese knotweed (*Fallopia japonica*), which can dominate riparian areas and accelerate erosion;
- Common buckthorn (*Rhamnus cathartica*), which can dominate upland areas;
- Norway maple (*Acer platanoides*), which creates very heavy shade, discouraging herbaceous and understory vegetation.
- Giant hogweed (*Heracleum mantegazzianum*), which reduces the skin's ability to filter sunlight, causing severe burning.

Invasive Species Management Strategy

Through active management practices, DEC staff and contractors have the potential to unknowingly introduce and spread invasive species, and at the same time, the ability to prevent or reduce their impacts. Silvicultural practices, ranging from wildlife enhancement to land-use conversion influence invasive species growth, reproduction, and dispersal. Recognizing and predicting the response of individual species to these practices will enable managers to take steps to prevent or reduce the impact of invasive species on the State Forests and surrounding lands.

Past management efforts for invasive species on State Forests have primarily focused on minimizing the spread of newly documented and immature infestations before they have the chance to become well-established. The long-term strategy for managing invasive species on State Forest lands uses a combination of the following techniques: prevention, cooperation and collaboration, inventory and monitoring, early detection and rapid response (EDRR), treatment and control, and restoration. The forest as a whole must contain sufficient diversity and vitality to withstand future threats. State Forests must be managed carefully so as not to expose ecological systems to damage. State Forest lands must be monitored for the presence of damaging agents that can include fungi, insects, diseases and harmful plants.

Cooperation with federal, private and state partners helps DEC staff stay ahead of new threats by understanding the biology, symptoms, hosts, and available control strategies of many of the insects and diseases that can harm trees and forests in New York State. DEC's Forest Health Program gathers, analyzes, and reports on tree pest and disease information. The highest priority is placed on early detection of and rapid response to high-impact invasive species that may threaten the health of New York's forests. The role of the Office of Invasive Species Coordination (OISC) is to support the New York State Invasive Species Council in ensuring that the state has a comprehensive and well-coordinated system for preventing and managing the many ecological, economic and human health threats posed by invasive plants, animals and pathogens.

Preventing an introduction is the preferred strategy and the first

ADDITIONAL RESOURCES

Invasive Species Guidance Documents

DEC, with assistance from the Invasive Species Council agencies and Advisory Committee member organizations, is in the process of developing several new documents relevant to the management of invasive species. Those documents include:

- Generic Environmental Impact Statement (GEIS) for Rapid Response Actions
- Rapid Response Framework for Invasive Species
- Comprehensive Management Plan for Invasive Species
- Lists of Prohibited, Regulated and Unregulated Non-native Plant and Animal Species

These documents will be posted as they are finalized, at www.dec.ny.gov/lands/64567.html

line of defense against invasive species. Prevention measures are usually the most cost-effective means to minimize or eliminate the environmental and economic impacts caused by an invasive species.

EDRR is the second line of defense against invasive species. The early detection of a new invasive species can result from formal monitoring systems, such as networks of trained professionals or volunteers, or from public inquiries to agencies or organizations. The rapid response process begins once a potentially new infestation has been reported to an agency (e.g., state or federal resource agencies, public land managers) or organization (e.g., PRISMs, private land managers) whose mission includes responding to invasions. EDRR of new invasions greatly improves the likelihood of species eradication and eliminates the need for long-term management and control programs.

Treatment and control measures are usually the last line of defense against invasive species. If an invasive species goes undetected and the population becomes well established, the most effective action may be control to lessen its impact or strategies to slow its spread to unaffected areas. In these cases, populations are typically beyond eradication, but can usually be managed or confined to tolerable levels.

Aquatic Invasive Species

Although water-based activities are not as prevalent on State Forests as land-based activities, there is still a significant risk that recreationists, contractors and other people entering State Forests could contribute to the spread of aquatic invasive species. Of particular concern are the illegal introduction of fish species via the dumping of bait buckets, and the failure to properly clean and disinfect boating and fishing equipment, which can spread invasive plant species and fish diseases. A complete discussion of these issues and recommended disinfection practices can be found at www.dec.ny.gov/animals/50121.html.

Invasive Species Management Principles

The call for a management approach that balances sustainable forestry with the need to preserve native or non-invasive plant and animal communities is a challenging and complex task. Understanding the relationship between management practices and invasive species is paramount. Invasive species can eliminate all productive uses on infested sites and can be very expensive to control or eradicate if an inappropriate action is taken.

The following principles will be used to manage invasive species on State Forest lands:

1. Learn to identify invasive plants and animals and address their presence in UMPs
Knowing which invasive plants and animals are likely to invade a region and being able to identify those species aids in preventing their spread and quickly responding to new threats.

2. Prevent the introduction of invasive plants and animals to uninfested sites.
Invasive species can be introduced to a site by moving infested equipment, soil, sand, gravel, borrow, fill and other off-site material. Monitoring disturbed areas and proper sanitation of equipment will help prevent new infestations. Best Management Practices (BMPs) to prevent the introduction of invasive species include:

- Clean equipment prior to visiting site.
- Begin activities in uninfested areas before operating in infested areas.
- Use native plants and weed-free seed and mulch (straw, wood fiber).
- Use fill that does not have invasive plant seeds or material.
- Keep equipment on site during the entire project.
- Incorporate invasive plant prevention into road work layout, design, and decisions. Use uninfested areas for staging, parking and cleaning equipment. Avoid or minimize all types of travel through infested areas, or restrict to those periods when spread of seed or propagules are least likely.
- When possible, to suppress growth of invasive plants and prevent their establishment, retain relatively closed canopies.

3. Contain and treat new invasive plants and animals or those not yet well established.
Controlling small infestations is more effective and economical than trying to control well-established, rapidly spreading infestations. Selected control measures need to be based on species biology and the individual characteristics of an infestation.

4. Minimize transport of invasive plants and animals from infested to uninfested areas.
Invasive species can be spread by moving infested materials and equipment. Cleaning vehicles and equipment is the most effective method of preventing an introduction. Best Management Practices (BMPs) involving the transport of off-site material and equipment include:

- Determine the need and identify sites where equipment can be cleaned. Seeds and plant parts need to be collected when practical and effectively disposed of (e.g., burned, buried, dried, bagged and taken to landfill, etc.). Remove mud, dirt, and plant parts from project equipment before moving it into a project area and clean all equipment before leaving the project site, if operating in infested areas.
- Inspect material sources at site of origin to ensure that they are free of invasive plant material before use and transport. Treat infested sources for eradication, and strip and stockpile contaminated material before any use.
- Inspect and document the area where material from treated infested sources is used annually for at least three years after project completion to ensure that any invasive plants transported to the site are promptly detected and controlled.
- Minimize roadside sources of seed that could be transported to other areas.

- Periodically inspect system roads and rights-of-way for invasion. Inventory and mark infestations and schedule them for treatment.
- Avoid working in infested areas if possible. Postpone work until invasive plants have been eliminated from the site.
- Perform road maintenance such as road grading, brushing, and ditch cleaning from uninfested to infested areas to help prevent moving seeds and plant material from infested areas into adjacent uninfested areas.
- Clean road graders and other equipment immediately after operating in infested areas.
- Clean all dirt and plant parts from the top and underside of mower decks.

5. Minimize soil disturbance.

Invasive plants prefer and often thrive under disturbed conditions. Do not disturb the soil unless absolutely necessary. BMPs for activities involving soil disturbance include:

- Before starting ground-disturbing activities, inventory invasive plant infestations both on-site and in the adjacent area.
- Minimize soil disturbance and retain desirable vegetation in and around area to the maximum extent possible.
- Monitor infested areas for at least three growing seasons following completion of activities. Provide for follow-up treatments based on inspection results.
- Avoid, where possible, grading roads or cleaning ditches where new invaders are found.
- When it is necessary to conduct soil work in infested roadsides or ditches, schedule activity when seeds or propagules are least likely to be viable and to be spread.
- Quarantine soil from infested area to prevent off-site spread.

6. Maintain desirable species.

Establishing and maintaining competitive, non-invasive desirable plants along roadsides and disturbed areas prevents or slows establishment of invasive plants. Best Management Practices (BMPs) for re-vegetating disturbed areas include:

- Re-vegetate all disturbed soil, except on surfaced roads, in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site will prevent establishment of invasive plants.
- Use local seeding guidelines and appropriate mixes, but realize that many species previously recommended for this purpose are now presenting invasive problems.
- Use native material where appropriate and available. Re-vegetation may include planting, seeding, fertilizing, and mulching.
- Monitor and evaluate success of re-vegetation in relation to project plan.
- When re-vegetating areas that were previously dominated by invasive plants, try to achieve at least 90% control of the invasive before attempting restoration.

7. Accomplish invasive species management work with the "minimum tool" approach.
Management actions will be reviewed to determine the minimum action or tool (practices, tools, equipment, and regulations) that will accomplish the task. Management will seek the approach from available alternatives that will have the least impact on the resources while still being able to accomplish the desired goal. The minimum tool approach has important implications regarding use of **control methods**.

8. Manage invasive species with interdisciplinary scientific skills.
Invasive species management involves acquiring a working knowledge of complex relationships and requires the skills of natural resource professionals and researchers who work as a team in focusing on preserving biodiversity and native ecosystems.

Invasive Species Control Methods

Management options should be selected with consideration for the likelihood of success, the location and size of forest stands, the age of infestation, past methods used at the site, time of year, sensitive native flora or fauna within or adjacent to the target infestation, available resources, and adjoining and nearby land uses.

The application of control methods will be determined using **Integrated Pest Management** (IPM). IPM is a science-based decision-making process that guides land managers when investigating a pest situation. The IPM approach determines the most appropriate and cost effective management solution for the specific pest situation. IPM includes identification of the pest, understanding the use and significance of a site or the importance of protecting unique resources, and education of the people involved. IPM also establishes pest tolerance levels and monitoring protocols. Then, with the help of technical experts and on a case–by-case basis, DEC foresters develop an effective, site specific and low risk strategy to manage the pest. This includes altering conditions which attracted pests to the site in the first place. IPM often involves changing human behavior as well.

ADDITIONAL RESOURCES

Control Methods for Select Invasive Species, including information regarding control of specific species of concern can be found at www.dec.ny.gov/lands/64567.html

The following priorities will guide the application of control methods with varying degrees of environmental impacts. The most impactful methods hold the lowest priority and will not be applied unless all higher priority methods are not effective. Low priority methods will be applied in concert with higher priority methods in order to increase effectiveness. As new technologies are developed, they will be incorporated into State Forest management following appropriate review and assessment.

1. **Silvicultural Remedies**
   Changes in forest composition and structure may create conditions that are less favorable to some invasive species.

2. **Hunting**
   Invasive and nuisance species can be kept in balance within the ecosystem by applying hunting as addressed within the Deer Management section of this plan.

3. **Mechanical Control**
   Digging, pulling or cutting may be effective in altering site conditions to control invasives and directly controlling some plant species.

4. **Grazing**
   Although many invasive plants may be resistant to applied scientific grazing, this method may be appropriate for some species. Grazing on State Forest lands would require the availability of an agricultural partner along with staff and funding resources.

5. **Biological Control**

   Biological control is the science of reconnecting invasive plants with the specialized natural enemies that often limit their density in their native ranges. The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) is responsible for controlling introductions of species brought into the United States for biological control of plants, in accordance with the requirements of several plant quarantine laws, the National Environmental Policy Act, and the Endangered Species Act. Petitions for release of plant biological control agents are judged by a Technical Advisory Committee, which represents the interests of a diverse set of federal and other agencies. (Van Driesche, et al. 2002)

6. **Herbicide Treatment**
   All pesticide/herbicide use will conform to guidelines identified in the Active Forest Management section on *page 81.*

Invasive Species Laws and Policies

The State of New York's official policy, enacted into law, is "to conserve, improve and protect its natural resources and environment..," (ECL §1-0101(1)) and it is DEC's responsibility to carry out this policy. As set forth in ECL §3-0301(1) DEC's broad authority includes, among many other things, the power to:

- Manage natural resources to assure their protection and balanced utilization;
- Protect and manage fish and other aquatic life and wildlife;
- Promote control of pests and regulate use of pesticides;
- Promote control of weeds and aquatic growth, develop methods of prevention and eradication, and regulate herbicides.

ECL § 9-1303 requires DEC to control and prevent the spread of forest insects and forest tree diseases. Similarly, ECL § 11-0325 gives DEC the authority to undertake fish and wildlife control measures to prevent the introduction or spread of a disease which endangers the health and welfare of fish and wildlife populations, domestic livestock, or the human population.

ECL Title 17 of Article 9 essentially requires that New York State agencies implement the recommendations of the 2005 New York State Invasive Species Task Force *Final Report* to the Governor and Legislature. ECL § 9-1705(5)(b) gives the Invasive Species Council the authority to identify actions taken to respond rapidly to and control populations of invasive species; and ECL § 9-1705(5)(c) gives the council the authority to develop a comprehensive plan that will address, among other things, prevention, early detection and rapid response.

CONTROL OF INTERFERING VEGETATION

Foresters manage forests with the goal of improving forest health, promoting biodiversity and enhancing forest productivity. These management goals may, from time to time, be impacted by interfering vegetation – either exotic invasive plants or over-abundant and interfering indigenous plants like hay-scented fern (*Dennstaedtia punctilobula)*, American beech (*Fagus grandifolia*) or striped maple (*Acer pensylvanicum*). Methods are chosen which maximize interfering vegetation control while protecting overall forest health and productivity (growth). For example, interfering vegetation may need to be controlled when: protecting a threatened species like hart's-tongue fern (*Asplenium scolopendrium* var. *americanum*) from an exotic invasive plant; perpetuating pitch pine (*Pinus rigida*) in the Albany Pine Bush; or establishing a desired species mix of Appalachian hardwoods.

Interfering Vegetation: Vegetation that uses the common resources (space, light, water, and nutrients) of a forest site needed by preferred trees for survival and growth (Glossary of Forestry Terms in British Columbia, Ministry of Forests and Range, March 2008)

Foresters have many options for controlling interfering vegetation to increase the success of their management decisions. With all management decisions, each option comes with benefits and drawbacks. However, foresters choose the option that best controls interfering vegetation most efficiently and economically while minimizing negative environmental impacts. Common practices foresters apply to control interfering vegetation include:

- **Do nothing** – When interfering vegetation becomes established, the forester may choose not to take action, for biological, economic or societal reasons. If this option is chosen however, future control measures may be more expensive and may have more of an impact on the site. If this situation occurs the management objective for the site might fail or take much longer to achieve success.

- **Hand pulling** – Foresters may choose to have a crew enter the site and remove the interfering vegetation by hand. . This method of control may be successful in removing individual small occurrences of some species. However, this method is very labor intensive and expensive, has the potential for negatively impacting the site by disturbing growing conditions for desired plants, and is therefore typically limited to very small sites of less than two acres. Additionally, this method is not appropriate for removing species that can re-grow from root fragments unless workers can be sure to remove all plant material above and below ground.
- **Chainsaw cutting** – This option is adequate for sites requiring the control of individual large woody stems (typically small trees and shrubs) like hop hornbeam (*Ostrya virginiana*) and ironwood (*Carpinus caroliniana*). Although labor intensive and moderately expensive, chainsaw cutting can target very specific interfering vegetation with minimal site disturbance to surrounding vegetation and soils. Chainsaw cutting to control interfering vegetation can also be conducted at the same time as other silvicultural activities such as timber harvests and requires little additional expertise beyond the safe use of a chainsaw. Unfortunately, in many circumstances chainsaw cutting does not kill the target plants. Some of the more common interfering vegetation such as American beech (*Fagus grandifolia*) and striped maple (*Acer pensylvanicum*) can actually rapidly re-grow from root and stump sprouts after the main stem has been cut. However, by incorporating herbicide treatments after the cutting, either on the cut stump or on the foliage of the resulting sprouts, may improve the chances of successfully removing of this type of aggressive re-sprouting interference.
- **Mechanical removal** – Mechanical removal may include disking or mowing. Disking or mowing by large equipment can effectively and efficiently treat large areas in a short period of time. This option may be expensive but cost-effective compared to other options at a similar scale. The use of disking and mowing in New York is not very common and not readily available as an option for forest management. Additionally, the action of mechanical removal is non-discriminatory (it will destroy desired vegetation as much as interfering vegetation), is extremely site intensive, and may do significant damage to residual trees purposefully left on the site. Most methods of mechanical removal are limited to sites that are relatively flat, dry and free from large obstacles such as boulders – conditions relatively uncommon in New York forests. However, there are times when mechanical removal is appropriate to maintain desired herbaceous forbs and grasses in open land areas or to maintain early successional habitat. Mechanical removal may also improve growing conditions for exotic invasive plants just as well as for the preferred plants.
- **Fire –** Fire can be used to control interfering vegetation if the desirable species in the stand can withstand temperatures that will kill the undesirable species. In New York, oak forest types are best suited to being managed using prescribed fire, because oak seedlings and saplings are able to survive fire temperatures that will kill most of the

plant species that commonly cause regeneration difficulties. Prescribed fires are only executed when weather and fuel conditions (wind, relative humidity, temperature, fuel levels and moisture content) are optimal to support a manageable controlled burn.

To learn more about fire in New York please refer to the Fire Management section on page 299 of this plan.

- **Herbicide Application** – Herbicide use for the control of interfering vegetation will comply with guidelines identified in the Active Forest Management section on *page 81.*

"FH" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Forest Health (FH) Objective I – Promote overall forest health on State Forests, using timber sales to improve forest health and the diversity of species, habitats and structure in order to enhance the resiliency of ecological systems and forest sustainability. Harvests will be planned in such a way as to develop a wider range of forest successional stages. Harvest schedules will be developed as part of Unit Management Planning to further this objective.

FH Objective II – Protect State Forests from introduced diseases and invasive plant and animal species through cooperation with the Division's Forest Health program.

FH Action 1 – Complete development of the State Forest Invasive Species Response Plan, establishing step by step procedures to address invasive insect and disease outbreaks, by the end of 2010.

FH Action 2 – Identify, prioritize and address infestations within each UMP.

FH Action 3 – Develop invasive species BMP language to be included in all forest product harvest and construction contracts, to protect State Forest lands from the introduction, establishment and spread of invasive species. Language to be completed by 2011.

FH Action 4 – Develop and publish an educational brochure about invasive species BMPs for recreational users by 2014.

FH Action 5 – Develop species-specific guidelines for control of invasives to be used by all DEC staff undertaking activities on State Forests. Guidelines to be developed by 2012.

FH SEQR Alternatives Analysis and Thresholds

The **preferred alternative** (also the **no-action alternative**) is to continue to enhance overall forest health following the strategies, guidelines and actions discussed above. This involves the application of all components related to integrated pest management, including the use of targeted pesticide applications when all other options have been exhausted.

Another alternative would involve a hands-off approach to forest health issues. The option of letting nature take its own course is not viable, considering the real and imminent threats from human-introduced invasives and diseases and climate change. Human-induced impacts threaten natural systems and, in some cases, will lead to species extirpation if not controlled or mitigated.

The alternative of pesticide use has been addressed specifically in the active forest management section of this plan.

SEQR Analysis Threshold: Compliance with the guidelines and strategies of this section will avoid and minimize potential impacts resulting from forest health activities to the maximum extent practicable and no further SEQRA review will be conducted. However, specific mitigations and thresholds for pesticide use have been established in a separate “pesticides and herbicides” section of this plan.

MANAGING DEER IMPACTS

White-tailed deer are arguably the most significant wildlife resource in New York State from an economic, social and ecological perspective. Economically, benefits derived from deer include direct and indirect expenditures on hunting and wildlife observation. Losses are primarily associated with: agricultural crop damage; damage within forests to woody and herbaceous plants; damage in urban areas to ornamental plantings; adverse health impacts associated with deer (e.g., Lyme disease), and deer-vehicle collisions.

Ecologically, deer are considered a keystone herbivore. A keystone species is a species that has a disproportionate effect on its environment relative to its abundance (Paine 1995). The overabundance of deer can lead to the local extirpation of certain preferred herbaceous plant species, alter forest composition by favoring certain tree species over others, and alter habitat structure and food resource availability for other wildlife species.

Deer also have intrinsic value as a native wildlife species. For these reasons, it is unavoidable that deer management, and the setting of goals and objectives related to deer populations and impacts, is complex and often contentious.

The DEC Division of Fish, Wildlife and Marine Resources (DFWMR) is vested with the management of white-tailed deer in the state; as with all wildlife species in New York, deer are property of the state (ECL 11-0105) . Deer management in New York occurs at a multitude of scales, ranging from broad-scale statewide management to decisions focused on an individual-property. Land managers try to balance the needs and desires of the public with the possible impacts of deer on biodiversity and forest health.

History

The history of white-tailed deer in New York since 1492 mirrors the history of most other game species, across North America. The deer density in North America at the time of first European contact is hypothesized to have been 3.1 to 4.2 deer/km^2 (8-11 deer/sq. mi) (McCabe and McCabe 1994). Present-day deer population density estimates for much of New York are actually significantly higher. Upon European settlement of the continent, the deer population

began to slowly decline. Over the next 350 years, the herd shrank to 35 to 50% of its former size. In the era following the Civil War, wildlife was under the greatest hunting pressure ever. During this time period, commonly referred to as the "era of exploitation" (1870-1920), deer numbers were reduced to 1 to 2% of their pre-European population (McCabe and McCabe 1994). As a result deer were extirpated from much of New York.

The devastation wrought on wildlife populations by unregulated market hunting and habitat loss during this period ushered in the beginnings of the modern era of wildlife management – an era during which game populations have largely rebounded and flourished because of the acceptance of science-based management, underpinned by a sound understanding of species' life histories and ecology, and the enactment of federal and state wildlife laws, which established hunting licenses and seasons, bag limits, and means of legal taking. It is extremely likely that deer densities now present in many localities of the state greatly exceed historic densities.

At present, deer populations in New York reflect a number of factors. Annual and short-term variations in populations are largely attributable to winter severity in northern NY and allowable harvest, specifically the allocation of Deer Management Permits (DMPs – permits for antlerless deer) in southern portions of NY. Long-term changes in habitat condition associated with land-use change, ecological succession, and possibly chronic deer overabundance may also have significant effects on deer populations; however, these effects are less obvious and more difficult to understand, quantify, and address when devising deer management strategies. As road density and vehicle use has increased and predator populations have also increased, non-hunting sources of deer mortality have likely also increased over the past 50 years. However, deer populations have also generally grown through this period and mortality associated with these sources is not generally sufficient to control deer populations (Vreeland 2002).

EXISTING CONDITIONS

Currently, DFWMR manages deer populations on the scale of a Wildlife Management Unit (WMU). Deer population levels in each WMU are monitored through the trends in annual deer harvests, bow logs and nuisance complaint levels. DFWMR sets goals for desired deer population levels within a WMU through recommendations of local stake-holders. Stake-holders represent the full range of interested citizens concerned with deer population size in an individual WMU. Based on these recommendations, DFWMR sets the number of DMPs available annually to manage the deer population closer toward the objective level. Statewide, there are a total of 92 WMUs, 89 of which are open to deer hunting.

ADDITIONAL RESOURCES

For more information on WMUs and the Citizen Task Forces go to www.dec.ny.gov/animals/7211.html

Deer Management Assistance Program

The Deer Management Assistance Program (DMAP) is an additional tool that allows landowners and resource managers to implement site specific deer management on their lands by allowing the harvest of additional deer. Applicants must qualify in one of five categories (agriculture, forest regeneration, significant natural communities, municipality, or custom deer management) to be considered for the program. A trial program for using this tool on State Forests where deer populations are negatively impacting forest health is being implemented.

Deer Impacts on Forest Ecosystems

The impacts of deer on forests are very well documented. Deer impacts have been demonstrated in countless instances of primary research and have generated numerous review articles (Waller and Alverson 1997) (Cote, Rooney and Tremblay 2004) (Latham, et al. 2005) and books dedicated solely to the topic (McShea and Rappole, Herbivores and the ecology of forest understory birds 1997). Researchers recognize that as deer populations increase, their impact on the ecosystem structure and function will also increase.

As deer browse, they select for individual plants in order to meet seasonally-based nutritional needs. Through selective browsing and foraging, deer can dramatically affect herbaceous and woody plant composition of a forest by preferentially selecting highly nutritious and palatable species while avoiding less nutritious or unpalatable species. Direct impacts to individual plants may include reduced growth rates, reduced or absent reproductive output, or mortality. For overstory tree species such as oak, reproductive output may be affected by consumption of propagules, including seeds (acorns), fruits, suckers, stump sprouts etc.; for herbaceous plants, consumption of flowers, seed heads, or fruits may limit reproduction. The selection of preferred specimen within a species may result in the elimination of individual plants with particular qualities. This could have significant impacts on the quality and representative stocking of the species at a population level. Selection by species has negative effects on preferred species and affects forest composition. For herbaceous plants, these effects may include local rarity, genetic isolation, and extirpation. For tree species, regeneration may be eliminated, threatening the long term sustainability of a forest cover type following natural disturbance or timber harvest.

Furthermore, non-preferred invasive species, such as Japanese barberry and Japanese stiltgrass, and native species, such as hay-scented fern, Pennsylvania sedge, and mountain laurel, are given a competitive advantage over species preferred by deer and, after many years of overabundant deer, come to dominate the understory of many forested sites. These conditions can persist even after a drastic reduction in deer density occurs.

Aside from direct impacts on vegetation, deer can have indirect impacts on other trophic levels by simplifying forest structure and competing for food resources. Deer browsing can severely degrade the habitat quality for bird species requiring areas of dense understory for nesting or

foraging. Overabundant deer degrade the vertical structural diversity of forest habitats by eliminating the shrub/sapling layer and decreasing the diversity of the ground layer.

Deer-attributed changes to forest structure and composition can have significant negative effects on the diversity and abundance of forest-breeding birds (Casey and Hein 1983) (deCalesta, Effect of white-tailed deer on songbirds within managed forests in Pennsylvania 1994) (McShea and Rappole 2000). Declines in bird diversity result from both the loss of ecological niches with habitat simplification and an increased exposure to nest predators as habitat complexity decreases (McShea and Rappole, Herbivores and the ecology of forest understory birds 1997). A decrease in vegetation density may reduce food, cover, and nesting sites, while increasing nest predation rates, even in large forest tracts (Leimgruber, McShea and Rappole 1994). Populations of birds that nest or forage on the ground or in the understory grow after deer reduction, along with increasing vegetation cover and diversity (McShea and Rappole 2000). Bird species of conservation concern in New York that may be impacted by deer browsing include wood thrush, worm-eating warbler, cerulean warbler, black-throated blue warbler, Louisiana waterthrush, ruffed grouse, and Canada warbler. Direct competition by deer for mast crop resources can impact small mammal populations as well (McShea and Rappole 1992) (McShea and Schwede 1993).

The Ripple Effect

Deer impacts on bird species don't end there. Those impacts have a "ripple effect" on other parts of the ecosystem. For example, deer browsing removes the understory habitat of the Yellow-billed Cuckoo, an impact that further affects the forest because the Yellow-billed Cuckoo is one of the few North American birds that readily eat hairy caterpillars (ex. tent caterpillars and forest tent caterpillars). They also eat gypsy moths. This bird species is a natural control for caterpillar species that left unchecked could do serious damage to the tree canopy and affect the forest as a whole. Their population is often abundant when an outbreak of these pests occurs. (Ickes 1992) For example, prior to a major tent caterpillar outbreak that occurred in 2003-05, regular bird surveys indicated that Yellow-billed Cuckoos were scarce on Fort Drum, in northwestern New York. During the outbreak, the population expanded rapidly and although it has since declined, it is still above pre-outbreak levels.

The maximum deer density that is acceptable for the successful regeneration of herbaceous and woody plants can vary from property to property depending upon the previous and current forest management regime, site productivity, and availability of forage within the surrounding landscape. Figure 1 provides a good illustration of the interaction between deer density and the forest ecosystem on lands that are actively managed for wood products. This model can be considered representative of DEC State Forests. The managed disturbance regime within such a forest allows for the increased production of forage thus allowing it to sustain higher deer populations than a typical unmanaged forest. This curve illustrates the often cited optimum deer density within a managed forest as approximately 10-15 deer per square mile. To sustain high levels of biodiversity in an unmanaged forest, deer densities need to be well below this level. (Figure 2)

These figures illustrate that the presence of agricultural land in close proximity to the forest has a significant impact on the carrying capacity of the land to support deer populations, and the carrying capacity of a forest is drastically altered by the abundance of deer. When population levels exceed the carrying capacity over browsing reduces the carrying capacity further, creating a downward spiral that dramatically affects the health of the deer herd and can lead to mortality. Deer population levels are also affected by several additional and significant factors: winter snow levels, conditions and duration and deer predator population levels.

The measurement of deer density can only be useful in providing insight into the relationship between a property's deer density and corresponding impacts. Ultimately, the success of policies enacted to reduce deer density on a specific property should be measured in terms of any changes in impact levels.

Figure 1 (deCalesta and Pierson 2005)

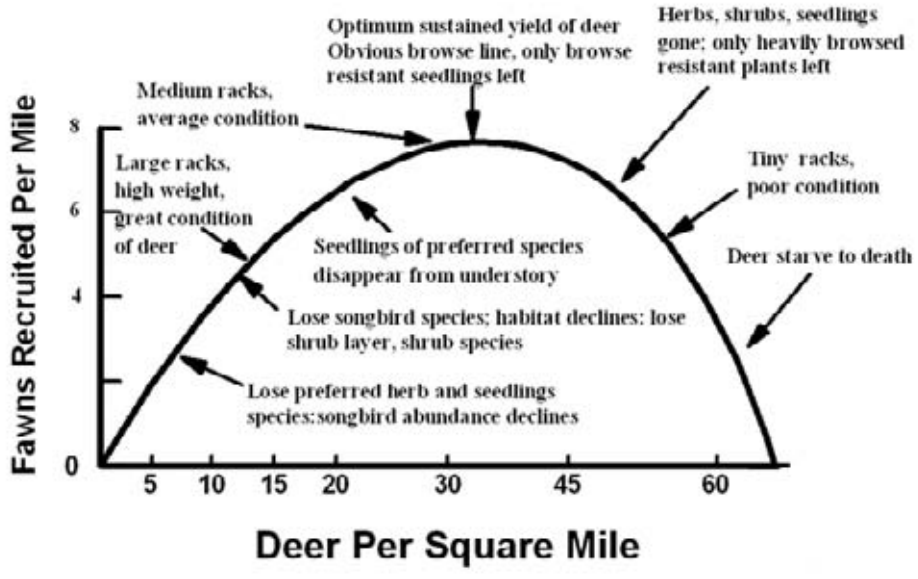
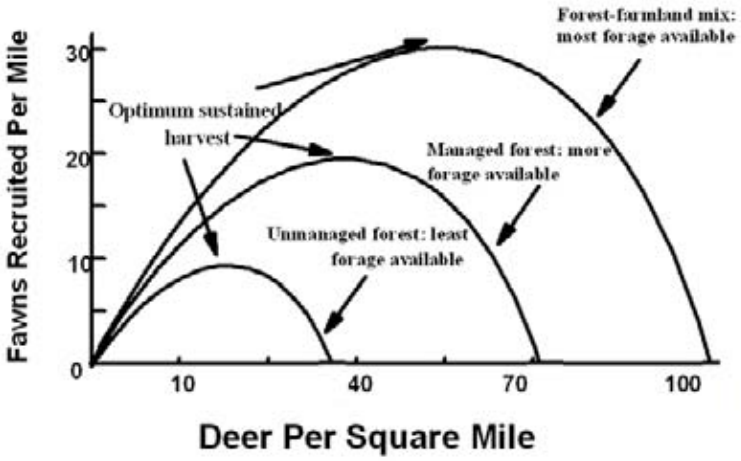


Figure 2 (deCalesta and Pierson 2005)



Smallest curve = unmanaged forest
Middle curve = typically managed forest
Largest curve = forest/farmland mix

STRATEGIES FOR MANAGING DEER IMPACTS

The following recommendations will guide management of deer impacts on State Forests.

Participation in Citizen Task Force Meetings for WMU's which contain State Forests.
In most landscapes, State Forests represent only a small portion of the forest base within each WMU. It would be impractical and inefficient to develop and attempt to implement deer management at the State Forest level. For this reason, State Forest managers will seek to participate as advisors in all Citizen Task Forces and as stake-holders where appropriate and will rely on the expertise and assistance of DFWMR.

The Bureau of State Land Management will designate or recommend a regional representative to attend all citizen task force meetings pertaining to the management of deer within a WMU that contains State Forest properties. The representative should be a person (such as the State Forest land manager), who has a distinct knowledge and familiarity of the browse impacts present on the State Forests located within the WMU. Performance of browse impact surveys on these properties preceding such meetings will be encouraged to offer insight as to the state of the deer herd and its interaction with the resources on property open to the public for hunting.

Work Planning to Assess Deer Herd Impacts on State Forests and Monitor the Effectiveness of Management Actions:

There is limited ability to manage deer impacts using silvicultural systems. The most effective method of keeping deer impacts in line with management objectives is to monitor impacts while observing and managing the herd (Stout 2005). On properties where deer are suspected of impacting values and objectives associated with biodiversity and timber management, such impacts will be inventoried and assessed. Any management actions taken to address deer over-abundance will also need to be assessed to determine if in fact the action taken is accomplishing the stated objective of reducing impacts. This will require a commitment of time and resources by inter-Divisional staff to develop a protocol for assessing the impacts of deer and the appropriate management response needed to address those impacts.

Developing an Inventory Protocol for the Assessment of Browse Impacts:

Staff will need to work with DFWMR and leading experts in the field of deer management to develop a simple and acceptable protocol for conducting an inventory of deer impacts on State Forests, as well as providing a simple tool for use by private landowners. The protocol should include the following specifications:

1) The protocol needs to be adaptable to the different regions of the state, different ownerships, and have the ability to integrate into existing State Forest Inventory Protocols. In addition, the protocol can be conducted as a standalone inventory for properties in which Forest Inventory is not being conducted for that fiscal year.
2) The protocol needs to be quantitative. It should avoid using subjective observational data that could vary depending upon the person assigned to do the inventory. Example: Fixed radius plots combined with a percent of browse impact (previous winter's browsed bud sites/total bud sites).
3) Inventory will record browse impacts on preferred species.

Developing State Land Deer Management Guidelines for making decisions related to addressing Deer Impacts on State Forests:

Once a protocol has been instituted, a model needs to be developed to indicate the level of deer impacts within the forest and if action needs to be taken to reduce those impacts. A Deer Impact Index such as the one developed in (Marquis, Ernst and Stout 1992) would be an excellent tool to translate objective data recorded in the field into a description of the impacts and their level of severity. Recommendations for actions would then need to be developed.

Developing Capacity to Create a State Forest Fencing Program:

The use of high fences to exclude deer from large areas of the forest is the most effective method to mitigate the negative impacts of deer upon understory plants within a forested area. As stated previously, negative impacts associated with deer overabundance can persist even after a reduction of deer density occurs. Fencing portions of State Forest lands that have been

impacted by excessive deer browse will prevent the loss of “high preference” browse intolerant herbaceous plants that may otherwise become locally rare or even extirpated from the ecosystem. Such species could include trillium, Indian cucumber, Canada mayflower, etc. (Rawinski 2008).

The Bureau of State Land Management has considered a fencing program intended to exclude deer from areas on State Forest properties where the impacts associated with deer browse are contributing to the loss of species diversity and the failure of silvicultural objectives. The state of Pennsylvania and the Allegheny National Forest both have successfully employed temporary deer exclosures to allow establishment of forest regeneration in areas with excessive deer population levels. This is a very effective but very expensive method which is well beyond existing funding capacity.

The only viable means of supporting this program and other needed deer management strategies would be to re-invest a portion of every timber sale’s proceeds into a dedicated fund for the purpose of regenerating forest stands and mitigating deer impacts. A similar program in Pennsylvania has been established with part of the income from their State Forest timber sales.

The effect of deer browsing is dramatically illustrated in the above pictures where, deer have been excluded from one side of the fencing. Conditions were identical on both sides before construction of the fence.

Applying for use of DMAPs on State Forests:

In some cases, WMU-wide deer take objectives are not sufficient to address impacts occurring on a specific property. In these cases, the land manager may seek approval from the DFWMR Regional Wildlife Manager for participation in the Deer Management Assistance Program (DMAP) until such time as deer impacts can be reduced and the Deer Take Objectives can be reviewed through the citizen taskforce. As stated previously, DMAP permits are issued to a landowner or land manager for the purpose of reducing the deer herd on a specific property.

On state lands enrolled in DMAP, the forester responsible for the management of the subject property will be the designated agent for the distribution of DMAPs and harvest reporting to DFW. Success of the program will be depend on the development of a fair, equitable and effective system for issuing permits which will be developed with approval of DFWMR staff. Regions participating in DMAP will be expected to develop a hunter database intended to keep track of DMAP recipients and conduct follow up surveys/personal interviews with DMAP recipients intended for the purpose of generating harvest reports in accordance with DFWMR policy. Refer to DFWMR guidelines for reporting procedure.

Hunter Access and Demographics

It is recognized that DMAPs are not the only answer and may not always provide the solution to the impacts of overabundant deer. Big game hunters can provide an important and viable means of deer population control, which should be enhanced when possible. Issues related to hunter access and demographics can be influential factors related to the effectiveness of a targeted deer reduction program. This means that, on State Forests, land managers must consider provision of maps, web-based information, road access and parking availability. Closely monitoring vegetation response to reduced deer populations on individual properties will offer insight to the land manager regarding other issues that may be impeding hunter success and the subsequent reduction of deer impacts. The land managers can then use such information to implement management strategies to address these factors.

Deer Density

Land managers are encouraged to participate in surveys of deer density on State Forests where impacts are evident. Direct methods such as spotlight surveys and indirect methods such as pellet group surveys should be encouraged on lands where deer impacts are high and actions have been taken or will be taken to reduce impacts by reducing deer density.

Mitigation Strategies

Deer impact mitigations should include but not be limited to deer exclosures, invasive species removal and site preparation. Another mitigation strategy is to adapt harvesting strategies to group treatments or harvested areas to overwhelm the existing deer population.

"DM" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Deer Management (DM) Objective I – Monitor the impact of deer browsing on forest health and regeneration.

DM Action 1 – Develop an inventory protocol for the assessment of deer browse impacts and deer density. Protocol should include thresholds for when inventories should be conducted and guidelines for monitoring effectiveness of actions taken. Protocol to be developed by 2014.

DM Action 2 – Develop a list of strategies appropriate for addressing unsustainable levels of deer density on State Forests. Develop guidelines including impact thresholds, to assist staff in deciding which strategies to use in addressing deer impacts. Strategies and guidelines to be developed by 2014.

DM Action 3 – Conduct deer density and browse impact inventories on State Forests using protocol developed in DM Action 1. Initiate impact inventories no later than 2015 in high priority areas.

DM Action 4 – Participate in Citizen Task Forces where State Forests are part of a WMU.

DM Objective II – Address issues of over-browsing.

DM Action 5 - Improve hunter access and success rates by providing web-based information and maps, and by enhancing road access and parking availability.

DM Action 6 – Work with DFWMR biologists to identify and employ active deer population control measures, such as DMAP issuance, fencing to mitigate impacts when and where excessive browsing is identified.

DM SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, continuing with current management approaches, has not been selected. There are a few areas of the state where the above actions are being implemented, but throughout the State Forest system as a whole, noticeable deer browse impacts continue to occur. This alternative is not acceptable, considering the severe impacts deer over-browsing can have on future forest structure as well as some protected species.

The overall **preferred alternative** is to enhance monitoring and actively manage deer populations in conjunction with DFWMR biologists. The preferred alternative also considers the interests of deer hunters and will lead to sustainable deer population levels.

There are a number of individual deer population control methods which have been considered as alternatives and listed under DM Objective II. Of these, the preferred alternative is to implement DM Action 5. This alternative is preferred as it has been proven to be effective and furthers other recreational goals. Only when this action has been fully implemented and monitoring still shows excessive browsing, shall additional population control methods under DM Action 6 be employed.

SEQR Analysis Threshold: Compliance with the guidelines and strategies of this section will avoid and minimize potential impacts resulting from managing deer impacts. Use of any deer population control methods other than those actions proposed within this section would likely be unproven and controversial, requiring additional SEQR analysis.

FIRE MANAGEMENT

Statewide, fire currently plays a small role in shaping New York's forests; but in some areas it is an ever-present danger, and in some ecological regimes, it is a necessary component. Some natural communities are dependent on fire for renewal and growth.

Public education has reduced the incidence and extent of wild land (forest) fires in New York over the past 100 years. When fires do break out, New York's climate and vegetation tend to make them relatively easy to suppress. But during periods of drought, New York has seen historically significant wildfires that have caused serious damage to forest soils and human settlements.

Fire management on State Forest lands will entail the suppression of fires, both natural and human-induced as well as the application of prescribed fire under appropriate conditions. The goal of this is to maintain fire-replicated natural communities and prevent extreme fire danger that could threaten natural and human communities. The cumulative impact related to suppression of fire over time can lead to excessive fuel loads that can be dangerous in drought conditions. Maintaining the presence of fire in appropriate areas can keep fuel loads in check.

Prescribed Fire is used to approximate the natural vegetative disturbance of periodic fire occurrence. This vegetative management tool is used to maintain fire dependent ecosystems and restore those outside their natural balance. Generally, low intensity prescribed fire, is applied by trained experts to clear ground of dangerous fuels like dead wood and brush. This low-intensity fire is vital to the life cycles of fire-dependent range and forest lands. (USFS, website www.fs.fed.us/fire/fireuse/rxfire/rx_index.html) Prescribed fires are also used as a tool to control the buildup of excessive fuel levels which could contribute to disastrous and uncontrollable wildfires. Prescribed fires are only executed when weather and fuel conditions (wind, relative humidity, temperature, fuel levels and moisture content) are optimal to support a manageable controlled burn.

The Division of Lands and Forests is heavily reliant on the support and cooperation of the Division of Forest Protection and Fire Management. Their Forest Rangers review fire plans for state lands, help oversee and develop prescribed fire programs and are responsible for maintaining an organization which is capable of responding to wildland fire. In the protected areas of fire districts and fire towns, Forest Rangers share dual jurisdiction with village and town fire departments under the General Municipal Laws.

NEW YORK'S FIRE HISTORY

Prior to European settlement in New York State, use of fire was widespread among hunting and gathering societies. Fire was used to encourage berries, harvest natural grains and nuts, and shape a habitat rich in game. Fire hunting was a common practice in the fall, and fires sustained

the herbaceous landscape frequented by elk, deer, buffalo and turkey. The forests around native settlements were periodically burned to eliminate underbrush and other herbaceous cover. This practice effectively thinned out the forest, creating areas suitable for agriculture and reducing the opportunity for ambush by marauding enemies. Early European explorers often referred to clearings by fire as “barrens” or “deserts,” and they were common sights. However, in New York, mountains, river bottoms, swampy lowlands and denser boreal forests were more or less spared from annual fire setting.

European settlement expanded the process of agricultural reclamation begun by the aboriginal tribes. More forested land was cleared and new villages were created. Domestic grasses and managed pastures replaced the harvesting of natural foodstuffs and wildlife. Forest land was also cleared to satisfy the ever increasing demand for lumber. Slash-heavy logging practices, widespread logging and dry weather between 1880 and 1910 led to intense wildfires, especially in the Adirondack and Catskill mountains.

During this era, New York State initiated a fire protection system, led by fire wardens and a newly formed group known as forest rangers, covering the most fire prone areas. From the 1880s until the 1990s, the state’s fire management activities were focused on fire suppression. Except for occasional regional fires and outbreaks in the early 1940s and 1960s, favorable climatic conditions, along with the state’s suppression and prevention efforts have led to reduced numbers of fires and acreage burned in recent years.

Causes of Wildfire

There are many different causes of wildland fires. The leading cause of wildland fire on New York State’s public lands is unattended campfires. Overall in New York State, human caused wildfires are the leading category of reported fires and debris burning is the leading human cause. Over the past 20 years, lightning strikes have accounted for approximately four percent of the total reported fires in the state. However, in 2002, at the end of a five year drought, lightning caused 12 percent of the total fires reported.

Wildfire Detection

Wildfire detection and reporting has evolved over time, since the first fire tower in New York was constructed in 1905 on Balsam Mountain in the Catskills. Through the late 1980s fire towers manned by fire tower observers were the principal tool used to report smokes. A number of fire towers were constructed amidst large holdings of State Forest lands in the Southern Tier and Hudson Valley in order to protect those lands from fire. Additionally, the CCC's built many miles of truck trails and fire breaks and hundreds of water holes for better access, to prevent fire spread and to aid in extinguishment when fires occurred.

Today, none of the fire towers are manned for the express purpose of fire detection. DEC uses aerial detection flights, flown as conditions warrant during fire season, detection by DEC staff and reports from civilian aircraft and the public.

Trends

The number of prescribed burns is anticipated to increase throughout the state, focusing primarily on perpetuation of fire dependent communities, along with increasing interest in hazard fuel reduction and habitat manipulation projects. This trend is dependent on the availability of DEC resources and assistance from other partners such as The Nature Conservancy.

FIRE DANGER RATING AREAS

Fire Danger Rating Areas are zones with similar climatic and vegetative conditions that are monitored for susceptibility to wildfire. Monitoring is achieved with the assistance of Remote Automatic Weather Stations that provide real-time weather conditions, allowing the fire danger to be updated on a daily basis. The following Fire Danger Rating Areas contain significant areas of State Forest lands and have a tendency for elevated fire danger.

Long Island
The central portion of the area, or as it is known locally, the Central Pine Barrens, has large tracts of pine barrens species such as pitch pine, scrub oak, black oak and scarlet oak, creating different communities such as dwarf (pitch) pine, pitch pine/oak, oak/pine, pine/oak/heath and to a lesser extent upland hardwoods. Agricultural areas and grasslands as well as many small and large pockets of phragmites are also found.

Large fires on Long Island are typically wind-driven. July, August and September see the most severe fire behavior. The sea breeze can influence wind driven fires with high rates of spread and diurnal 180 degree wind shifts. Dense stands of pine/oak/ scrub oak/heath can produce flame lengths of 15 to 30 feet. Crown fires can be sustained in closed stands of pitch pine or in stands of scrub oak with leaves that over-winter.

Hudson Valley
Mixed northern hardwoods of oak, maple, hickory, ash, cherry and beech dominate the area. Some scattered pockets of hemlock, fir, pine and red cedar are also present.

The primary carrier of fire is timber litter or grass. Spread rates are low to moderate. Fire intensity may be low to high with flame lengths usually less than four feet. Spotting and torching is possible. Duff fires with high resistance to control are common during summer periods with sustained periods of drought.

Southern Tier
This FDRA is a combination of forested land and abandoned agricultural land. Primary forest types are oak/hickory and northern hardwoods. Abandoned agricultural lands generally have a majority grass/shrub component.

Spring fire behavior in the grass fuel types during moderate weather conditions will produce flame lengths between 4-12 feet and ROS between 78-104 chains per hour, if not influenced by initial attack or other conditions. Typical fire behavior in hardwoods will produce flames of 1-5 feet with ROS between 2-8 chains per hour. Higher fire intensities are observed in the oak/hickory types and may contribute to problem fire behavior, especially if an understory of rhododendron is present.

FIRE-REPLICATED OR DEPENDANT NATURAL COMMUNITIES

Grasslands and Oak Openings

Grasslands

Prescribed fire can be used to improve the quality of grassland habitat for bird species such as the Henslow's sparrow, grasshopper sparrow, bobolink, and savannah sparrow. The quality of habitat in grasslands is reduced for many bird species when shrubs and other successional species encroach into open fields. Prescribed fire is intended to remove the build-up of dead vegetation, encourage new grass growth, and control undesirable vegetation such as thistle, milkweed, goldenrod, asters, and various shrub species.

Maintenance of grassland habitat on Long Pond State Forest in Chenango County

A typical management objective, applied to fields on Long Pond State Forest, is the prevention of shrub cover from increasing beyond 5%. Management activities will generally occur during the non-breeding season to minimize effects on breeding birds.

ADDITIONAL RESOURCES

USGS Management Guidelines – The USGS has published guidelines for specific grassland bird species at: www.npwrc.usgs.gov/resource/literatr/grasbird/

Oak Openings

The globally rare plant communities commonly referred to as "oak openings" or "oak savannahs" are composed of native prairie plants, usually surrounded by Oak - Hickory forests. Considered to be "fire climax" communities, fire has played a key role in establishing them and assuring their continued existence. Historically, fires were set by Native Americans or caused by lightning strikes. Without prescribed fire, these communities will weaken over time and disappear from the landscape. Fire produces bio-chemical effects which cannot be duplicated by other management actions.

The DEC manages the 230 acre Rush Oak Openings Unique Area, located in southern Monroe County. This site is the only known intact oak opening remaining in New York State and is the easternmost remaining oak opening. Oak openings were very common in the Midwest (where the prairie met eastern forests) prior to European settlement.

Oak openings can be variable in size, from just an acre to several thousand acre complexes. Characteristic species include indian grass (*Sorghastrum nutrans*), little bluestem (*Schizachyrium scoparium*), butterfly - weed (*Asclepias tuberosa*), and wild bergamot (*Monarda fistulosa*) along with scattered specimens of chinquapin oak (*Quescus muhlenbergii*), northern red oak (*Quercus rubra*) and white oak (*Quercus alba*).

Pine Barrens

Long Island Central Pine Barrens

The pitch pine, oak, and ericaceous shrub dominated forests of the Long Island Central Pine Barrens represent an extremely volatile fuel type with a long history of severe fires. They are the most dangerous wildland fuel complex in the Northeast. Coupled with a dense human population and decades of extensive development, the Central Pine Barrens presents a significant wildland-urban interface hazard. These fire-dependent barrens are also an important habitat for a variety of rare, threatened, and endangered plant and insect species.

David Sarnoff Preserve in Suffolk County is part of the Long Island Pine Barrens

Most of the area is comprised of an overstory of pitch pine and/or tree-sized oak in varying densities, with either a scrub oak or huckleberry/blueberry understory. Open areas are dominated by scrub oak. Many stands have a heavy accumulation of litter and duff.

Following a recent round of catastrophic fires in 1995, the Central Pine Barrens Commission formed a Wildfire Task Force to develop a coordinated approach to fire management. The DEC and The Nature Conservancy are joint partners in the Long Island Central Pine Barrens Forest Fuel Reduction and Ecological Restoration Demonstration Site, funded in part by a federal grant issued under National Fire Plan. The goal is to apply prescribed fire or mechanical fuel reduction techniques at a landscape level. In order to reach beyond state lands, local demonstration projects have been undertaken for public education and as a learning opportunity for land managers to observe firsthand the results of different types of fuels management.

Albany Pine Bush

The Albany Pine Bush represents one of the best remaining examples of an inland pine barrens ecosystem in the world. This gently rolling sand plain is home to a unique diversity of animals and plants, including 20 rare species and two rare natural communities. DEC is a member of the Albany Pine Bush Preserve Commission, which administers the preserve, which includes state land as well as private and municipal land.

A formal protection plan guides the future management and protection of the unique inland Pine Barrens habitat, home of the endangered Karner Blue Butterfly. Prescribed fire and mechanical treatment are used to encourage native species of grass, wild blue lupine (*Lupinus perennis*), pitch pine (*Pinus rigida*) and scrub oak (*Quercus ilicifolia*) and to inhibit hardwood invasion by species such as quaking aspen (*Populus tremuloides*), black cherry (*Prunus serotina*, and gray birch (*Betula populifolia*).

GUIDELINES FOR FIRE MANAGEMENT

The use of prescribed fire will be addressed, where applicable, in Unit Management Plans. UMPs that address prescribed fire should clearly state goals and objectives for the use of fire on the unit. Engaging in partnership with multiple DEC programs, state agencies, non-profit groups, municipalities and private landowners is vital to implementing fire management policies. Protocols and procedures for the use of prescribed fire and fire suppression response have been developed by DEC's Division of Forest Protection and Fire Management. The chief role of land managers is to offer input on ecological and biological concerns as well as the public notification procedures to be included in prescribed fire plans.

Fuels Management and Prescribed Fire

Fuels management may include use of prescribed fire, mechanical treatments, or chemical treatments, or any combination. A safe and effective prescribed fire program can mitigate risks to people and their communities, and restore and maintain healthy, diverse ecological systems using fuels management.

There are a number of potential short-term impacts associated with prescribed fire, including:

- The risk of a fire burning out of control and the resulting danger posed to personal property and public safety and health.
- The safety risks for staff
- The impact of smoke on neighboring communities, especially on individuals with respiratory sensitivities
- The impact on wildlife species
- Aesthetic impacts
- Impacts to non-target vegetation if the prescribed fire intensity is exceeded.

The following mitigation measures will be employed to address potential impacts:

- Prescribed fires in grasslands will be timed to limit impact during breeding and nesting season
- All prescribed fire projects must have an approved prescribed fire plan prior to ignition.
  - All prescribed fire plans must contain measurable objectives and a predetermined prescription that defines conditions under which a prescribed fire may be ignited to reduce the chance of an escaped fire.
  - Prescribed fire plans will also establish acceptable wind directions to avoid smoke impacts on population centers and travel corridors.
  - Plans will incorporate public notification protocols
  - Staff members conducting prescribed fires will be required to follow safety protocols.
  - Areas to be treated (burn units) will be delineated and sized to reduce visual impacts

Wildfire Prevention and Suppression

The impacts from wildfires are similar to and greater than those from prescribed fires. Most wildfires occur during periods of high fire danger and their intensity is far greater than would be permitted under a prescribed fire. Intense fires can seriously impact forest soils, riparian areas and valued natural communities. As a result, it is the Department's policy to prevent and control wildfires on State Forest lands. The risk of fuel loading in non-fire dependent natural communities and hardwood stands that form the majority of New York's State Forests is minimal and does not require fuel reduction by letting wildfires burn.

DEC's wildfire prevention and suppression program strives to mitigate or avoid wildfire impacts by applying the following measures:

- Fuel loading and fire danger are monitored by Forest Rangers during fire seasons.
- Wildfires on State Forest lands are reported to DEC's Division of Forest Protection and Fire Management.
- Timber sales contracts require all harvesting equipment to have spark arresters.
- When significant mortality from blowdown, disease or insect infestation creates high fuel loading, salvage harvests are conducted to mitigate the risk.
- The public is encouraged to use campfires responsibly.

"FM" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Fire Management (FM) Objective I – Support Forest Rangers in their traditional responsibilities of controlling the ignition and spread of wildfire on State Forests.

FM Objective II – Maintain naturally occurring fire-dependent communities on State Forests.

> **FM Action 1** – Continue to conduct prescribed burns in conjunction with Forest Rangers to perpetuate fire dependent communities.

FM SEQR Alternatives Analysis and Thresholds

Wildfire Prevention and Suppression
The **no-action alternative** which has been chosen as DEC's **preferred alternative** is the continuation of the Forest Rangers' traditional role of prevention education and active suppression. As mentioned above, suppression does not create excessive fuel loading in most State Forest settings.

An alternative for the suppression of wildfire would be a "let burn" policy. This cannot be implemented, considering the resource damage from an intense wildfire, threat to public safety and destruction of personal property.

No other viable alternatives have been identified.

Fuels Management and Prescribed Fire
The **no-action alternative** for use of prescribed fire has been adopted for all State Forest lands other than those listed in the preferred alternative. DEC's **preferred alternative** is to continue the use of prescribed fire on a limited acreage to maintain fire-dependent communities, grasslands and to treat forests in highly populated areas where excessive fuel loading could develop (ie. Long Island Pine Barrens).

SEQR Analysis Threshold: Compliance with the guidelines and strategies of this section will avoid and minimize potential impacts resulting from the use of prescribed fire. DEC will employ prescribed fire only if it is in conformance with the preferred alternative above and addressed in an approved fire plan. Any other prescribed fire will require additional SEQR.

CARBON SEQUESTRATION

Climate Change, Global Warming and Greenhouse Gases

One of the most important and highly-publicized environmental issues in the world today is climate change and the related concern of global warming. While there is a significant amount of debate and speculation on the rate of global warming, scientific studies from almost every nation have documented an increase in greenhouse gasses in the Earth's atmosphere. "As the largest source of greenhouse gas emissions, carbon dioxide (CO_2) from fossil fuel combustion has accounted for approximately 79 percent of global warming potential (GWP) weighted emissions since 1990…" (U.S. EPA 2009). "The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm (parts per million) to 379 ppm in 2005. The atmospheric concentration of carbon dioxide in 2005 exceeds by far the natural range over the past 650,000 years (180-300 ppm) as determined from ice cores." (Intergovernmental Panel on Climate Change 2007).

The predicted consequences of global warming include species extinction, wider swings in weather patterns, melting of polar ice and glaciers, rising sea levels, shifting trade winds and the death of coral reefs, to name a few. Even though the future cannot be accurately predicted, all possible solutions to mitigate this problem must be considered, including the contributions that forests can supply.

In order to combat climate change, carbon needs to be pulled out of the atmosphere and put into long-term storage elsewhere. Trees and forests are one of the answers. Carbon sequestered "by US forest growth and harvested wood products currently offsets 12-19% of US fossil fuel emissions." (Ryan 2010). Through photosynthesis trees absorb CO_2 and use the carbon (C) to form wood fiber (growth) while releasing oxygen (O_2) into the atmosphere. Forests and urban trees presently absorb over ten percent of the overall CO_2 emissions in the United States annually. Carbon sequestration is also occurring in wetland habitats and is a great reason to protect wetlands as well as forests.

One half the dry weight of wood is carbon.

One means of combating climate change is adapted management of State Forests. Minor adverse impacts associated with carbon sequestration strategies (discussed below) may include slightly lower harvesting levels and reduced capacity to accommodate biodiversity objectives because of longer harvest intervals in some stands.

Afforestation has been a tremendous source of carbon sequestration over the past century. However, today much of that potential has already been realized. In the early 1900s about 25% of New York's land area was forested,

today more than 61% is forested. Consequently there are relatively limited opportunities for new, large scale additions of forest cover. Active forest management now provides the primary potential for carbon sequestration in this state.

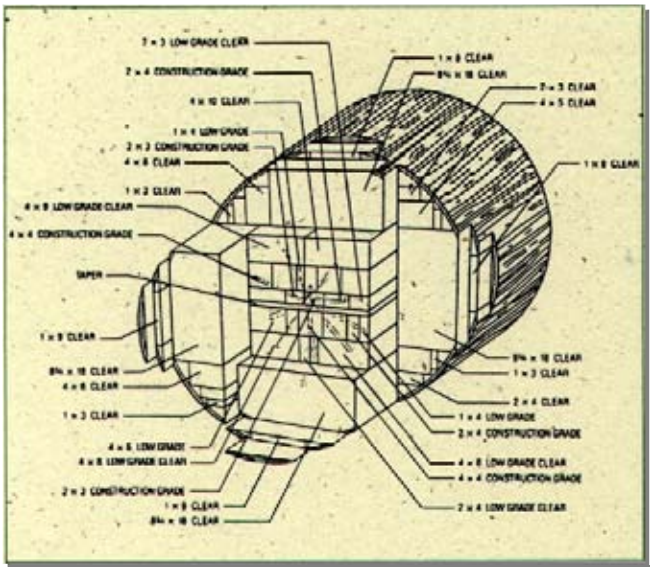
Active Forest Management

Active forest management involves the use of silvicultural systems to conduct timber stand improvements, timber harvests and various other treatments described in this plan that affect forest composition and vigor. Associated impacts are addressed in the forest products section of this plan.

Active forest management enhances a forest's carbon sequestration capacity by harvesting of future mortality and enhancing growth rates through thinning. Through active forest management, State Forest lands have an advantage in the ability to sequester carbon. Although forests do release some CO_2 from natural processes such as decay and respiration, a healthy forest typically stores carbon at a greater rate than it releases carbon. A forest's rate of growth is reminiscent of human growth for in its "teenage" years it has a large appetite for CO_2. The actual rate of carbon sequestration will vary with species, climate and site, but in general, younger and faster growing forests have higher annual sequestration rates. While older forests, such as those in New York's Adirondack and Catskill Forest Preserve and on many State Forests, have significant value as pristine water sources, undisturbed wildlife habitat, genetic repositories, and places of rare beauty and special value to society, these forests have a significantly lower potential for carbon sequestration.

Forest Soils

As a forest grows, carbon in the form of organic matter such as roots, leaves and twigs, collects in the soil. This is called soil organic carbon (SOC). SOC stock may decline sharply following harvesting due to soil mixing and exposure, leading to oxidation and increased susceptibility to erosion (Bouwman 1990) (Johnson 1992) (Davidson 1993). SOC stock can return to pre-harvest levels within 17 to 80 years, depending on site conditions. Harvesting on State Forests is conducted in a manner to minimize the disruption of natural processes and thereby maintain SOC stock.



Cross-section of a 38" diameter log, displaying its potential to produce lumber and thereby delay the release of carbon that occurs through natural decay

Forest Products

One half of the dry weight of wood is actually carbon. The use of wood in durable goods can bolster the effectiveness of

forests to sequester carbon. Trees in a forest gradually slow their carbon intake as they age. Eventually forests reach a point where harvesting and conversion of wood to durable goods enhances long term carbon storage and increases forest growth rate.

Use of forest products continues the sequestration (storage) of carbon until those products are eventually discarded and allowed to decay. Use of wood over other substitutes provides additional benefits through "avoided emissions." The manufacturing process for plastics can emit 40 to 75 times as much carbon than for similar wood products. Carbon emissions for manufacturing other substitutes are also substantially greater than for wood: 4 to 8 times more carbon emissions for concrete, 12 to 24 times more for steel, and up to 3 times as much additional carbon emissions for brick manufacturing (U.S. EPA 2006).

Forest products may also be used as a renewable energy source. Woody biomass is effectively consumed in large scale power plants as well as in smaller scale wood-energy heating systems. When harvested on a sustainable basis, biomass-derived energy is considered carbon-neutral because the carbon released in combustion originates from the natural above-ground carbon cycle, which includes natural sequestration, decomposition systems and atmospheric CO_2. Combustion of fossil fuels, on the other hand, adds carbon into the system.

"CS" OBJECTIVES, ACTIONS AND SEQR ANALYSIS

Carbon Sequestration (CS) Objective I – Keep forests as forests

CS Action 1 – Protect forests (and wetlands) through fee and easement acquisition. The state's land acquisition program will focus on purchases as outlined on page *147*. An indirect benefit of most acquisitions will be the protection of forests (and wetlands) from development.

CS Action 2 – Limit conversion of State Forests to non-forest habitat. Exceptions will be made to protect rare, threatened and endangered species and to fill habitat gaps which cannot reasonably be provided on private lands.

CS Objective II – Enhance carbon storage in existing stands

CS Action 3 – Lengthen rotation or harvest intervals in some stands, focusing on high-value timber species that have potential for longer term sequestration in durable goods

CS Action 4 – Control wildfires which cause large carbon emissions

CS Action 5 – Manage timber harvests to protect forest soils and to reduce SOC loss.

CS Objective III – Keep forests vigorous and healthy and improve forest growth rates.

CS Action 6 – Conduct thinning operations on young forests, to concentrate and enhance growth on crop trees. This action mimics natural events with enhanced results.

CS Action 7 – Stem the spread of invasive insects and diseases which can cause widespread mortality in a forest, resulting in large carbon emissions when those trees decay. Employ adequate resources for rapid detection and eradication of new introductions of non-native threats to native species.

CS Objective IV – Sequester carbon in forest products.

CS Action 8 – Conduct timber sales from State Forest lands on a sustainable basis, following sound silvicultural systems described within this plan.

CS SEQR Alternatives Analysis and Thresholds

The **no-action alternative**, or in other words, failure to adopt the actions listed above, would directly reduce the carbon sequestration potential of State Forests. This alternative will not be adopted in consideration of the important role that forests play in carbon sequestration. The other negative impacts of adopting the no-action alternative are: unchecked spread of forest pests, decreased economic contributions from State Forests, damage to soils and potential loss of land in forest cover.

The **preferred alternative** is the implementation of all actions listed above, which have been designed to mitigate the potential effects of increased atmospheric levels of CO_2. The only other alternatives would involve implementation of a selected group of these actions. These alternatives will not be adopted considering the need to maximize carbon sequestration and the serious consequences associated with climate change.

SEQR analysis thresholds have not been specifically formulated for carbon sequestration actions. Other relevant sections of this plan, which include actions that assist in carbon sequestration, include thresholds for those actions.

CHAPTER 7

BACKGROUND

LEGAL CONSIDERATIONS

NYS CONSTITUTION

Article XIV, Section 3 of the New York State Constitution provides that forest and wild life conservation are declared to be policies of the state, and authorizes the acquisition of lands outside the Adirondack and Catskill Parks for the practice of forest or wild life conservation.

STATUTES

Federal Statutes

Americans with Disabilities Act (ADA)

Title II of the ADA requires, in part, that the Department make reasonable modifications 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. For a more detailed discussion of this topic, see Section 6.17.1 Universal Accessibility.

State Laws

Environmental Conservation Law (ECL)

Among other powers and duties, Article 9 of the ECL provides authorization for the DEC to do the following:

- exercise care, custody and control of state lands;
- acquire lands outside of the Adirondack and Catskill Parks "...which are adapted for reforestation and the establishment and maintenance thereon of forests for watershed protection, the production of timber and other forest products, and for recreation and kindred purposes;"
- create "reforestation areas which shall consist respectively of not less than five hundred acres of contiguous lands, which shall be forever devoted to the planting, growth and harvesting of...trees;"
- make necessary rules and regulations;
- enter into stewardship agreements with any person or persons for the purposes of preserving, maintaining, or enhancing a state-owned natural resource or portion thereof;
- sell the trees, timber and other products on State Forest lands outside the forest preserve;
- enter into leases for the purpose of aiding in discovering and removing oil or gas from, or for storage of gas or oil on State Forest lands outside the forest preserve;
- maintain a system of forest fire protection.

LEGAL CONSIDERATIONS

Further, the Park and Recreation Land Acquisition Act of 1960, and the Environmental Quality Bond Acts of 1972 and 1986 (as implemented through Articles 51 and 52 of the ECL, respectively) contained provisions for the acquisition of lands to be managed for multiple uses and added to the State Forest system.

Article 8 of the ECL, often referred to as the State Environmental Quality Review Act (SEQRA), requires all state agencies to "act and choose alternatives which...minimize or avoid adverse environmental effects," and to prepare...an environmental impact statement on any action they propose...which may have a significant effect on the environment."

Parks, Recreation & Historic Preservation Law (PRHPL)

Article 14 of the PRHPL requires the Department to include such cultural resources in the range of environmental values that are managed on public lands. For a more detailed discussion of this topic, see Section 6.7 Historic and Cultural Resources.

General Obligations Law (GOL)

The Department is subject to the provisions of the GOL, Article 9, Title 1 of which sets forth the duty of care owed by a landowner who allows specific uses of their property by others.

RULES & REGULATIONS

Public use of State Forests is regulated under 6 NYCRR Part 190, Chapter II. This includes general regulations that apply to all State Forests, as well as regulations that apply only to specific parcels of state land. The following is a brief summary of the sections of those regulations that pertain to the use and management of lands for which this plan is written.

- Section 190.1 Fire - no fires permitted except for cooking, warmth or smudge. Also prohibits depositing matches, etc. and using live trees for fuel;
- Section 190.2 Signs and structures - no person shall deface, mutilate or destroy, etc. This section also prohibits placing trash, garbage, etc. on state lands;
- Section 190.3 Camping sites - sites must be kept neat, 150 feet from trail, road, stream, pond, spring, etc. and includes emergency closure times and elevation restrictions;
- Section 190.4 Camping permits - camping at one site for four nights or more without a permit prohibited, length of stay specified, camping restricted to posted areas, group size specified and age of permittee;
- Section 190.5 Permissible structures - no permanent structures allowed, no transfer of existing structures, listing of reasons for cancellation of existing permits for lean-tos (open camps)
- Section 190.6 Open camps - specifies number of days a lean-to may be occupied, what constitutes an enclosure, etc;

- Section 190.8 General - list of prohibitions for the public use of state lands including gambling, use of snowmobiles, toboggans and sleds on ski trails, sale of alcohol, speed limits on truck trails, defacing, removing or destroying vegetation without a permit, etc. This section allows the use of horses except on intensively developed facilities (listed);
- Section 190.9 - Use of pesticides on state lands - none allowed except by written permission;
- Section 190.10 Unique Areas - special regulations listed by area;
- Section 190.11 Environmentally sensitive lands - lists the sections above that apply to people using sensitive lands (Sections 190.0 - 190.9);
- Section 190.24 Boat launch sites - specific rules of public use of launch sites;
- Section 190.25 - 190.33 Regulations for specific areas such as Zoar Valley, etc.

POLICY & GUIDELINES

The following policies and guidance documents are currently in effect and should be adhered to when making any decisions regarding the use and management of State Forest lands:

- Motor Vehicle Access to State Lands Under the Jurisdiction of DEC for People with Disabilities (CP-3);
- Standards and Procedures for Boundary Line Maintenance (NR-91-2; NR-95-1);
- Division Regulatory Policy (LF-90-2);
- Land Acquisition, Timber Cutting Reservations (NR-86-1);
- Adopt-A-Natural Resource (ONR-1);
- Policies and Procedures Manual Title 8400 - Public Land Management;
- State Land/Facility Naming (NR-90-2);
- Trail Construction and Maintenance Manual

Additional discussion of specific policies and guidance is provided where necessary in preceding sections of this plan.

AANRs & TRPs

Adopt-A-Natural Resource stewardship agreements (AANRs) are authorized by DEC policy, and allow interested parties to undertake care and maintenance of department facilities, while providing Worker's Compensation coverage for those working under the auspices of the AANRs. The AANRs set forth the activities allowed and the services to be provided by the Department to facilitate those activities.

Temporary Revocable Permits (TRPs) are authorized by DEC policy and Environmental Conservation Law and allow careful review of special events and proposed activity on State Forests. In general, TRPs are required for any activity that conforms to existing law but exceeds average levels of usage or access. TRP review allows the Department to avoid conflicting uses of state land and situations that could threaten public safety or integrity of natural resources. TRP authorization does not provide exemption to any existing state laws and regulations.

APPENDICES

For most supplemental information and resources, refer to
www.dec.ny.gov/lands/64567.html

GLOSSARY

Access trails
: temporary, unpaved roads which do not provide all weather access within the state land. 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 log 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.

Adaptive management
: a dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, along with research results, to modify management on a continuing basis to ensure that objectives are being met

Afforestation
: The establishment of a forest or stand in an area where the preceding vegetation or land use was not forest

Age class(es)
: trees of a similar age originating from a single natural event or regeneration activity

All-aged
: a condition of a forest or stand that contains trees of all or almost all age classes.

Basal area
: the cross sectional area, measured in square feet, of a single stem, including the bark, measured at breast height (4.5 ft above the ground)

Best Management Practices (BMP's)
: a practice or a combination of practices that are designed for the protection of water quality of water bodies and riparian areas, and determined to be the most effective and practicable means of controlling water pollutants

Biodiversity
: **1.** the variety and abundance of life forms, processes, functions, and structures of plants, animals, and other living organisms, including the relative complexity of species, communities, gene pools, and ecosystems at spatial scales that range from local through regional to global —synonym biological diversity, diversity
2. an index of richness in a community, ecosystem, or landscape and the relative abundance of these species —note 1. there are commonly five levels of biodiversity: (a) genetic diversity, referring to the genetic variation within a species; (b) species diversity, referring to the variety of species in an area; (c) community or ecosystem diversity, referring to the variety of communities or ecosystems in an area; (d) landscape diversity, referring to the variety of ecosystems across a landscape; and (e) regional diversity, referring to the variety of species, communities, ecosystems, or landscapes within a specific geographic region —note 2. each level of biodiversity has three components: (a) compositional diversity or the number of parts or elements within a system, indicated by such measures as the number of species, genes, communities, or ecosystems; (b) structural diversity or the variety of patterns or organizations within a system, such as

habitat structure, population structure, or species morphology; and (c) functional diversity or the number of ecological processes within a system, such as disturbance regimes, roles played by species within a community, and nutrient cycling within a forest

Biological legacy
: an organism, living or dead, inherited from a previous ecosystem - note: biological legacies often include large trees, snags, and down logs left after timber harvesting

Blowdown
: tree or trees felled or broken off by wind

Browse
: portions of woody plants including twigs, shoots, and leaves consumed by animals such as deer

Buffer zone(s)/buffer strip
: a vegetation strip or management zone of varying size, shape, and character maintained along a stream, lake, road, recreation site, or other vegetative zone to mitigate the impacts of actions on adjacent lands, to enhance aesthetic values, or as a best management practice

Cavity tree/den tree
: a tree containing an excavation sufficiently large for nesting, dens or shelter; tree may be alive or dead

Clearcut
: the cutting of essentially all trees, producing a fully exposed microclimate for the development of a new age class —note 1. regeneration can be from natural seeding, direct seeding, planted seedlings, or advance reproduction —note 2. cutting may be done in groups or patches (group or patch clearcutting), or in strips (strip clearcutting) —note 3. the management unit or stand in which regeneration, growth, and yield are regulated consists of the individual clearcut stand —note 4. when the primary source of regeneration is advance reproduction, the preferred term is overstory removal

Climax forest
: an ecological community that represents the culminating stage of a natural forest succession for its locality / environment

Coarse filter approach
: a strategy for conserving biodiversity that involves maintaining a variety of native ecosystems within a landscape context. A coarse filter approach would ensure the availability of grasslands, shrublands, open wetlands, forest wetlands, riparian zones, northern hardwood forest and mixed northern hardwood/conifer forest in various stages of successional development. This approach assumes that a representative array of native ecosystems will contain the vast majority of species in a region

Coarse woody material
: any piece(s) of dead woody material on the ground in forest stands or in streams

Cohort
: a population of trees that originate after some type of disturbance

Community
: **1.** an assemblage of plants and animals interacting with one another, occupying a

habitat, and often modifying the habitat; a variable assemblage of plant and animal populations sharing a common environment and occurring repeatedly in the landscape.
2. a group of people living in a particular local area

Conversion
: a change from one silvicultural system to another or from one tree species to another

Corridor(s)
: a linear strip of land identified for the present or future location of a designed use within its boundaries. Examples: recreational trails, transportation or utility rights-of-way. When referring to wildlife, a corridor may be a defined tract of land connecting two or more areas of similar management or habitat type through which a species can travel from one area to another to fulfill any variety of life-sustaining needs

Cover type(s)
: the plant species forming a majority of composition across a given area

Crown class
: a category of tree based on its crown position relative to those of adjacent trees.
a) dominant: a tree whose crown extends above the general level of the main canopy and receives full light from above and partial to full light from the sides.
b) co-dominant: a tree whose crown helps to form the general level of the main canopy and receives full light from above and comparatively little from the sides.
c) intermediate: a tree whose crown extends into the lower portion of the main canopy and receives little direct light from above and none from the sides.
d) suppressed / overtopped: a tree whose crown is completely overtopped by the crowns of one or more neighboring trees and receives little or no direct sunlight

Cultural resources
: significant historical or archaeological assets on sites as a result of past human activity which are distinguishable from natural resources

Cutting interval
: the number of years between harvest or regeneration cuts in a stand

Designated recreational trail(s)
: a Department authorized recreational trail that is signed and/or mapped

Diameter (at) Breast Height (DBH)
: the diameter of the stem of a tree (outside bark) measured at breast height (4.5 ft) from the ground

Disturbance
: a natural or human-induced environmental change that alters one or more of the floral, faunal, and microbial communities within an ecosystem. Timber harvesting is the most common human disturbance. Wind or ice storms are examples of natural disturbance

Early successional habitat
: the earliest stage of development in a ecosystem. An example: vegetative habitat where early successional is seen as old fields, brushy shrubby type plants, with species that are shade intolerant

Ecosystem
: a spatially explicit, relatively homogeneous unit of the earth that includes all interacting

organisms and components of the abiotic environment within its boundaries - note: an ecosystem can be of any size, e.g., a log, pond, field, forest or the earth's biosphere

Ecosystem management

the appropriate integration of ecological, economic, and social factors in order to maintain and enhance the quality of the environment to best meet current and future needs. Involves management at the landscape level, prompting the biodiversity of natural communities of plants, animals, and seeking to maintain healthy and productive environments

Edge(s)

the more or less well-defined boundary between two or more elements of the environment, e.g., a field adjacent to a woodland or the boundary of different silvicultural treatments

Endangered species

any species of plant or animal defined through the Endangered Species Act of 1976 as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register

Even-aged

a class of forest or stand composed of trees of about the same age. The maximum age difference is generally 20 years

Even-aged (silviculture)

a program of forest management directed to the establishment and maintenance of stands of trees having relatively little (10-20 yrs) variation in ages. The guidelines to be applied in using this system at all stages of tree development are uniquely different from the uneven-aged system

Flood plain(s)

the level or nearly level land with alluvial soils on either or both sides of a stream or river that is subject to overflow flooding during periods of high water level

Forest fragmentation

1. the process by which a landscape is broken into small islands of forest within a mosaic of other forms of land use or ownership. Note- fragmentation is a concern because of the effect of noncontiguous forest cover on connectivity and the movement and dispersal of animals in the landscape

2. islands of a particular age class (e.g., old growth) that remain within areas of younger-aged forest

Forestry

the profession embracing the science, art, and practice of creating, managing, using, and conserving forests and associated resources for human benefit and in a sustainable manner to meet desired goals, needs, and values

Fragipan

a dense and brittle layer of soil. Its hardness results mainly from extreme density or compactness rather than from high clay content; the material may be dense enough to restrict root, nutrient, and water penetration

Gaps
: natural communities, habitats, successional stages, or organisms which have been identified as lacking in the landscape

Geocaching
: an outdoor activity in which the participants use a Global Positioning System (GPS) receiver or other navigational techniques to hide and seek containers

Geographic Information System (GIS)
: an organized collection of computer hardware, software, geographic and descriptive data, personnel, knowledge and procedures designed to efficiently capture, store, update, manipulate, analyze, report and display the forms of geographically referenced information and descriptive information

Group selection
: trees are removed and new age classes are established in small groups —note 1. the width of groups is commonly approximately twice the height of the mature trees with smaller openings providing microenvironments suitable for tolerant regeneration and larger openings providing conditions suitable for more intolerant regeneration —note 2. the management unit or stand in which regeneration, growth, and yield are regulated consists of an aggregation of groups

Habitat
: the geographically defined area where environmental conditions (e.g., climate, topography, etc.) meet the life needs (e.g., food, shelter, etc.) of an organism, population, or community

Hardwoods
: broad-leafed, deciduous trees belonging to the botanical group Angiospermae

Haul roads
: 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 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

Improvement thinning(s)
: the removal of less desirable trees of any species in a stand of poles or larger trees, primarily to improve composition and quality

Indicator species
: species with such specialized ecological needs that they can be used for assessing the quality, condition, or extent of an ecosystem on the basis of their presence and density, or the accumulation and effect of materials in their tissues

Invasive species
: species that have become established outside their natural range which spread prolifically, displacing other species, and sometimes causing environmental damage

GLOSSARY

Keystone species
: a plant or animal species that strongly influences that functioning of an entire ecosystem; for example, the way beaver influence wetlands

Landscape
: a spatial mosaic of several ecosystems, landforms, and plant communities across a defined area irrespective of ownership or other artificial boundaries and repeated in similar form throughout

Landscape ecology
: the study of the distribution and abundance of elements within landscapes, the origins of these elements, and their impacts on organisms and processes.

Landscape matrix
: the most extensive and connected landscape element type present, which plays the dominant role in landscape functioning; for example, New York's South-Central Highlands (Central Appalachian) landscape is dominantly forest cover; thus, the landscape matrix is forest cover

Large poles
: trees that are 9 to 11 inches in diameter at breast height

Large sawtimber
: trees that are 24 inches or greater in diameter at breast height

Late successional habitat
: habitats predominated by forests with older and larger trees, having more structural complexity than mature forest, and being either in the process of developing or have developed old growth characteristics; they may exhibit evidence of past human or natural disturbances; these forests may exist as entire stands or as smaller patches within younger stands

Log landing(s)/(Log deck)
: a cleared area to which logs are skidded and are temporarily stored before being loaded onto trucks for transport

Mast
: all fruits of trees and shrubs used as food for wildlife; hard mast includes nut-like fruits such as acorns, beechnuts and chestnuts. Soft mast includes the fleshy fruits of black cherry, dogwood and serviceberry

Mature forest cover
: pertaining to an even-aged stand that has attained most of its potential height growth, or has reached merchantability standards. Within uneven-aged stands, individual trees may become mature but the stand itself consists of trees of diverse ages and stages of development

Medium sawtimber
: trees that are 18-23 inches in diameter at breast height

Mesic
: of sites or habitats characterized by intermediate moisture conditions; i.e., neither decidedly wet nor dry

Mid Successional
: forests that are pole-sized or larger, with relatively open understories

Multiple use
: a strategy of land management fulfilling two or more objectives, e.g. forest products removal and recreation

Natural area(s)
: an area allowed to develop naturally; intervention will be considered to protect forest health (e.g. fire or invasive plant or animal invasive species), to enhance structural or species diversity, to protect, restore or enhance significant habitats or to exploit or create regeneration opportunities for desired plant species

Natural regeneration
: the establishment of a forest stand from natural seeding, sprouting, suckering or layering

Neotropical migratory birds (migrants)
: birds that breed in Canada and the United States and spend the winter in Mexico, Central America, South America or the Caribbean islands; these species represent more than 50% (340 of the 600 species) of North American birds

Niche
: **1.** the ultimate unit of the habitat, i.e., the specific spot occupied by an individual organism
2. by extension, the more or less specialized relationships existing between an organism, individual or synusia, and its environment
3. the specific set of environmental and habitat conditions that permit the full development and completion of the life cycle of an organism —note the ecological niche of a species is the functional role of the species in a community; the fundamental niche is the totality of environmental variables and functional roles to which a species is adapted; the realized niche is the niche a species normally occupies

Northern hardwood forest
: a forest type usually made up of sugar and red maple, American beech, yellow birch, and to a lesser extent black cherry and white ash. This type represents about 70 percent of all forests in New York State

Old growth
: an abundance of late successional tree species, at least 180 - 200 years of age in a contiguous forested landscape that has evolved and reproduced itself naturally, with the capacity for self perpetuation, arranged in a stratified forest structure consisting of multiple growth layers throughout the canopy and forest floor, featuring canopy gaps formed by natural disturbances creating an uneven canopy, and a conspicuous absence of multiple stemmed trees. Old growth forest sites typically are characterized by an irregular forest floor containing an abundance of coarse woody materials which are often covered by mosses and lichens; show limited signs of artificial disturbance and have distinct soil horizons. The understory displays well developed and diverse surface herbaceous layers. Single, isolated trees may be considered as old growth if they meet some of the above criteria

Overstory
: that portion of the trees in a forest forming the upper or uppermost canopy layer

Overstory removal

the cutting of trees constituting an upper canopy layer to release adequate desirable advanced regeneration in the understory

Parcelization
: the subdivision of land into smaller ownership blocks. This intrudes new features and activities into the forest and changes its character, but does not necessarily fragment it in biophysical terms

Patch cut
: a type of clearcut where the cut area consists of a small part of a stand or forest —note 1. the minimum size of a patch depends primarily on (a) the creation of microclimate conducive to establishment of desired regeneration of particular tolerance, and (b) the area needed for safe felling and yarding of harvested trees

Pioneer Species
: a plant capable of invading bare sites (newly exposed soil) and persisting there or colonizing them until supplanted by later successional species

Plantation
: a stand composed primarily of trees established by planting or artificial seeding – a plantation may have tree or understory components that have resulted from natural regeneration

Poletimber
: trees that are generally 6-11 inches diameter at breast height

Prescribed fire
: fire that is deliberately ignited to burn wildland fuels in either their natural or modified state and under specific environmental conditions which allow the fire to be confined to a predetermined area and produces the fireline intensity and rate of spread required to attain planned resource management objectives.

Protection area
: land excluded from most active management to protect sensitive sites; exclusions include: timber harvesting, road construction, oil and gas exploration and development and some recreational activities. These sites most often include steep slopes, wet woodlands and riparian zones along stream corridors

Public Forest Access Roads (PFAR)
: permanent, unpaved roads which may be designed for allweather use depending upon 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 those of the Class A and Class B access roads as provided in the Unpaved Forest Road Handbook (8/74). As a general guideline, sufficient access is typically achieved when 1 mile of PFAR is developed for each 500 acres of state land, and no position within the Unit lies more than one half-mile from a PFAR or public highway

Pulpwood
: low grade or small diameter logs used to make paper products, wood chips

Regeneration
: seedlings or saplings of any origin

Release
: **1.** a treatment designed to free trees from undesirable, usually overtopping, competing vegetation
: **2.** a treatment designed to free young trees not past the sapling stage from undesirable competing vegetation that overtops or closely surrounds them

Riparian buffer (zone)
: areas of transition between terrestrial and aquatic ecological systems; they are characterized as having soils and vegetation analogous to floodplains, or areas transitional to upland zones; these areas help protect the water by removing or buffering the effects of excessive nutrients, sediments, organic matter, pesticides, or pollutants

Rotation
: the period of years between stand establishment and final harvest as designated by management decisions

Salvage cutting
: the removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost

Sapling
: a small tree, usually defined as being between 1 and 5 inches diameter at breast height

Sawtimber
: trees that are 12 inches and larger diameter at breast height

Seed tree
: 1. a regeneration method consisting of cutting all trees except for a small number of widely dispersed trees retained for seed production and to produce a new age class in fully exposed microenvironment
: 2. a tree retained for seed production —note seed trees are usually removed after regeneration is established

Seedling
: a young tree originating from seed that is less than one inch in diameter

Seedling(s)/sapling(s)
: trees less than 6 inches diameter at breast height

Shade tolerance
: the ability of a tree species to germinate and grow at various levels of shade;
: a) shade tolerant: having the capacity to compete for survival under shaded conditions,
: b) shade intolerant: having the capacity to compete for survival only under direct sunlight conditions; light demanding species

Shelterwood
: an even-aged method of natural regeneration designed to regenerate and maintain a stand with a single age class;
: the cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment —note the sequence of treatments can include three types of cuttings: (a) an optional preparatory cut to enhance conditions for seed production, (b) an establishment cut to prepare the seed bed and to create a new age class, and (c) a removal cut to release established regeneration from

competition with the overstory; cutting may be done uniformly throughout the stand (uniform shelterwood), in groups or patches (group shelterwood), or in strips (strip shelterwood); in a strip shelterwood, regeneration cuttings may progress against the prevailing wind

Silviculture
: the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis

Single tree selection
: individual trees of all size classes are removed more or less uniformly throughout the stand, to promote growth of remaining trees and to provide space for regeneration — synonym individual tree selection

Site
: the area in which a plant or forest stand grows, considered in terms of its environment, particularly as this determines the type and quality of the vegetation the area can support

Skid trail(s)
: a temporary or permanent trail used to skid or forward felled trees from the stumps to the log landing

Small poles
: trees 6-8 inches diameter at breast height

Small sawtimber
: trees 12-17 inches in diameter at breast height

Snags
: standing, dead trees, with or without cavities; function as perches, foraging sites and/or a source of cavities for dens, roosting and/or nesting for wildlife

Softwoods
: generally refers to needle and/or cone bearing trees (conifers) belonging to the botanical group Gymnospermae

Spatial analysis
: an examination of data in the context of where it occurs geographically or “on the ground;” This is usually accomplished by tying database information to GIS based maps

Species
: the main category of taxonomic classification into which genera are subdivided, comprising a group of similar interbreeding individuals sharing a common morphology, physiology and reproductive process

Species richness
: the number of different species present within a defined area

Stand
: a contiguous group of trees sufficiently uniform in age-class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit —see all-aged stand, mixed, pure, even-aged, and uneven-aged stands —note 1. a mixed stand is composed of a mixture of species —note 2. a pure

stand is composed of essentially a single species —note 3. in a stratified mixture stand different species occupy different strata of the total crown canopy

Stand structure

the horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers and stems of trees, shrubs, herbaceous understory, snags and down woody materials

State Forest / State Reforestation Area

lands owned by the State of New York, administered by the Department of Environmental Conservation Division of Lands & Forests, and authorized by Environmental Conservation Law to be devoted to the establishment and maintenance of forests for watershed protection, the production of timber and other forest products, and for recreation and kindred purposes. These forests shall be forever devoted to the planting, growth, and harvesting of such trees (Title 3 Article 9-0303 ECL). (G)

Stocking

1. the amount of material on a given area – example: the stand is fully stocked
2. an indication of growing- space occupancy relative to a pre-established standard

Succession

the gradual supplanting of one community of plants by another —note 1. the sequence of communities is called a sere, or seral stage —note 2. a sere whose first stage is open water is termed a hydrosere, one whose first stage is dry ground, a xerosere —note 3. succession is primary (by pioneers) on sites that have not previously borne vegetation, secondary after the whole or part of the original vegetation has been supplanted, allogenic when the causes of succession are external to and independent of the community (e.g., accretion of soil by wind or water, or a change of climate), and autogenic when the developing vegetation is itself the cause

Suite

species similar in their habitat needs which may respond similarly to habitat changes

Sustainable forest management

management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things, while providing environmental, economic, social and cultural opportunities for present and future generations

Temporary revocable permit (TRP)

a Department permit which authorizes the use of state land for a specific purpose for a prescribed length of time

Thinning(s)

a silvicultural treatment made to reduce stand density of trees primarily to improve growth of remaining trees, enhance forest health, or recover potential mortality

Threatened species

a species likely to become endangered in the foreseeable future, throughout all or a significant portion of its range, unless protected

Timber Stand Improvement (TSI)

pre-commercial silvicultural treatments, intended to regulate stand density and species composition, while improving wood product quality and fostering individual tree health and vigor through the removal of undesirable trees

GLOSSARY

Understory
: the smaller vegetation (shrubs, seedlings, herbaceous plants, small trees) within a forest stand, occupying the vertical zone between the overstory and the forest floor

Uneven-aged system
: a planned sequence of treatments designed to maintain and regenerate a stand with three or more age classes

Uneven-aged stand/forest
: a stand with trees of three or more distinct age classes, either intimately mixed or in small groups

Universal Design
: Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

Variable patch retention (harvest system)
: an approach to harvesting based on the retention of structural elements or biological legacies (trees, snags, logs, etc.) from the harvested stand for integration into the new stand to achieve various ecological objectives

Watershed
: a region or area defined by a network of stream drainage. A watershed includes all the land from which a particular stream or river is supplied

Wetland(s)
: a transitional area between aquatic and terrestrial ecosystems that is inundated or saturated for periods long enough to produce hydric soils and support hydrophytic vegetation

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