Fulfilling The Promise Of The Adirondack Park

VOLUME 1

Biological Diversity: Saving All The Pieces

George D. Davis

The Adirondack Council
October 1988

The Adirondack Council

Founded in 1975, the Adirondack Council is dedicated to preserving and enhancing the Adirondack Park through public education, advocacy, and legal action when necessary. The Council is funded entirely by membership and private foundations. Membership information is available from the Council at Box D-2, Elizabethtown, New York, 12932.

2020 VISION

Fulfilling the Promise of the Adirondack Park

2020 VISION is a series of reports setting forth a vision for the Adirondack Park of the year 2020 and beyond. Subjects to be treated include biological diversity, wilderness and wild forest (the two main categories of Adirondack Forest Preserve), lakes and lakeshores, recreational road and river corridors, economics, and park management. Emerging from these studies will be a specific and comprehensive plan for the Adirondack Park. If fully implemented by the state, this plan will guarantee the preservation and ecological integrity of this superb natural resource.

All photographs are by George D. Davis unless otherwise noted. Graphics are by Pat Taber and Andrea Riner. Design is by George D. Davis and Pat Taber.

Greenie Chase

Ed Ketchledge

This volume would not have been possible without the enthusiasm and assistance of Greenleaf Chase and Dr. Edwin H. Ketchledge. Greenie Chase is a man incredibly sensitive to all life. A career wildlife biologist for the state, he retired in 1974 but continues to work diligently for the preservation of his beloved Adirondacks. Ed Ketchledge, the consummate plant ecologist and natural history teacher, retired to the Adirondacks after a distinguished teaching career at the SUNY College of Environmental Science and Forestry. He continues, however, to teach all who show an interest in the Adirondacks.

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Contents

Figures

Tables

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Definitions

In order to fully comprehend this volume a thorough understanding of two terms is essential:

The **Adirondack Park** consists of six million acres of public and private land within a boundary delineated in the Environmental Conservation Law. It must be emphasized that the Park consists of private land as well as public land and is a contiguous geographical entity.

The **Adirondack Forest Preserve** consists of land owned by the state within 12 Adirondack counties. Essentially all of the 2,575,000 acres of state land within the Adirondack Park is Forest Preserve. It is not a single compact tract. Article XIV, Section 1 of the New York State Constitution protects Forest Preserve, not the Adirondack Park.

Technical terms are defined in the glossary beginning on page 61.

Recommendations

To secure and sustain the maximum, natural biological diversity of the Adirondack Park, the State of New York should:

1. In consultation with private conservancy organizations, continually improve and expand this inventory of the Park's natural diversity. (pages 11, 49).
2. Acquire, as Forest Preserve, a low elevation boreal heritage reserve encompassing approximately 125,000 acres in the northwestern portion of the Adirondack Park. (pages 19, 23-25).
3. Preserve a portion of the biologically rich and unusual Champlain Valley through the acquisition of 8,350 acres of Forest Preserve and acquire conservation easements on an adjoining 11,000 acres of scenic farm and forest land. (pages 26-28).
4. Acquire fourteen sites totaling 11,520 acres to insure the preservation of a complete cross-section of the Adirondack Park's principal vegetative cover types. (pages 19-21, 28-33).
5. Acquire thirty-two sites totaling 62,550 acres to preserve their striking biological richness or unusual species composition. (pages 21, 33-46).
6. Create a "nature preserve" system with restricted human use but with educational and interpretive opportunities where appropriate. (page 23).
7. Acquire conservation easements on farms and timberlands where active management is necessary to secure and sustain desirable biological diversity. (pages 23).
8. Undertake biological studies to determine the feasibility of restoring extirpated species of Adirondack fauna to the Park and, in the meantime, protect the wildness of the 2,230,000 acre area that appears most suitable for such restorations. (pages 46-47).

I. Introduction

The first prerequisite of intelligent tinkering is to save all the pieces.
Aldo Leopold

Over most of the United States —indeed, over most of the planet —the natural "pieces" that comprised the flora and fauna of pre-industrial life no longer exist. The passenger pigeon is gone forever, and the timber wolf, moose, peregrine falcon, and bald eagle have radically reduced ranges. Old growth forests towering to the horizons in all directions are gone, leaving only spectacular remnants of various forest types.

However, the Adirondack Park still contains most of its original pieces. Although the Park is no longer virgin territory, the remaining pieces can be preserved and fostered if we so choose. But this must be done in this generation. If we understand what remains of our natural heritage and how these natural systems function, we can secure and sustain an Adirondack Park that reflects the diverse natural world once found throughout the northeastern United States and southeastern Canada.

The Adirondack Park Today

The Adirondack Park is the largest park in the contiguous United States, more than two and one-half times the size of Yellowstone National Park. Having expanded from 2,807,000 acres when the Park was established in 1892 to 5,927,600 acres today, the Park now encompasses two entire counties and portions of ten others. The 9,262 square miles embrace both public and private lands, rugged mountains and gently rolling lake country, spectacular northern hardwood forests and alpine tundra, raging white-water rivers and placid ponds, remote wilderness and bustling communities. The Adirondack Park is a true study in diversity.

The Adirondack Park, nevertheless, remains an unfilled promise that time may pass by. Today the Park shows unmistakable signs of being transformed: pristine shorelines and vast forest tracts are being randomly chopped into unplanned second home plots and roadside strip development.

It need not be so.

A Vision for the Adirondack Park Tomorrow

The Adirondack Park of the twenty-first century should be a world-renowned sanctuary of the natural world, a special place, a place apart. Like the English countryside parks, the Adirondacks could be unique in the United States, exemplifying a park where people live in harmony with nature.

What is proposed here is a vision of the Adirondack Park as a model for integrated land use and wildland conservation. The park should be a mix of private and public land with residential development concentrated in and around numerous small, attractive hamlets. Communities and homes can be placed to be compatible with a park-setting and made accessible by aesthetically appealing highways and roads. The Park of 2020 should continue to offer vast areas of undisturbed open space, a sanctuary for native plant and animal species, and for human beings in need of spiritual and physical refreshment.

2020 VISION proposes a blueprint for achieving this Adirondack Park.

Figure 1: THE ADIRONDACK PARK

II. Purpose

This volume will focus on how to secure and sustain the biological diversity of the Adirondack Park.

To begin with, the preservation of native species of plants and animals is critical. It is recognized that active management and manipulation of the natural environment sometimes can increase the number of plant and animal species in an area. Where this is compatible with other Park values, it is encouraged. But the Adirondack Park's premier claim to fame is based on its natural and wild state, a condition which seems incongruous in such close proximity to the population centers of the northeastern United States. Preservation of this wild state should be the preeminent goal.

Faced with population pressure, preserving the Park's natural and wild state will become both more difficult and more important in the future. The land subdivision and development trends so evident today will increasingly foreclose the opportunity to preserve many of the diverse elements of the Park's natural systems. The opportunity to sustain and secure the Adirondack Park's vast array of natural diversity has never been more compelling and will never be more feasible.

> Some people might ask, "In a world with so much poverty and misery, where droughts, famines, plagues, terrorists, dictators and wars never seem to leave us, shouldn't we focus all our efforts on improving our own lives and those of other people? Why should we care about the loss of trees, bugs or swamps?" A basic answer is that human life cannot exist without the other kinds of life on Earth. By reducing biological diversity, humanity is squandering its greatest natural resource, on which we depend for food, medicines, clothes, energy, building materials, clean air, clean water, psychological well-being and countless other benefits. (Norse et al. 1986)

All living things on this small planet have a right to survive; our use of a species should never endanger its ability to live and flourish.

The Adirondack Opportunity

In the past 300 years, settlement and exploitation have drastically altered the natural environment of eastern North America. Even in the Adirondack Park, undisturbed by Indian and European settler alike until 150 years ago, most of the land has been heavily cut for timber and huge acreages set on fire in the wake of this disturbance. However, most of the species and the genetic and ecosystem diversity of 300 years ago still exists — albeit in reduced numbers. This further distinguishes the Adirondack Park from much of eastern North America.

Land use and ownership patterns are now changing as dramatically as they did 150 years ago. The future of the Adirondack landscape and speciation will be decided in this generation.

The opportunity which lies before us is not only to preserve and extend the numbers and ranges of remnant species, gene pools, and ecosystems. We might also restore species swept away in the first wave of Adirondack exploitation. Many of these species have remnant populations elsewhere that could be used to re-populate the Adirondacks where this is deemed feasible.

A land and easement acquisition program which preserves diverse ecosystems insures maximum biological diversity in the Adirondack Park. The logic of such a policy is simple: ecosystems are, by definition, made up of interacting individuals and species in a shared environment, and a network of ecosystems will preserve genetic and species diversity.

While the logic is straightforward, the work of selecting the particular ecosystems and developing a sufficiently complex and redundant network of ecosystems is not. In the Adirondacks, the opportunity to build a natural landscape of sufficient breadth to secure self-perpetuating populations sets this area and time apart. In lieu of islands of sanctuary, the Adirondacks could offer a broad haven for species to roam, with enough redundancy to foster success.

III. Methodology

Defining Biological Diversity

Biological diversity is the sum of species diversity, genetic diversity, and ecosystem diversity. Species diversity is perhaps the most familiar form. It is a measure of the number of individual species in any given area. The term can be applied to one form of species, such as the number of species of birds nesting in the Adirondack Park, or it can be used to describe the total number of living species within an area, both plants and animals. Genetic diversity deals with the variation within a species due to differing genetic make-up that individuals have inherited from their parents.

Ecosystem diversity is used to describe different physical settings (i.e. environments) and processes that have more or less distinctive communities of species. For instance, the forested ecosystems of the Adirondack Park vary considerably from the forested ecosystems of South Carolina. There is also ecosystem diversity within a region. The spruce-fir ecosystems of the northwestern Adirondack Park differ sharply from the white pine ecosystems in the southeastern Park. Indeed, as we shall see later, the spruce-fir ecosystems of the northwestern Adirondack Park differ from the small isolated spruce-fir ecosystems of the southern Adirondack Park at least insofar as plant and animal species composition is concerned.

The Process

Evaluating the existing and potential biological diversity of nearly six million acres, even in a general manner, is no small task. To accomplish this task we reviewed the literature and discussed our objectives with experienced Adirondack biologists. As a result we chose a three-tiered hierarchic classification system designed to provide not only a framework for our research but also one capable of future refinement. We secured maps and data sufficient to allow us to apply this system to the Adirondacks and then field checked them, both on the ground and from the air. Next, we sought out specialists familiar with all corners of the Park to identify areas of unusual biological richness and areas that best typify the elements of our chosen classification system. Finally, we field verified all such suggested areas and chose those that we felt could best preserve the widest range of biological diversity if protected from incompatible use and development.

This survey was extensive and reflects the most exhaustive overall survey of the Park's diversity that we know of. It is not, however, comprehensive and complete and should be viewed as a first rather than last step in identifying the Park's great wealth of diverse sites in need of protection.

Ed Ketchledge discusses unusual ground cover composition with fellow biologists Tom Duffus and Greenie Chase.

Classification System

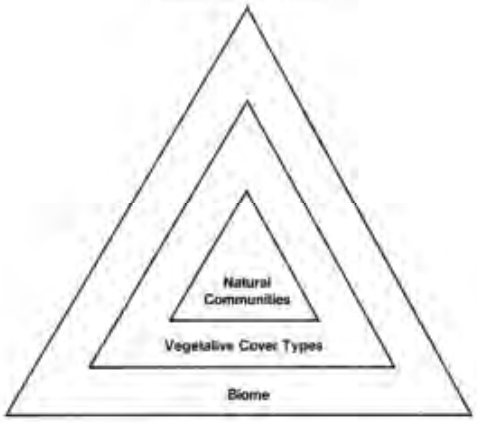
Nature is complex. The distribution of plant and animal species differs on every acre of the Adirondack Park. Species composition varies from one acre to another both in kind and in population density. Most classification systems attempt to simplify this complexity into systems that reflect similarities. Although we will use classifications to guide our recommendations to preserve Adirondack diversity, we must remember that there is much diversity within similar classifications. Furthermore, all ecosystems are dynamic in that they are always in transition from one composition to another, a transition in both space and time in response to shifting environments.

Classification systems are commonly indexed by the dominant vegetation, which in its vigor and composition summarizes the nature of the immediate environment. These systems are easier to use than associated soil types or other less observable resources. By and large, wildlife is dependent on vegetative types, so classifications using dominant vegetation are useful in defining wildlife habitats.

A number of ecological or biological classification systems exist for the Adirondack Park (e.g. Will et al. 1981, DEC 1980, Davis 1977, Stout 1958). Each of these classifications was designed for specific research. Generally they have been developed for commercial forest management, wildlife management, or for informational and educational purposes.

A classification system that is hierarchic, progressing from very broad units to more specific communities, is used in this study. At the generalized level we used the concept of "biomes", a broad, world-wide classification system accepted by field biologists and ecologists. At the intermediate level, vegetative cover types, which are relatively easy to observe and identify, were used. Finally, we used a site-specific natural community and ecosystem classification developed by the New York Natural Heritage Program.

Figure 2: ECOLOGICAL CLASSIFICATIONS OF THE ADIRONDACK PARK



Biomes

Biomes are the broadest unit of biogeographical classification of the world's terrestrial regions. Although their nomenclature is derived from the dominant natural vegetation, they correspond closely with a map of world climates. Natural plant communities of the world are primarily dependent on climate and secondarily on soils.

Although most of the Adirondack Park falls within the temperate deciduous forest biome, it also contains disjunct islands of a biome otherwise found only much further north: the northern, or boreal, coniferous forest biome also known as taiga.

The temperate deciduous forest biome is characterized by a moderate climate and dense forests of oaks, maples, beech, and other hardwood species (Whittaker 1970). This biome has been extensively modified by development patterns worldwide. The boreal biome, found in cool, moist regions, is typified by coniferous forests. Tree species characteristic of this biome are white spruce, black spruce, balsam fir, and tamarack* (Larsen 1980, Rowe 1972). Figure 3 on page 13 illustrates the biome classification for the Adirondack Park.

Vegetative Cover Types

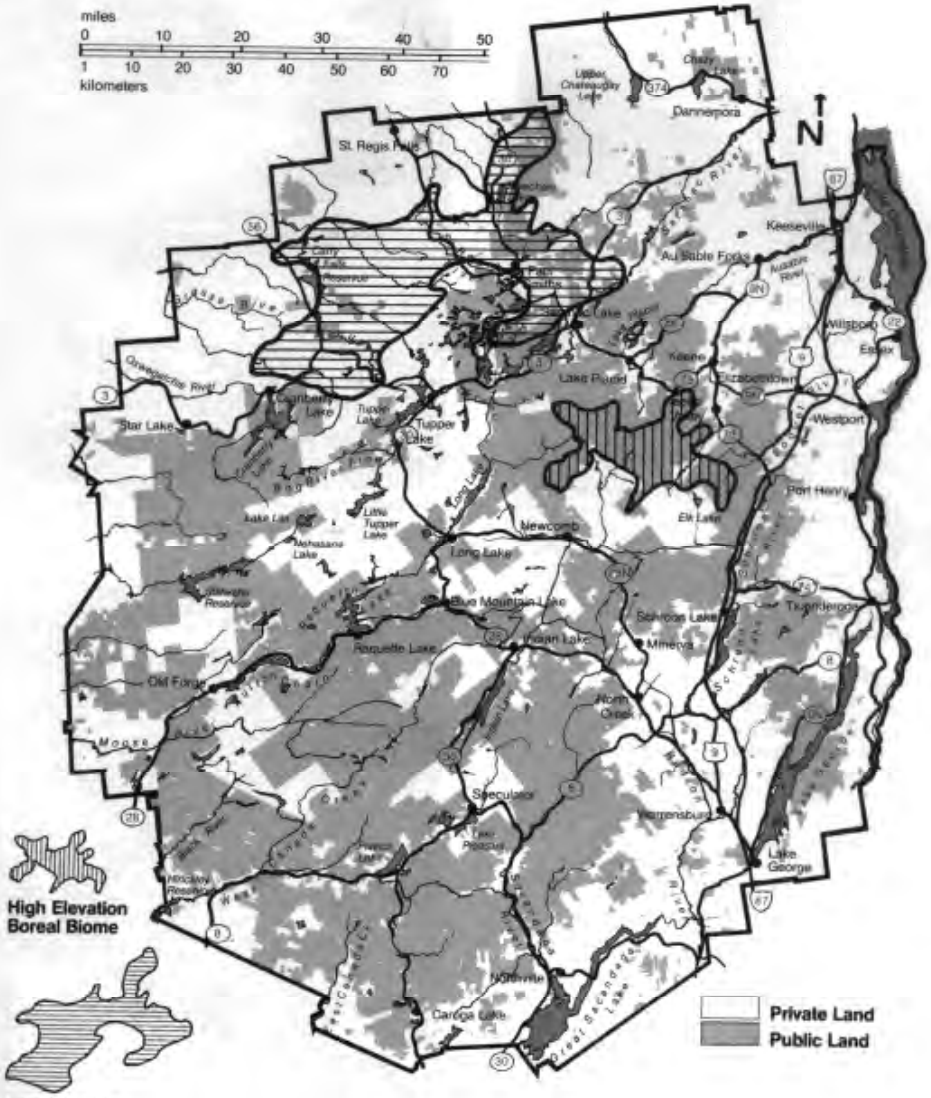
One of the most useful biological classifications for regions such as the Adirondack Park is a broad vegetative cover-type classification. The system we used is based on the recurring dominant "climax" vegetation, i.e. vegetation that maintains itself on a site over time and is not dependent on human alteration of the site. (For a more detailed discussion of the climax community concept refer to Appendix B.) This vegetation will generally reflect similar local climates and, often, soils. Vegetative cover types are broad enough to be easily understood and recognized in the field while at the same time retaining scientific usefulness.

Nine vegetative cover types, described below, dominate the Adirondack Park. Figure 4 on page 19 summarizes the distribution of these cover types in both the Park and the Preserve. Since these cover types are generally distributed throughout the Park in a mosaic pattern, they cannot be readily mapped. Figure 5 on page 20 shows the proportion of public and private ownership of each vegetative cover type in the Park.

1. **Northern Hardwoods** — This is by far the most common forest cover type across the rolling uplands and hill country of the Adirondack Park. It occurs on rich, well-drained soils up to an elevation of approximately 2,500 feet. Sugar maple, American beech, and yellow birch are the predominant "climax" species although other hardwoods such as white ash, ironwood, and black cherry are locally found in varying numbers, generally reflecting some recent natural disturbance or variation in site quality. The forest is also typified by scattered conifers: white pine on the drier northern hardwood sites, red spruce on the moist sites, and hemlock on the moist, north-facing sites and ravines. The latter is often found in nearly pure stands of several acres. Aspen, fire cherry, and paper birch are common species found on northern hardwood sites in early

* Scientific names of all plant and animal species mentioned in this report can be found in Appendix D on page 62.

Figure 3: BIOMES OF THE ADIRONDACK PARK



Old growth sugar maple dominates this northern hardwood site a few miles west of Saranac Lake village.

Biologists Greenie Chase and Mike DiNunzio examine old growth yellow birch and red spruce, species characteristic of the mixed wood type.

successional stages, i.e. before the northern hardwood species have had time to become established. The ground cover is composed primarily of maple and beech seedlings, shrubs such as witch-hobble and fly honeysuckle, and scattered herbs.

2. Mixed Woods — The moist, gently rolling sandy terrain, generally between the coniferous swamps and the northern hardwood cover types, is occupied by the mixed woods. The most frequent tree species in this type include the red spruce, balsam fir, red maple, and yellow birch. Ground cover is profuse; witch-hobble and evergreen woodfern seem to be everywhere and bluebead lily, bunchberry, goldthread, and various ferns are common. The nearly pure spruce forests sometimes found within this cover type are referred to as "spruce flats".

3. Pine — The pine forest cover type characterizes the dry, sandy, and less fertile soils of the Park where the more nutrient-demanding hardwoods cannot get the foothold necessary to establish themselves and crowd out the pine. Individual trees within the pine stands are often of the same age because they seeded in after a natural or human-caused catastrophe such as fire.

A native red pine forest near the South Inlet of Raquette Lake.

clearcutting, or windthrow. Undergrowth is limited to a few ferns, herbs, and scattered shrubs; a carpet of pine needles predominates. The vast majority of the pine type in the Adirondack Park is occupied by white pine, but red pine stands are common. Stands of pitch pine and jack pine are infrequent with jack pine limited to a few sites in Essex and, especially, Clinton County while pitch pine stands are scattered infrequently along the eastern edge of the Park where wildfires were once common and soils are droughty.

4. Oak-Pine — This type is limited to the eastern portion of the Park and is most frequently found in the southeastern counties of Warren, Washington and Saratoga. Red oak predominates with white pine, red pine, white oak, and American beech being common associates. Shaghark hickory and bitternut hickory are occasional components of the stand along with a dozen or more southern species, here reaching their northern range limits, and in effect making this one of the most diverse types in the Adirondack Park. It usually occurs on warm, south and west facing slopes. Woody shrubs, such as round-leaf dogwood and witch-hazel, predominate in the understory. Eighty-five percent of the Park's oak-pine type is privately owned.

Oak-pine forests characterize only the Champlain Valley and southeastern portions of the Park.

5. Coniferous Swamps, Bogs and Fens — Bogs and fens are generally occupied by *Sphagnum* mosses and sedges, as well as by the insectivorous pitcher plant and heath species

Coniferous swamps and fens surround the Jones Pond Outlet.

such as leatherleaf, bog rosemary, bog laurel, and Labrador tea. Bogs are located on nutrient poor flatland sites saturated with water that has little or no lateral movement. They are dependent on rainfall for additional water. Fens, on the other hand, are enriched by mineral-laden waters seeping into the site from surrounding uplands, an invisible process but clearly reflected in the higher species diversity of fens. Coniferous swamps may be found in conjunction with bogs and fens, often surrounding them, or in isolated pockets, often kettle-like depressions in glacial soils. Where the ground is recharged with fresh water, the most common swamp species are red spruce and balsam fir. Tamarack and black spruce predominate on the fringes of the more stagnant bogs. Associated swamp species include paper birch, yellow birch, red maple, American elm, and white cedar. Individual white pine trees are occasionally found on the drier hummocks. *Sphagnum* moss dominates the wet depressions. In areas with an open canopy, numerous heath plants such as leatherleaf and sheep laurel may dominate the ground for long periods of time. (This cover type should not be confused with the boreal biome, a broader classification of extensive areas.)

6. Hardwood Swamps — These swamps are typified by red and silver maple, American elm, and black ash. Associated species include bluebeech, basswood, and sweet birch. Speckled alder is also common. Undergrowth may be profuse with sedges, rushes, and water-loving shrubs.

Biologist Dan Spada slogs through a hardwood swamp at Auger Flats.

7. Upper Spruce Slopes — Upper spruce slopes are found above 2,500 feet in elevation. The evergreen forests clothing these slopes are dominated by the long-lived red spruce up to about 4,000 feet elevation where the mineral soils run out; from there to the timberline balsam fir is the exclusive conifer. Among the hardwoods, only paper birch and mountain-ash can survive the high-elevation climate. All trees are dwarfed, creating a krummholz tangle, as trees give way to the open alpine zone on the highest summits. Ground cover is sparse primarily due to the dense shading and unfavorable growing conditions.

The dark upper spruce slope can be seen on Blue Mountain from the Adirondack Museum.

8. Open Wetlands (Marshes) — Only one-tenth of one percent of the Adirondack Park is characterized by marshes, but these areas — in terms of total biomass produced — are the most productive ecosystems in the Park. A marsh is characterized by grass or grass-like plants (sedges and rushes) anchored in moist ground that is periodically or continually inundated and recharged with fresh water. Emergent marshes are covered with water throughout the year; common species include the cattail, pickerel-weed, mannagrass, and lilypads.

Wickham Marsh provides important waterfowl habitat along the Lake Champlain flyway.

9. Alpine Tundra — Alpine tundra is limited to a total of eighty-five acres on twenty mountain summits. It is generally found above 4,900 feet in elevation although several small patches can be found at somewhat lower elevations due to microtopography and microclimate conditions. This alpine tundra is dominated by two vegetational types: the graminoids, or grass-like plants, and the low heath plants. All plants in this zone survive by means of short stems and adaptation to a very short growing season. They survive the long and harsh winter under a protecting blanket of snow. Any plants that grow higher than the snow level are soon desiccated by bitter winter winds. Species unique to this zone include the black crowberry, Lapland rosebay, Diapensia, and mountain sandwort. Unfortunately, the alpine life zone is one of the lures of the Adirondacks, a fact that may be its undoing since trampling of the alpine vegetation threatens its existence. No other cover type is nearly as fragile as the alpine tundra.

Alpine tundra near the summit of Haystack Mountain.

Communities and Ecosystems

Communities are site-specific, interacting assemblages of plants, animals, and micro-organisms while an ecosystem is a community and the physical environment within which it exists. The classification of communities and ecosystems is a perplexing problem. Fortunately, a New York Natural Heritage Program has recently been undertaken as a cooperative venture between the New York State Department of Environmental Conservation and The Nature Conservancy, one of forty-seven such programs nationwide. To date the New York program has classified ninety-eight types of natural palustrine (wetland) and terrestrial communities in New York State (Reschke 1987), fifty-seven of which can be found in the Adirondack Park. At least nineteen of these Adirondack communities are thought to be rare or vulnerable in New York State and five of these are thought to be very rare or vulnerable globally. Table 1 lists the natural communities of the Adirondack Park and indicates which are rare.

In this study we tentatively classified the natural communities within each site which we identified as important to protect for reasons of biological diversity. When our community classification is confirmed or modified by Natural Heritage Program staff, this work can then be readily integrated into the state's Natural Heritage Program.

Sources

Working with the biologists, the soil scientist, and the computer specialist of the Adirondack Park Agency (APA), we were able to identify the existing vegetation and soil type combinations that would likely be found in the boreal biome and in each of the nine vegetative cover types we had identified. We then used the APA's geographic information computer system (GIS) to plot the location of the boreal biome and eight vegetative cover types and determine how much of each is in private ownership and how much is in state ownership (Figure 5, page 20). These computer maps were field checked both on the ground and from the air and appropriate revisions were made. Because of GIS limitations, we were unable to delineate the oak-pine cover type by this method. It was subsequently delineated from data in the statewide *Forest Resources Assessment* (Hardy and Askew 1980) and the *Atlas of Forestry in New York* (Stout 1958) and verified by aerial and field observation.

Site specific information was then sought to determine the location of sites that would give us the best potential cross-section of natural biological diversity. Two types of sites were sought: exemplary communities that typify the boreal biome and vegetative cover types, and sites uncommonly rich in species diversity or biologically unusual.

Candidate sites for these categories were obtained from interviews with employees of the Adirondack Park Agency and Department of Environmental Conservation, APA's special interest area and nature preserve inventory, DEC's significant habitats inventory, the Natural Heritage Program community inventory, The Nature Conservancy's potential preserve inventory, interviews with a dozen professional biologists with extensive Adirondack experience, and a general literature search. These candidate sites were then field verified, and those on private land were then evaluated for their potential contribution to a program of securing and sustaining the maximum natural biological diversity within the Adirondack Park.

Table 1: PRELIMINARY NYS NATURAL HERITAGE PROGRAM
PALUSTRINE (WETLAND) AND TERRESTRIAL COMMUNITIES OF THE ADIRONDACK PARK

SYSTEM	SUBSYSTEM	COMMUNITY
Palustrine	Open Canopy Wetlands	Deep Emergent Marsh Shallow Marsh Sedge Meadow Beaver Pond and Meadow Inland Calcareous Lakeshore Inland Non-Calcareous Lakeshore Rich Graminoid Fen** Rich Shrub Fen* Poor Fen* Patterned Peatland* Rich Hillside Fen** Poor Hillside Fen Boreal Acid Bog* Shrub Swamp
	Forested Wetlands	Floodplain Forest* Rich Red Maple-Tamarack Swamp** Northern White Cedar Swamp* Red Maple-Hardwood Swamp Black Spruce-Tamarack Swamp* Rich Hemlock-Hardwood Swamp* Poor Hemlock-Hardwood Swamp Red Spruce-Balsam Fir Swamp
Terrestrial	Open Canopy Uplands	Riverside Ice Meadow** Riverside Sand/Gravel Bar Shoreline Outcrop Calcareous Shoreline Outcrop Cobble Shore Calcareous Cobble Shore Alpine Meadow* Cliff Community Calcareous Cliff Community Shale Cliff Community Appalachian Acidic Rocky Summit Boreal Acidic Rocky Summit Rocky Summit Grasslands* Appalachian Calcareous Rocky Summit Boreal Calcareous Rocky Summit Successional Fern Meadow Successional Blueberry Heath Successional Old Field
	Barrens and Woodlands	Pitch Pine-Heath Barrens* Alpine Krummholz* Limestone Woodland Calcareous Talus Slope Woodland* Acidic Talus Slope Woodland Successional Red Cedar Woodland
	Forested Uplands	Pitch Pine-Oak Forest Appalachian Oak-Hickory Forest Appalachian Oak-Pine Forest Beech-Maple Mesic Forest Maple-Basswood Rich Mesic Forest* Hemlock-Northern Hardwood Forest Pine-Northern Hardwood Forest Spruce Flats Spruce-Northern Hardwood Forest Mountain Spruce-Fir Forest** Successional Northern Hardwoods

* Communities thought to be rare (less than 100 occurrences), imperiled (less than 21 occurrences) in New York State, or vulnerable due to biological factors.
** Communities thought to be rare or vulnerable due to biological factors globally as well as in New York State.

IV. Inventory of Existing Representation

Biome Representation

Occupying ninety-four percent of the Park, the temperate deciduous forest biome is also well represented in the Adirondack Forest Preserve. The Adirondack's limited boreal biome is located within two discrete islands (see map on page 13), one representing the high-elevation boreal biome, such as the mountain red spruce-balsam fir and the krummholz communities, and the other representing the low-elevation boreal communities such as white spruce, red spruce-balsam fir swamps, black spruce-tamarack swamps, and bogs. There are, of course; spruce-fir, black spruce-tamarack, and bog communities scattered throughout the Park, but they are in isolation from one another so that in no other area of the Park do these vegetative communities predominate and interconnect to constitute a biome.

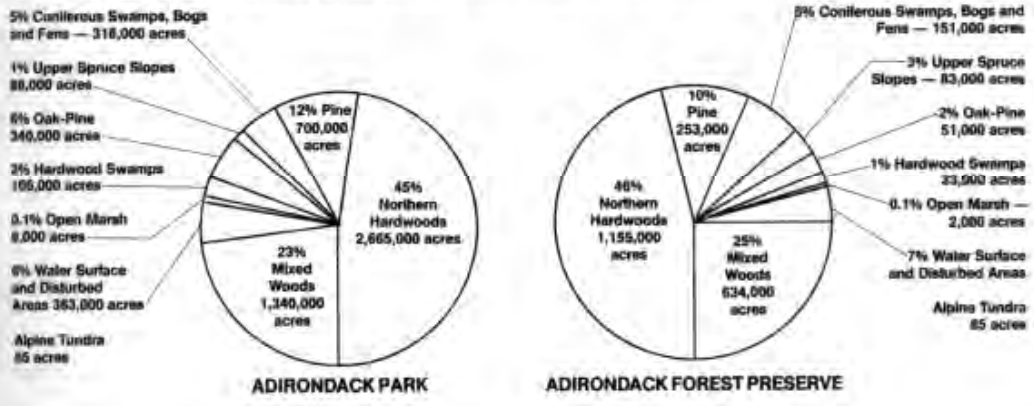
The high elevation boreal biome consists of almost exactly 100,000 acres of which nearly ninety-five percent is within the Adirondack Forest Preserve; five percent is protected by a conservation easement held by the State of New York; and less than one percent is found on other private lands not permanently protected.

The low elevation boreal biome is comprised of approximately 350,000 acres in New York State, where at least fifty percent of the land area is occupied by flora and fauna characteristic of the circumpolar coniferous forest biome. Over ninety-nine percent of New York State's low elevation boreal biome is within the Adirondack Park. Of this, less than twenty percent is now within the Adirondack Forest Preserve. The biological significance of this existing boreal Forest Preserve is further diminished because it is made up of numerous scattered parcels rather than a contiguous ownership.

Vegetative Cover Type Representation and Exemplary Communities

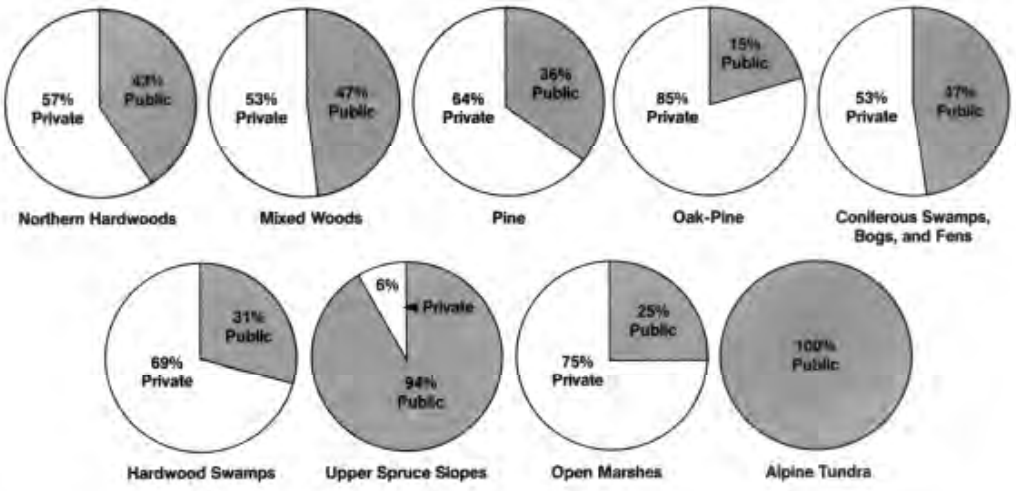
Figure 4 summarizes representation of the principal vegetative cover types in both the Park and the Forest Preserve. Less than ten percent of the Preserve consists of open emergent wetlands, oak-pine forests, hardwood swamps, or coniferous swamps, bogs and fens. Opportunities to increase representation of these

Figure 4: PRINCIPAL VEGETATIVE COVER TYPES OF THE ADIRONDACK PARK AND ADIRONDACK FOREST PRESERVE



Sources: Estimates from Adirondack Park Agency Geographic Information System soil and vegetative cover data, the *Atlas of Forestry in New York* (Stout 1956), and the *NYS Forest Resources Report #3* (Hardy and Askew 1980).

Figure 5: PUBLIC (FOREST PRESERVE) OWNERSHIP OF PRINCIPAL VEGETATIVE COVER TYPES



Sources: Estimates based on Adirondack Park Agency Geographic Information System soil and vegetative cover data, the *Atlas of Forestry in New York* (Stout 1958), and the *NYS Forest Resources Assessment Report #3* (Hardy and Askew 1980)

types will be suggested later in this report. Although the upper spruce slopes and alpine meadows also occupy less than ten percent of the Preserve, essentially all of these cover types are currently in public ownership.

Figure 5 illustrates the relative amount of each major cover type in public ownership. Since forty percent of the Park is publicly owned, a similar percent of each cover type would be expected to be in public ownership if the Adirondack Forest Preserve is to represent a cross-section of the Park as a whole. If this is deemed a desirable goal, additional acreage of the oak-pine, open marsh, hardwood swamp, and pine cover types should be acquired.

Exemplary communities of each of the principal Adirondack cover types were inventoried first on Forest Preserve land. The rationale for this was that in vegetative types where sufficient exemplary communities exist on Forest Preserve there would be no need to search out privately-owned sites to supplement the Forest Preserve sites. Recognizing that three of the nine principal vegetative cover type classes were much more complex than the others, they were subdivided into finer distinctions. The resultant sixteen vegetative types and the results of the Forest Preserve exemplary community inventory are shown in Table 2. The twenty-eight inventoried Forest Preserve sites are described in Appendix A.

In most cases, there are many more examples of these vegetative cover types on Forest Preserve than the number shown in Table 2. In cover types where fewer than three sites are indicated, however, no other sites were found that would qualify as "exemplary sites" in terms of size, site quality, and associated species diversity.

After reviewing Forest Preserve exemplary communities, privately-owned sites were field checked. In addition to site quality and representativeness, the results of the Forest Preserve survey were considered. Generally, private sites were chosen to be recommended for protection only to the extent needed to bring the total exemplary communities recommended for protection up to three quality sites in each cover type category. Two exceptions were made to this general criterion. A total of six exemplary swamp hardwood sites were chosen based on the paucity of this cover type in the Forest Preserve (one percent), its species richness, and the quality of the sites. An additional white pine site was chosen because one of the Forest Preserve exemplary communities is less than an acre in size. In eight cover types there were not enough quality sites inventoried to achieve the objective of three exemplary community sites for each cover type. Further study should be undertaken to locate suitable additions.

In total, fourteen privately owned sites, encompassing 11,520 acres, were selected as exemplary communities in need of protection if a high quality cross-section of biological diversity is to be preserved in the Adirondack Park. These sites are discussed individually in the next chapter.

Table 2: EXEMPLARY COMMUNITY REPRESENTATION BY COVER TYPE FOR EXISTING PUBLIC SITES AND FOR PRIVATE SITES PROPOSED FOR ACQUISITION

VEGETATIVE COVER TYPE (See pages 19-24)	PUBLIC OWNERSHIP — SITE NUMBERS (See Appendix A)	PRIVATE AREAS PROPOSED FOR PROTECTION — SITE NUMBERS (See pages 28-33)	TOTAL NUMBER OF SITES INVENTORIED
1. Northern hardwoods	1-7	-	7
2. Mixed woods	8, 9	1	3
Mixed woods-spruce flats	10	2	2
3. Pine-white	11, 12, 13	3	4
Pine-red	14, 15	4	3
Pine-jack	-	5	1
Pine-pitch	-	6	1
4. Oak-pine	16	(Champlain Reserve)	1
5. Coniferous swamps, bogs and fens:			
Spruce-fir	17	(Boreal Reserve)	1
Black spruce-tamarack	18, 19	(Boreal Reserve)	2
White cedar swamp	20, 21	7	3
Bogs and fens	22	8, 9, (Boreal Reserve)	3
6. Swamp hardwoods	23	10, 11, 12, 13, 14	6
7. Upper spruce slopes	24	-	1
8. Marshes	25, 26, 27	-	3
9. Alpine tundra	28	-	1

Biologically Rich or Unusual Sites

The inventory of biologically rich or unusual sites as reflected in site productivity, species diversity, and rare species or communities was limited to those sites not already protected as part of the Forest Preserve or already protected with a conservation easement.

Thirty-two sites, encompassing 62,550 acres, were selected for acquisition or other protection based on the degree of biological richness (diversity) or unusualness they display. These sites and the resources that led to their selection are discussed in the next chapter.

V. Securing and Sustaining Adirondack Diversity

The publicly-owned Forest Preserve should contain as much biological diversity as possible. Currently the Forest Preserve does not possess all the wildland diversity indigenous to the Adirondack Park; this shortcoming should be rectified. Where compatible with maintaining the Park as a natural, open-space reserve, the myriad native species dependent on active management of the environment should be encouraged through the use of conservation easements and incentive programs on productive private lands throughout the Park.

Forest Preserve status is sometimes not enough to protect very sensitive sites. The state should have a program to formally designate "nature preserves" within the Adirondack Forest Preserve. Here the emphasis would be on strict nature preservation with restricted human use. Fragile communities are not insured survival by public ownership; in fact, quite the opposite may be the case unless true nature preserve management is instituted. Designating sensitive habitats or locations of rare, threatened or endangered species of plants or wildlife, would insure that land managers are made aware of such areas so they could undertake appropriate management.

Filling the Gaps, Expanding the Richness

This chapter sets forth an acquisition program to secure and sustain the great biological diversity of the Adirondack Park. The first section describes two project areas, the low elevation boreal biome and the Champlain Valley, where an imaginative program of Forest Preserve purchase and conservation easement acquisition should be undertaken at once for multiple biological reasons. The next section briefly describes fourteen specific sites that should be acquired in order to secure exemplary communities not adequately represented in today's Forest Preserve. This is followed by a section describing thirty-two specific sites where acquisition is necessary to preserve rare or unusually rich communities. Finally, this chapter ends with a section suggesting protection of a large portion of the Park essential to a major restoration program designed to return the Park's extirpated species to their rightful habitats should such programs appear feasible.

The decision as to what acquisition technique or techniques is most appropriate must reflect public values and objectives. Generally, this would involve negotiations with the property owner that might include acquisition options such as: full fee title purchase at once, with or without retained rights; purchase of a life estate whereby the ownership transfers to the state at the time the owner, or another family member named in the contract, dies; purchase of a conservation easement whereby the owner sells some or all of the development rights to the property while retaining title and the right to manage the property for agriculture, silviculture, recreation, or other specified uses; purchase of a right of first refusal whereby the state must be given the opportunity to purchase the property, matching any bona-fide offer, whenever it comes on the market; and, any combination of the preceding or other acquisition possibilities. The state should use such negotiations with the landowner to achieve a mutually satisfactory agreement, one that will preserve the resources of state interest.

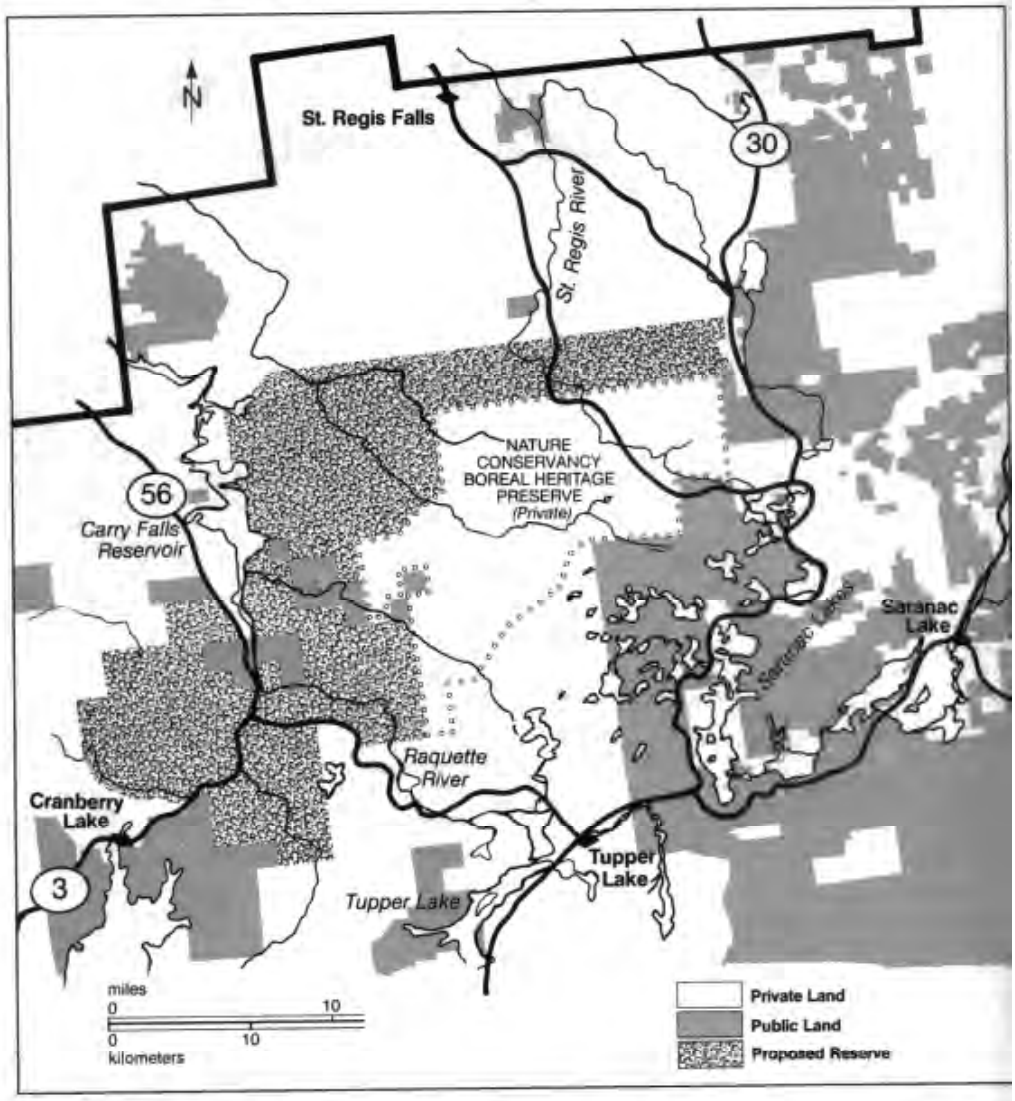
Proposed Low Elevation Boreal Heritage Reserve

As the map on page 13 illustrates, only twenty percent of this biome is presently protected in perpetuity as part of the Adirondack Forest Preserve, and this occurs in widely scattered tracts.

Figure 6 on page 24 illustrates an opportunity to create a 185,000 acre "Boreal Heritage Reserve". The Adirondack Conservancy Committee is already well on the way to saving 60,000 acres of boreal habitat as a private preserve designed to protect rare and sensitive species. State purchase of an adjacent 115,000 acres of prime, low-elevation boreal ecosystems, combined with the 10,000 acres of scattered Forest Preserve parcels in the area, would result in a reserve large enough for all boreal species, including the moose, to survive. Furthermore, it would provide the public an opportunity to visit and enjoy the rarest biome in New York State.

Although it is the habitat of some of the rarest species of both plants and animals, there is less Adirondack Forest Preserve in the northwestern

Figure 6: PROPOSED LOW ELEVATION BOREAL HERITAGE RESERVE



quadrant of the Park than in any other quadrant. It is time that these boreal ecosystems were permanently protected. To do so would not be a difficult task. Only nine private property owners control all of the recommended public boreal preserve, and property costs here are among the lowest in the entire state. New York State will never again have such an opportunity to preserve biological diversity so easily and so cheaply.

Although this proposal contains numerous critical sites needed to protect threatened populations of several species of plants and animals, its greatest value is that it is both extensive and compact: 290 square miles, sixty-eight percent of which would be public. The proposed public (i.e. Forest Preserve) boreal heritage reserve is located in the Franklin County towns of Waverly and Santa Clara and the St. Lawrence County towns of Hopkinton, Parishville,

Colton, Piercefield, and Clifton. The proposal includes several areas long recognized as desirable for state acquisition:

Madawaska Wetland — One of the better boreal bird walks in the Adirondack Park, the 3,000 acre Madawaska wetland complex is a series of open bogs with *Sphagnum*-sedge-leatherleaf mats surrounded by mature stands of black spruce and tamarack with scattered balsam fir and white pine. A remnant population of spruce grouse exists but is threatened by changing land uses, especially timber harvesting. Tentatively identified natural heritage program communities include the rare or vulnerable boreal acid bog and black spruce-tamarack swamp.

Massawepie-Grasse River Flow — This 5,000 acre wetland complex supports one of the largest populations of the endangered spruce grouse in New York State as well as boreal birds such as the white-winged crossbill, boreal chickadee, grey jay, and Lincoln's sparrow. The bog itself is one of the largest open heath-*Sphagnum* mats in the northeast, exceeding 500 acres (Jenkins 1981). Worley's authoritative study (1982) classifies this bog as being of national significance and a candidate for registry as a National Natural Landmark. The combination of bog, shrub swamps, spruce-fir swamps, and islands of hardwood communities greatly enhances the number of species of both plants and animals. The setting itself is unusual: glacial kettles, kames, and a well-defined esker. The eastern wetland complex, Massawepie, contains *Sphagnum* and other mosses, cotton grass, Labrador tea, leatherleaf, and sheep laurel with scattered small black spruce and tamarack (DiNunzio 1981). The Grasse River Flow portion to the west "consists largely of extensive wooded coniferous wetlands dominated by black spruce and tamarack and an open boggy mat (actually a fen) dominated by *Sphagnum*, sedges, and heath shrubs" (DiNunzio 1981). Tentatively identified natural heritage program communities include the rare and vulnerable poor fen, boreal acid bog, patterned peatland, and black spruce-tamarack swamp, as well as the shrub swamp, red spruce-balsam fir swamp, and pine-northern hardwood forest.

Joe Indian Pond Wetland Complex — This wetland contains a large boreal bog surrounded by black spruce, tamarack, and white pine, an ideal spruce grouse habitat (Larsen 1980). The present population of spruce grouse is small and is threatened by changing land use, including timber harvesting. An unusually large number of species of warblers nest in the area. The pond itself is not included in the suggested acquisition because of a number of camps on its northern shore. Tentatively identified natural heritage program communities include the poor fen and the black spruce-tamarack swamp, both considered rare or vulnerable in New York State.

Moosehead Mountain rises above the low elevation boreal forests and bogs of the northwestern Adirondacks.

Sevey Bog — This easily accessible bog lies to the west of Route 56 just north of Route 3. A short woods road follows a ridge on the northern side of the bog and offers excellent views of the bog and associated wetland complex. This area would be an excellent, accessible educational opportunity for the public. In addition, Sevey Bog contains one of the highest spruce grouse populations in the state along with the other boreal bird species, including the rare black-backed three-toed woodpecker and ruby-crowned kinglet. It is the only site in New York State where one can find the rare peatmoss, *Sphagnum jensenii*, and the regionally rare southern bog lemming. "Sevey Bog can best be described as a fen . . . which covers approximately 200 acres. The extensive bog mat is dominated by heath shrubs and *Sphagnum* mosses. There are no open water pools." (DiNunzio 1981). The bog is surrounded by a black spruce-tamarack swamp with a nearby shrub swamp, while the sandy uplands are principally pine. Tentatively identified natural heritage program communities include the pine-northern hardwood forest, shrub swamp, and the rare and vulnerable black spruce-tamarack swamp and poor fen.

Conservation easements can protect the agricultural, recreational, historic, and scenic resources as well as the biological diversity of the proposed Champlain Valley Reserve.

Proposed Champlain Valley Reserve

Lake Champlain, one of the largest freshwater lakes in the United States, forms the eastern boundary of the Adirondack Park. The narrow, historic Champlain Valley offers a dramatic pastoral setting with a spectacular backdrop of mountains. It is also an important sub-region of the Adirondack Park because of the tremendous diversity it brings to the Park. Although the Champlain Valley comprises only about five percent of the Adirondack Park, an estimated 155 of the 193 bird species that nest in the Park (Peterson 1988) and well over half of the sixty-two native tree species make their home here.

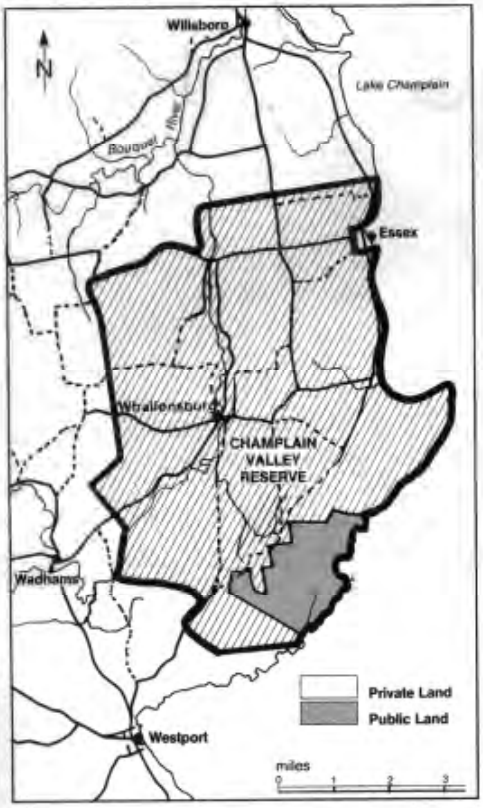
The Lake and low elevations moderate the climate of the Champlain Valley and give rise to a variety of land uses: cropland, pasture land, brush land, wetland, and forest. Most importantly, the soils of the Champlain Valley are more fertile than any other region within the Park. This fertility is a result of the limestone bedrock and glacial lake sediments.

Yet the Champlain Valley proper, with all its interest and diversity, is practically void of Forest Preserve lands. We suggest that the state acquire, as Forest Preserve, Split Rock Mountain, the adjacent Coon Mountain, and the neighboring North and South Boquet Mountains. We further propose that the cradle of farmland bounded by these four mountains, and by Lake Champlain on the east, be protected with conservation easements. Such a combination of Forest Preserve and easements would protect these fertile farmlands, sweeping vistas, lovely highways and byways, and the Boquet River corridor so that the area will continue to be the source of unparalleled biological diversity within the Adirondack Park.

This project area (see map on page 27) totals 21,505 acres. The state already owns 2,155 acres as Forest Preserve on Split Rock Mountain, the only Forest Preserve in the project area and the largest of the six Forest Preserve parcels in the entire valley. To preserve the Champlain Valley's variety, an additional 8,350 acres should be acquired as Forest Preserve, and easements should be acquired on 11,000 acres of agricultural lands and other lowlands in the area.

Land developers have begun to move into the area, and land values have doubled in the last two years. Not only the biological diversity of this historic valley, but its pastoral landscapes, scenic highways, and striking views of the Adirondack High Peaks and Vermont's Green Mountains will be lost forever if the state does not act quickly.

Figure 7: PROPOSED CHAMPLAIN VALLEY RESERVE



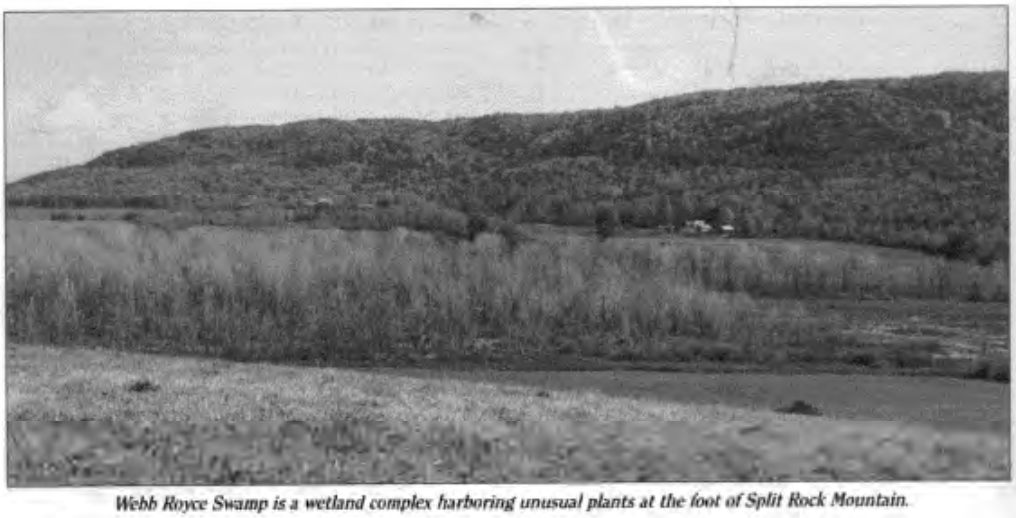
Several specific sites within the project area deserve special mention:

Split Rock Mountain — Split Rock Mountain rises 902 feet directly out of Lake Champlain making it by far the most imposing mountain on the lake. Sheer rock cliffs, known as the "Palisades", are a familiar sight to Lake Champlain boaters. The inland side of the mountain is easily accessible for its entire length by local roads. The author identified twenty-nine native tree species on the mountain in forty-five minutes, a feat possible in few, if any, other areas in the Park. The mountain's irregular topography creates numerous pockets of varying moisture and microclimates setting the stage for diverse plant communities, from barren rock to pocket wetland. Governor Rockefeller's Adirondack Study Commission wildlife consultant called for the acquisition of this biologically rich area as a nature preserve (Clarke 1970). Tentatively identified natural heritage program communities are limestone woodland, Appalachian oak-pine forest, and inland calcareous lakeshore.

Coon Mountain — Immediately west of Split Rock Mountain, Coon Mountain rises to a 1,000 foot elevation with the Boquet River, at elevation 295 feet, tucked tightly against its base. Coon Mountain is a rugged small mountain with innumerable rock faces, a small pond, and several pocket wetlands near the summit. The complex intermixture of oak-pine forest, hemlock ravines, hardwood swamps with beds of royal fern, and small fens give rise to wide biological diversity.

The Boquet Mountains — North and South Boquet Mountains, two peaks on one massif, form the western boundary of the Champlain Valley Reserve proposal. The slopes of both mountains are carpeted with pine-northern hardwood and oak-pine forests. Common components include red oak, sweet birch, beech, shagbark hickory, hop hornbeam and scattered red and white pine. The relatively level summit of South Boquet is an open woodland with scrub red oak predominating on the thin soils. The panoramic view from the summit includes the Adirondack High Peaks, Lake Champlain, the Boquet River Valley, and the Green Mountains of Vermont.

Split Rock Mountain presides over the longest stretch of undeveloped shoreline on Lake Champlain.



Webb Royce Swamp is a wetland complex harboring unusual plants at the foot of Split Rock Mountain.

Webb Royce Swamp — The 300 acre Webb Royce Swamp is one of the few known sites supporting swamp white oak in the Park. The swamp white oak and associated silver maples have a lovely royal fern understory. Beaver have raised the water level in the past few years, killing many of the oaks and maples and increasing the open water in this wetland to perhaps fifteen acres. Around the open water is a shallow water marsh and, on the east side, a wet meadow. Beyond these lie the forested swamp. Tentatively identified natural heritage program communities include the shallow marsh, sedge meadow, beaver pond and meadow, and the rare or vulnerable floodplain forest.

Recommended Acquisitions of Exemplary Communities

Exemplary communities are defined as vegetative communities and their associated wildlife that can serve as outstanding examples of the principal vegetative cover types and communities within the Adirondack Park. Emphasis was placed on choosing communities for this category that are not now adequately represented in the Adirondack Forest Preserve. State acquisition of communities described in this section would complement the exemplary Adirondack Forest Preserve communities described in Appendix A. Where the possibility of selecting more than two or three exemplary communities within a given cover type or community existed, those chosen are not only among the best examples but are also accessible, thereby readily able to fulfill an educational and interpretive role as well as preserving sample communities.

Each acquisition proposal will be presented in a similar format: map number and name; vegetative cover type; acreage; town(s); county(ies); tentatively identified natural heritage program communities on the site, with (R) indicating a rare or vulnerable community; and, a brief description of the area.

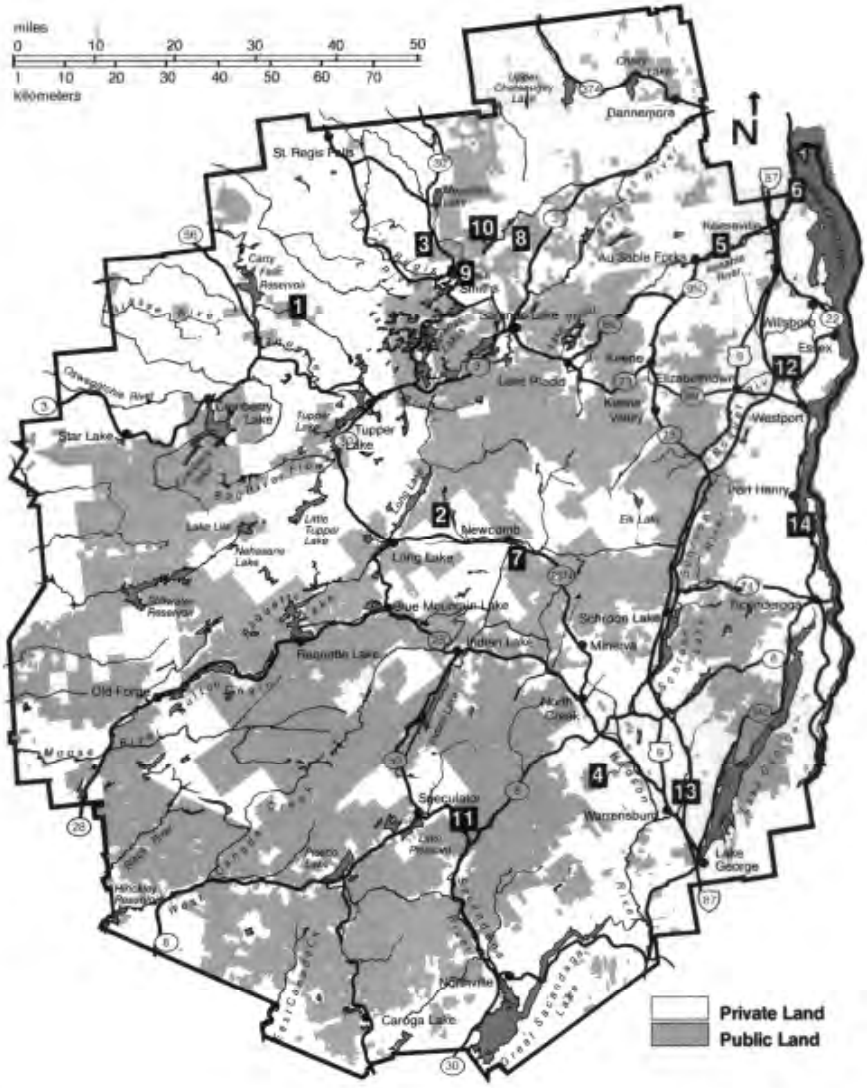
1. Kildare Old Growth
Cover Type: Mixed Woods
Acres: 4,600 **Town:** Hopkinton **County:** St. Lawrence
NHP Comm: Poor fen (R), hemlock-hardwood swamp, and spruce flats.

This impressive old-growth stand of red spruce, yellow birch, hemlock, and red maple, with scattered beech trees, is located on glacial outwash soils in the northwestern Adirondacks. Although scattered white pine were removed in the last century, "the forest has remained much the same as it was in pre-settlement times" (DiNunzio et al, 1979). Largely because of its isolation and old-growth characteristics, this stand and its interspersed bogs and lakes are home to five bird species of special concern: spruce grouse, rusty blackbird, black-backed three-toed woodpecker, loon, and osprey.

2. Huntington Forest Natural Area
Cover Type: Mixed Woods (Spruce Flats)
Acres: 1,000 **Towns:** Newcomb/Long Lake
Counties: Essex/Hamilton
NHP Comm: Spruce-northern hardwood forest, spruce flats, and red spruce-balsam fir swamp

Exemplary stands of spruce flats (mixed wood of red spruce and yellow birch) and northern hardwoods (sugar maple-yellow birch-American beech) exist on that portion of the Anna and Archer Huntington

Figure 8: RECOMMENDED ACQUISITIONS OF EXEMPLARY COMMUNITIES



Memorial Forest west of Catlin Lake. These lands, owned by Syracuse University and held in trust for the SUNY College of Environmental Science and Forestry, have been designated as a Society of American Foresters' Natural Area and will be exempted from the timber harvesting that takes place elsewhere on the Huntington Forest. Still, to insure that such a decision is not reversed, the State of New York should acquire a conservation easement on this natural area. The spruce flats forest is of particular importance since this community is not well represented, at least on exemplary sites, over large portions of the Forest Preserve as is the northern hardwoods type. The 418 acre spruce flats forest is approximately 125 years old while the northern hardwood forest which occupies 537 acres is approximately 200 years old. A five acre, 125 year old, exemplary spruce-fir swamp forest is also on this site.

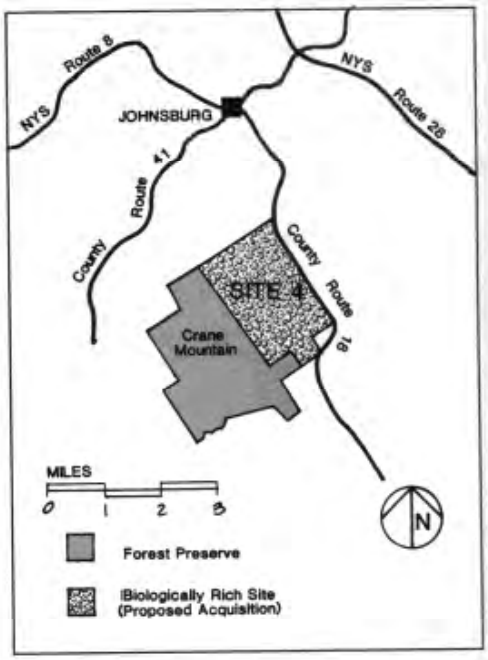
3. Forestmere Pine
Cover Type: Pine (White)
Acres: 350 **Town:** Brighton **County:** Franklin
NHP Comm: Pine-northern hardwood forest

A striking stand of white pine with a lovely dirt road winding through it is found immediately west of Route 30 at McCollums. This well-managed stand is on a superior white pine site. In view of its beauty, site, and accessibility, this stand is ideal to be made available to the public for educational and interpretive purposes. If this stand were acquired as Forest Preserve with no silvicultural management allowed, it is estimated that it would remain as an outstanding example of a pine forest for at least one hundred more years. In view of this, the preferred acquisition would be as Forest Preserve. However, management possibilities under a conservation easement should be explored with the landowner to determine if a mutually agreeable plan can be worked out in the event the owner does not want to sell fee title. Under a conservation easement, good silvicultural management could be employed to perpetuate white pine. Such management should be limited by the easement to that which would be aesthetically acceptable in view of the public purposes to be served by the easement. In addition to the exemplary white pine stand, this proposed acquisition includes a productive wetland, most of Clear Lake, and the western shoreline of Chain Lake, greatly enhancing its value to the public.

4. Huckleberry Mountain Red Pine
Cover Type: Pine (Red)
Acres: 1,220 **Town:** Johnsburg **County:** Warren
NHP Comm: Pine-northern hardwood forest

The magnificent stand of red pine on Huckleberry Mountain and its sweet fern understory offer an opportunity to preserve this vegetative community in an area readily accessible by foot trail. Unlike many red

White pine tower above lakeshore tamaracks at Forestmere Lakes.



pine stands in the Adirondack Park, the thin droughty soils of this site make it likely that this stand will continue to replace itself, with perhaps some intermixture of more shade tolerant species. Acquisition of this parcel should include the lovely Crystal Brook hardwood valley between Huckleberry and Crane Mountains to consolidate Forest Preserve in the Crane Mountain area.

5. Clintonville Pitch-Jack Pine Barrens
Cover Type: Pine (Jack, Pitch)
Acres: 1,230 **Towns:** Ausable, Black Brook
County: Clinton
NHP Comm: Pitch pine-heath barrens (R)

The Clintonville Pine Barrens represents the largest relatively undeveloped pitch and jack pine barrens in the Adirondack Park. The occurrence of both pitch and jack pine reflects the transitional location of this site between the pitch pine barrens more common further south and the jack pine found further north. It contains several rare plants including redroot, the regionally rare sand-cherry, and an unusual white form of pink lady's slipper (DiNunzio and Platt 1981). These barrens occupy approximately 1,230 acres two miles northwest of the community of Clintonville. The state should hold a conservation easement rather than fee title on this property so that it may be managed by the state, private owner, or conservancy group to perpetuate the pitch pine, jack pine and redroot.

This overstory of pitch pine is threatened by invading oaks and white pine and will require management soon to survive.

6. Wickham-Ausable Pitch Pine Barrens
Cover Type: Pine (Pitch)
Acres: 400 **Town:** Ausable **County:** Clinton
NHP Comm: Pitch pine-heath barrens (R)

The sandy plain between the Wickham Marsh and the Ausable Marsh Wildlife Management Areas on Lake Champlain is a good example of the rather limited pitch pine sites in the Park. The pitch pine on this site is associated with white pine, red oak, and trembling aspen. Acquisition of a conservation easement on the undeveloped portion of this property between the lake and Route 9 would provide protection for an exemplary stand of pitch pine. Such an easement would have to include management requirements to be exercised by the owner, state, or a third party that would provide the necessary silvicultural management to perpetuate the pitch pine.

7. Newcomb White Spruce-White Cedar Swamp
Cover Type: Coniferous Swamps, Bogs, and Fens
Acres: 310 **Town:** Newcomb **County:** Essex
NHP Comm: Northern white cedar swamp (R)

Stands of white spruce-white cedar are uncommon in the Park since they require a moist alkaline soil derived from limestone. An excellent example of such a rich site with these two species predominating is located east of the Hudson River near the hamlet of Newcomb, readily accessible to State Route 28N. This site would make an excellent example of this northern forest type. Mature white spruce up to twenty inches in diameter dominate the stand although smaller white cedar and balsam fir are equally prevalent. Calcite crystals are found on the ground surface reflecting the site's alkalinity. There is little shrub layer except for scattered beaked hazel and fly honeysuckle. Ground cover includes goldthread, wild lily-of-the-valley, and a wide variety of ferns. The site's location, only two miles from the Newcomb Adirondack Park Visitor Interpretive Center, makes this an ideal boreal forest interpretive site.

8. Roakdale Bog
Cover Type: Coniferous Swamps, Bogs, and Fens
Acres: 70 **Town:** Franklin **County:** Franklin
NHP Comm: Poor fen (R)

The Roakdale Bog contains unusual plant species as do most Adirondack bogs and fens. Bogs and fens are uncommon in the Adirondacks and extremely rare elsewhere in New York State and should be protected. The Roakdale Bog, in addition, is readily accessible, being adjacent to the Gabriels-Onchiota Road. Here the insect-eating pitcher plant and sundew may be found, and in one limited section it is also possible to find orchids. This fen provides an excellent example of the gradual succession from open water to dry land as vegetative matter moves in from the edges of a pond, eventually taking over the entire pond. In addition to

the unusual flora, this acquisition would also help consolidate the Adirondack Forest Preserve.

9. Brighton Bog
Cover Type: Coniferous Swamps, Bogs and Fens
Acres: 100 **Town:** Brighton **County:** Franklin
NHP Comm: Poor fen (R)

Brighton Bog is a small fen adjacent to the Jones Pond Road, a short distance north of State Route 192. This small fen is an ideal outdoor laboratory close to the Paul Smith's Adirondack Park Visitor Interpretive Center. It is a small, classic kettle hole fen with acidic, brown-stained waters in a deep central pool, deep peat deposits underlying a quaking/floating bog mat, a shrub zone, and a coniferous zone. The mat, shrub, and tree zones are concentric. The tree zone is dominated by black spruce and tamarack; the shrub zone by leatherleaf, bog andromeda, and bog laurel in a matrix of *Sphagnum*. *Sphagnum* mosses are encroaching and out-competing the sedges. An acidification process is taking place, probably due to poluronic acid and H ions released by the *Sphagnum*. The grass pink is a common orchid on the site. Other common species are round-leafed sundew, pitcher plant, and cottongrass.

10. North Branch Alder Carr
Cover Type: Swamp Hardwoods
Acres: 870 **Towns:** Brighton, Franklin
County: Franklin
NHP Comm: Shrub swamp, red spruce-balsam fir swamp, and black spruce-tamarack swamp (R)

Although speckled alder is common along stream corridors throughout the Adirondack Park, there is no known alder carr within the Forest Preserve the size of the 100 acre carr along the North Branch of the Saranac River north of Rainbow Lake. These alder are critical to the high trout productivity of the North Branch because their dense shade keeps the water cool in the summer while their root systems stabilize the streambanks. This alder carr is further differentiated by its black spruce-balsam fir-tamarack edge, more boreal in character than most Adirondack carrs, which are more frequently surrounded by red spruce, white pine, and hardwoods.

This extensive alder carr on the North Branch of the Saranac River is important to the trout fishery.

11. Auger Flats Floodplain Forest
Cover Type: Swamp Hardwoods
Acres: 160 **Town:** Wells **County:** Hamilton
NHP Comm: Floodplain forest (R)

The stand of large silver maple and black ash along the floodplain at Auger Flats on the Main Branch of the Sacandaga River is readily visible from New York State Highway 30, a few miles southeast of Speculator. Associated tree species include blue beech, butternut, and yellow birch while the ground cover is dominated by cinnamon and ostrich fern, bedstraw, bluejoint grass, and tussock sedge. The state recently acquired key parts of this floodplain forest, but this northern portion is essential to complete state ownership of this exemplary stand and provide ready access to it. Purchase of this parcel would not only diversify the Adirondack Forest Preserve through the addition of more floodplain hardwood forest, a rich and uncommon Adirondack forest, but also offer accessible educational and interpretive opportunities. At the same time this acquisition would bring the boundary of the Siamese Ponds Wilderness to a location that makes ecological and administrative sense.

12. Boquet River Floodplain Forest
Cover Type: Swamp Hardwoods
Acres: 130 **Town:** Westport **County:** Essex
NHP Comm: Floodplain forest (R)

The Boquet River floodplain adjacent to County Route 10 just north of Wadhams supports a hardwood floodplain forest of silver maple, American elm, green ash, and box-elder with a magnificent understory of ostrich fern four feet tall. This is another readily accessible example of an uncommon forest type, protection of which will add not only to species diversity within the Park but also to the educational opportunities for forest interpretation.

13. Schroon River Oxbows
Cover Type: Swamp Hardwoods
Acres: 790 **Towns:** Bolton, Warrensburg **County:** Warren
NHP Comm: Floodplain forest (R)

The spectacular oxbows of the lower Schroon River just north of Warrensburg offer another opportunity to preserve remnants of the scarce silver maple floodplain forest. In addition, this acquisition will provide access to an excellent canoeing river while at the same time protecting the natural character of the river corridor. The meandering river in this area provides a high degree of floodplain and open water interspersion

which increases the area's biological diversity. The forest is dominated by silver maple with American elm, blue beech, black ash, and red maple as common associates. Cinnamon fern forms a blanket of ground cover, broken by patches of blue cohosh, bellwort, wood anemone, and dog-tooth violet.

Periodic flooding of the Schroon River results in this rich silver maple forest.

14. Bulwagga Bay Floodplain Forest
Cover Type: Swamp Hardwoods
Acres: 290 **Towns:** Crown Point, Moriah **County:** Essex
NHP Comm: Floodplain forest (R)

A hybrid maple, Freeman's maple, resulting from a cross between red maple and silver maple, dominates this site. Swamp white oak and black ash, both uncommon in the Adirondack Park, are here common associates. This accessible floodplain forest is buffered from Lake Champlain by sedge and shrub wetlands. This site is adjacent to the Coot Hill biologically unusual site also recommended for acquisition.

Recommended Acquisitions of Biologically Rich or Unusual Sites

Biologically rich sites are defined as areas containing an unusual abundance of plant and/or wildlife species and communities. This abundance may be the result of soil fertility or the convergence of a number of different communities interspersed in a relatively small area. The greater the number of communities within a limited area, the greater the number of species likely to be encountered. Biologically unusual sites may contain individual species that are rare or threatened or communities that are infrequent in the Adirondack Park. Because of their rareness, it is particularly important that they not be lost, for to lose them to development or other major change would make the Adirondack Park a less diverse and a less valuable resource.

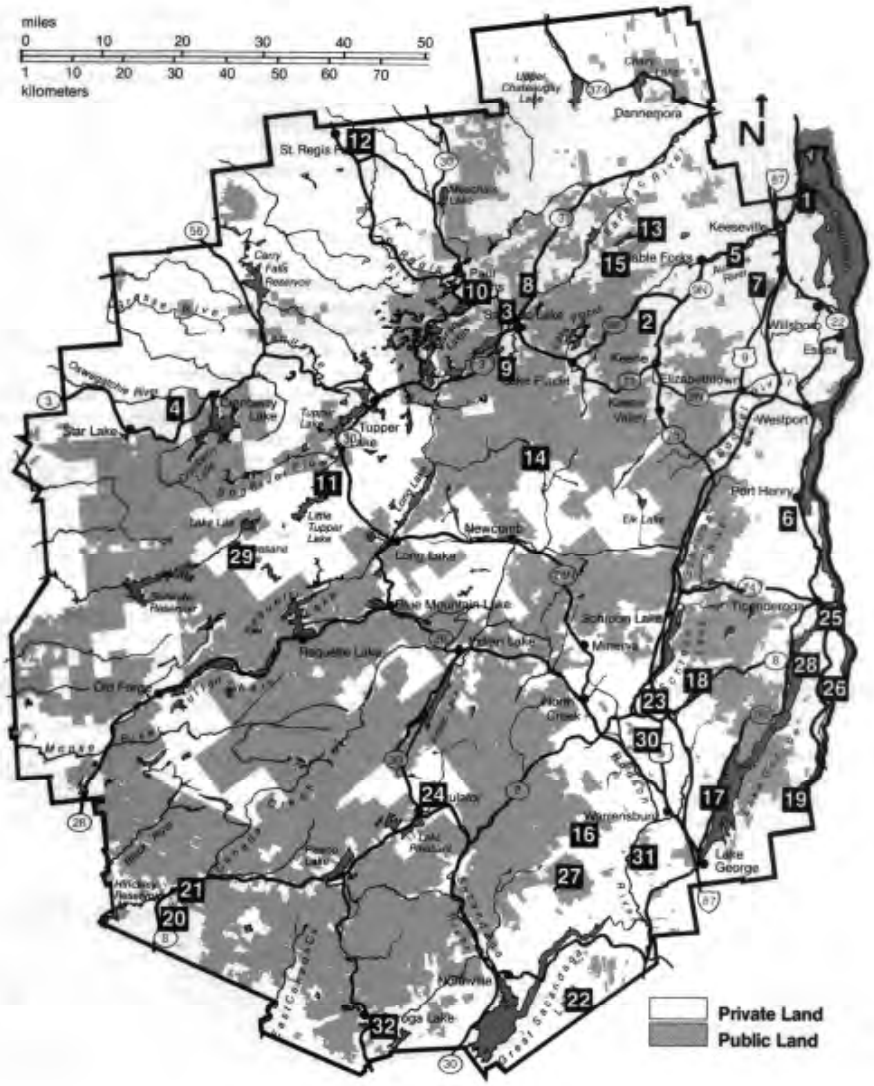
Each acquisition proposal will be presented in a similar format: map number and name; acreage; town(s); county(ies); tentatively identified natural heritage program communities on the site, with (R) indicating a rare or vulnerable community; and, a brief description of the area.

- Northern Adirondack Park -

1. Ausable Delta Floodplain Forest
Acres: 270 **Towns:** Ausable, Peru **County:** Clinton
NHP Comm: Floodplain forest (R)

A significant portion of the forested wetland at the delta of the Ausable River where it enters Lake Champlain is privately-owned and undeveloped. The remainder of the delta, much of which is marshland, is owned by the State of New York and is known as the Ausable Wildlife Management Area. The old-growth silver maple and cottonwood on the undeveloped private portion forms an unusual floodplain forest community, as eastern cottonwood is rare in most of the Adirondack Park.

Figure 9: RECOMMENDED ACQUISITIONS OF BIOLOGICALLY RICH OR UNUSUAL SITES

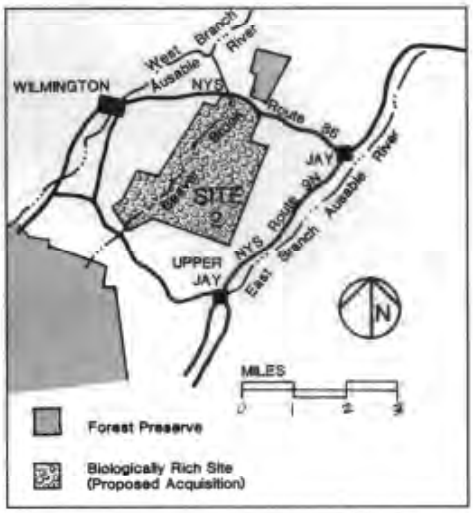


2. Beaver Brook Valley

Acres: 2,790 **Town:** Wilmington **County:** Essex

NHP Comm: Mountain spruce-fir forest (R), black spruce-tamarack swamp (R), beaver pond and meadow, shrub swamp, shallow marsh, sedge meadow, hemlock-hardwood swamp, northern white cedar swamp (R), calcareous cliff community, Appalachian oak-pine forest, pine-northern hardwood forest, and successional red cedar woodland

The Beaver Brook wetland complex is one of the most productive brook trout wetland systems in the Adirondack Park. In addition, it is surrounded by an uncommonly diverse system of upland communities, many of which owe their richness to the alkaline soils. Most acquisitions should emphasize conservation easements providing for management compatible with perpetuating the diversity although some Forest Preserve is desirable. Much of this area was cleared and used for agriculture at the turn of the century, and although some has reverted to brush and forest, the pastures and hay fields still in use add to the immense diversity of this valley. The spruce-fir on Bassett Mountain and the white spruce and white pine stands on lower elevations are boreal in nature, yet in this valley they meet the common southern associates of red oak, basswood, and white ash. The white spruce-white cedar forests on the wet sites could well serve as the exemplary forests of these species within the Park. The red cedar-jack pine type could also serve as an exemplary stand of this type. Thirty-two species of trees exist in the area, making it the second most diverse forest community found in this survey of the Adirondack Park. The rich mix of habitats results in a wide variety of wildlife.



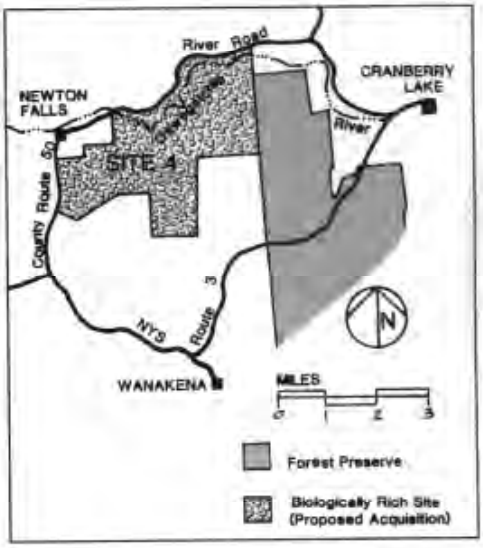
The Beaver Brook Valley between Jay and Wilmington is one of the most spectacular and diverse sites in the Park.

The Bloomingdale Bog is not only a biologic treasure but also an important element in one of the Park's few vistas.

3. Bloomingdale Bog
Acres: 1,110 **Town:** Harrietstown **County:** Franklin
NHP Comm: Boreal acid bog (R), black spruce-tamarack swamp (R), deep emergent marsh, shallow marsh, sedge meadow, and shrub swamp

The Bloomingdale Bog is an outstanding example of a climax flat bog community, an extremely rare community in New York State. It contains at least four rare plant species: ground-fir, mountain rice, Vasey's rush, and dwarf birch (DiNunzio and Platt 1981). Boreal birds of special significance breed in this habitat. These include the spruce grouse, black-backed three-toed woodpecker, grey jay, boreal chickadee, rusty blackbird, Lincoln's sparrow, and white-winged crossbill. In addition, the wetland contains Rhodora, a rare species of rhododendron. The Bloomingdale Bog includes approximately 1,000 acres, about half of which is already Adirondack Forest Preserve. This proposed acquisition includes enough surrounding land to protect the bog as well as the spectacular Donnelly's Corners state-designated vista. The bog's size and accessibility make it particularly significant as does its location in the middle ground of one of the Adirondack Park's most striking scenic vistas.

4. Chaumont Pond Wetlands
Acres: 4,750 **Town:** Clifton **County:** St. Lawrence
NHP Comm: Emergent marsh, shrub swamp, poor fen (R), black spruce-tamarack swamp (R), and pine-northern hardwood forest



Chaumont Pond wetlands.

The open shallow waters of Chaumont Swamp provide ideal fishing for the resident osprey, black tern, and great blue heron, while the mud flats are probed by Wilson's snipe. The deeper waters are fished by resident loon. The open water is fringed by a emergent cat-tail marsh; a heath wetland dominated by sweet-gale, leatherleaf, and Bebb willow; several small poor fens; and a tamarack swamp with scattered black spruce. Two coniferous islands — one clothed with red spruce and the other with white pine — and surrounding hills of northern hardwoods complete one of the richest mosaics of ecosystems in the Adirondack Park.

5. Cook Mountain
Acres: 1,980 **Town:** Ausable **County:** Clinton
NHP Comm: Successional northern hardwoods

Cook Mountain, immediately north of Clintonville, offers a readily accessible and easy hike through a surprisingly diverse forest. The forest's diversity exists because of past disturbances (fire, logging) and a soil and microtopography that blend moist "pocket wetlands" with dry slopes. The tiny pocket wetlands exist in depressions that range in size from less than one-tenth of an acre to approximately one acre. A trail system already exists on the mountain and from the mile-long main trail alone, twenty-four tree species can be identified.

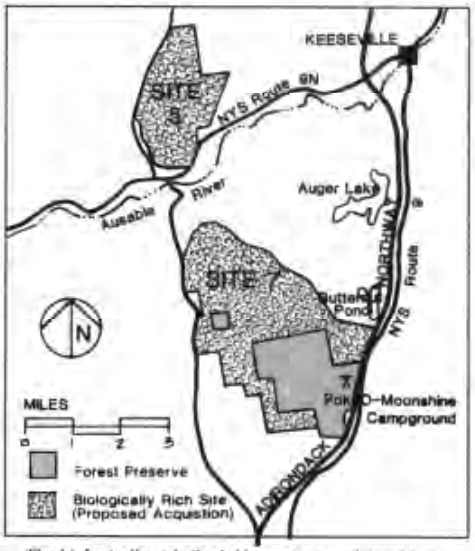
6. Coot Hill Hawk Watch
Acres: 440 **Towns:** Crown Point, Moriah **County:** Essex
NHP Comm: Appalachian acidic rocky summit and Appalachian oak-pine forest

Coot Hill offers not only spectacular vistas across Lake Champlain, but also the best "hawk watch" in the Adirondack Park. During spring and fall migrations, hundreds of raptors, including as many as eleven different species, have been observed in a single day. In addition to its importance as a "hawk watch", Coot Hill contains several unusual plant

Views of Big Hollow (right) and the Champlain Valley add to the pleasure of a day on the Coot Hill hawk watch.

communities. On the open summit, luxuriant growths of lichens and an extensive bearberry ground cover interspersed with trailing arbutus are common. A 400-foot deep gorge, Big Hollow, drops from the 1,095 foot summit to a tributary of Cold Spring where it plunges another 400 feet in elevation over the next one-quarter mile to the Lake Champlain floodplain. This southerly aspect of Coot Hill supports hemlock-white oak-chestnut oak-red pine forest, a very uncommon type.

7. Lime Ledges/Pok-O-Moonshine
Acres: 5,040 **Town:** Chesterfield **County:** Essex
NHP Comm: Pine-northern hardwood forest, calcareous talus slope woodland (R), and red maple-hardwood swamp



The biologically rich Cook Mountain (north) and Lime Ledges/Pok-o-moonshine (south) areas lie on opposite sides of the Ausable River.

Biologist Ed Ketchledge examines unusual bryophytes in a limestone fault along Gay Brook.

A complex mixture of soil types, slopes, aspects, and geologic fault zones rich in metasediments results in an extraordinary diversity of vegetative species in the Lime Ledges/Pok-O-Moonshine area. More tree species (thirty-three) were identified in this area than any other area of comparable size surveyed in the entire Park. Open dry sites with jack pine, round-leafed dogwood and poison ivy; rock outcrops with a profusion of lichens, mosses and juniper; and wetlands of black ash, butternut, and northern white cedar are interspersed with rich sites forested with eastern hop hornbeam, white ash, and basswood. A profusion of mosses and liverworts cover the rocks and ravines of the upper reaches of Gay Brook. *Rhytidium rugosum*, a carpet moss found on calcareous outcrops of the far north and known at only two other Adirondack sites, is located here.

8. Oregon Plains and Cold Brook
Acres: 2,150 **Town:** Franklin **County:** Franklin
NHP Comm: Not identified

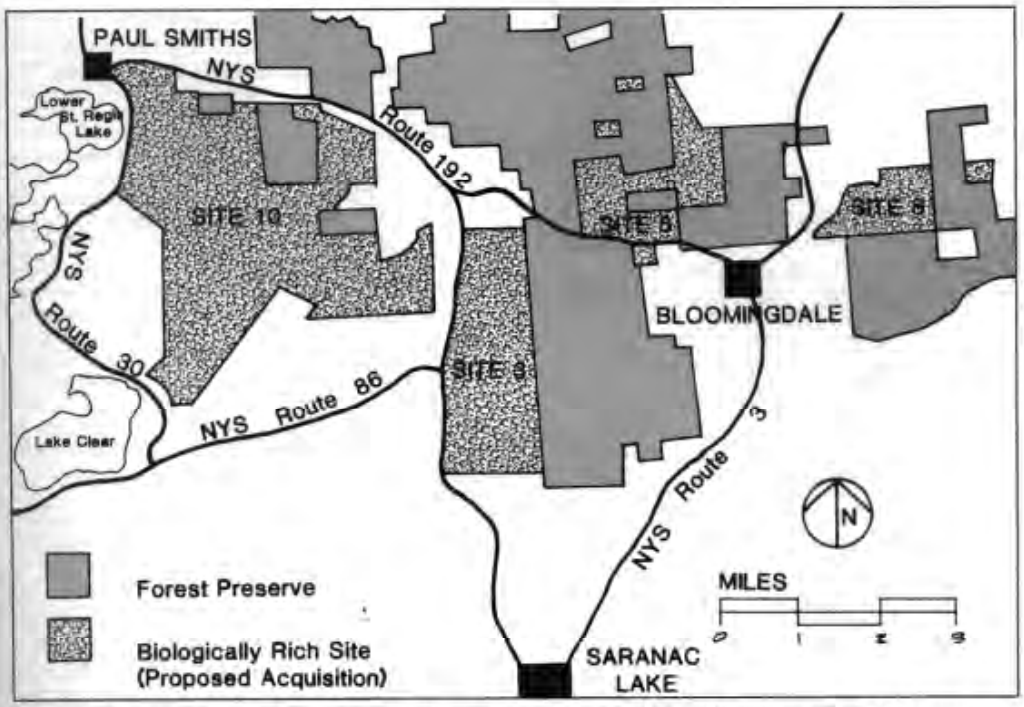
This recommended purchase would consolidate ownership in the largest black spruce sandplain in the Adirondack Park, the Oregon Plains, and a similar but separate community along nearby Cold Brook. The recommended purchase in the former is 1,380 acres which will result in a total Adirondack consolidated Forest Preserve black spruce sandplain community of approximately 3,000 acres. The secondary protected community at Cold Brook would total nearly 1,500 acres with the recommended purchase of 770 additional acres. These communities are unusual in that black spruce is a boreal species which, when found in New York State, is almost exclusively in wetlands. Yet on this sandplain it appears that black spruce is growing on very dry sand. The reason for this appearance is that below a surface layer of sand is an impervious "hardpan" or "fragipan" upon which lies a perched water table. Therefore, despite the dry sand at the surface, the roots of the black spruce are almost always in a saturated soil.

9. Ossetah Lake Wetlands
Acres: 460 **Town:** Harrietstown **County:** Franklin
NHP Comm: Black spruce-tamarack swamp (R), deep emergent marsh, and shallow marsh

Ossetah Lake wetland is an uncommonly rich marshland with a productive open water to vegetation ratio and a profile of wetland types from the alkaline cat-tail marsh to the very acid black spruce swamp. This wetland is one of the few ring-necked duck nesting habitats in the Adirondack Park. It is readily accessible by public road.

10. Rickerson Brook Headwaters
Acres: 5,580 **Towns:** Brighton, Harrietstown **County:** Franklin
NHP Comm: Red spruce-balsam fir swamp, beaver pond and meadow, and black spruce-tamarack swamp (R)

This boreal habitat of the rare arctic black-backed woodpecker lies between State Route 92 on the north and east, State Route 30 on the west, and Route 86 and the Saranac Lake Airport property on the south. It contains a rich mixture of forested uplands, forested swamps, open canopy wetlands, and open heath plains. An exemplary stand of red spruce and balsam fir with a carpet of woodland *Sphagnum*, reminiscent of northern Canada, is located along Rickerson Brook in the north central part of the area. Further south and east lies an impoverished, sandy, heath plain underlain with a perched watertable that allows wetland species such as black spruce to emerge from the heath while pockets of mountain feathermoss and *Dicranum* grow in shallow depressions under the blueberry. The rare balsam willow is found in the shrub swamps along the streams, and the unusual nanny-berry and plains honeysuckle grow on the plains. The coarse croaks of the raven echo throughout the area while sign of the equally rare spruce grouse is evident.



Three biologically rich areas are clustered north of Saranac Lake Village. From left to right, Rickerson Brook headwaters (site 10), Bloomingdale Bog (site 3), and the Oregon Plains (site 8).

11. Round Lake Wetlands
Acres: 3,090 **Town:** Long Lake **County:** Hamilton
NHP Comm: Sedge meadow, shallow marsh,, red spruce-balsam fir swamp, poor fen (R), and boreal acid bog (R)

The extensive wetlands between Little Tupper Lake and Round Lake contain a rich mix of balsam fir-red spruce swamps, sedge meadows, extensive poor fen communities, and at least three kettle hole bogs. Two sandy eskers wind through the area. Three uncommon sedges, *Carex oligosperma*, *Carex pauciflora*, and *Carex exilis* are found in the sedge meadows. The entire area, including the lakes, are of significant value as waterfowl habitat.

12. Saint Regis Falls Wetlands
Acres: 650 **Town:** Waverly **County:** Franklin
NHP Comm: Shrub swamp and sedge meadow

The bog and wetland complex immediately east of Saint Regis Falls is an important spring migration stop for waterfowl and a prime Wilson's snipe and woodcock nesting area. Osprey, great blue heron, green heron, and black-crowned heron also nest here. Wild rice grows in the flowing waters.

13. Silver Lake Mountains
Acres: 2,210 **Town:** Black Brook **County:** Clinton
NHP Comm: Poor fen (R) and pine-northern hardwood forest

Some of the most spectacular rock ledges — ideal for the nesting of peregrine falcons, golden eagles, and ravens — in the entire Park occur on the three mile long southern slopes of the Silver Lake Mountains. The Department of Environmental Conservation used this unique area for the hacking program that has resulted in the restoration of the peregrine falcon to the Adirondack Park. In addition to the biological importance of these nesting sites, a valuable wetland is located immediately south of Silver Lake Mountain. Mud Pond is open water surrounded by a sedge-heath-*Sphagnum* mat containing a variety of boreal bog species.

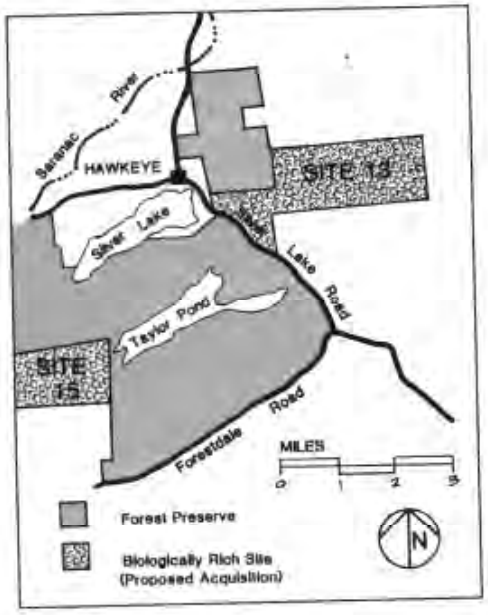
14. Tahawus Talus
Acres: 160 **Town:** Newcomb **County:** Essex
NHP Comm: Acidic talus slope woodlands

The Tahawus talus slope contains the rare and unusual rock vole and long-tailed shrew. "A large talus (up to ten feet in diameter) is covered by a dense

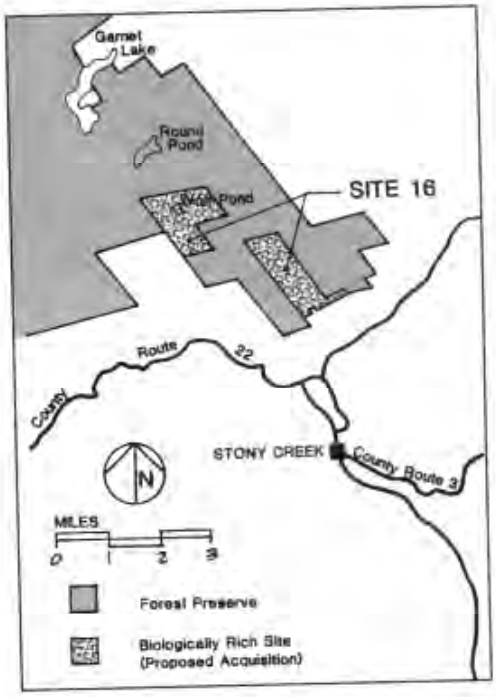
growth of mosses, ferns (spinulose wood, long beech, and polypody) and wood sorrel. The forest canopy is dominated by yellow birch, with a few scattered red spruce. The shrub layer is dominated by mountain maple, with scattered balsam fir, red spruce and witch-hobble." (Platt and DiNunzio 1981).

15. Third Burnt Hill
Acres: 1,070 **Town:** Black Brook **County:** Clinton
NHP Comm: Pine-northern hardwood forest

The healthiest bald eagle population in the Adirondack Park is located in the vicinity of Union Falls Reservoir. Union Falls Reservoir, with its shallow water and numerous stumps which discourage motor boats, provides an ideal feeding area for the eagles. These eagles are dependent on large pines with rather specific branch conformation for both nesting and resting. Many of the large white pines that the bald eagles use are southwest of Cranberry Pond on the slopes of Third Burnt Hill. Acquisition of this tract will not only preserve these critical pines but also consolidate Forest Preserve.



16. Baldhead Mountain and Wolf Pond Wetlands
Acres: 1,540 **Towns:** Stony Creek, Thurman
County: Warren
NHP Comm: Mountain spruce-fir forest (R), rocky summit grasslands, poor fen (R), shrub swamp, sedge meadow, pine-northern hardwood forest, successional northern hardwoods, and cliff community



The spruce-fir cap on Baldhead Mountain is an isolated example of the mountain spruce-fir forest community, rare in the southern portion of the Park which is elsewhere dominated by hardwoods. In addition, portions of the mountain were burned so heavily at the turn of the century that the resultant loss of all organic matter and much of the inorganic soil has resulted in communities that will remain in a very early successional stage for many generations. These early successional communities include grassy meadows, paper birch, and a variety of lichen and moss communities trying to reclaim the exfoliating rock faces. Acquisition of the remaining private land on Baldhead Mountain will provide the public an opportunity to examine and study both the isolated mountain spruce-fir forest and the early successional stages reclaiming the southeasterly slopes of the mountain. These communities are set in a matrix of

mature northern hardwood communities adjacent to the biologically rich Wolf Pond wetlands, thereby creating an unusually rich composite of ecosystems. Wolf Pond is approximately fifteen acres in size. The wetlands on the east and northern sides of the pond are the areas of particularly rich biological diversity containing a rich inter-mixture of all the major Adirondack wetland types: coniferous swamp, hardwood swamp, alder-willow shrub swamp, heath swamp, cat-tail marsh, sedge meadow, and poor fen. The inlet stream is especially important because of the interspersion of water within the bog mat and the scattered trees that make up this wetland. A well-maintained residence at the south end of the pond should be excluded from any purchase. The value of the Wolf Pond wetland is particularly high because of its composition, location in a heavily-forested area with few open wetlands, and adjacency to Baldhead Mountain with its mountain spruce-fir cap, hardwood slopes, and early successional communities.

17. Boon Bay and Huddle Bay Wetlands
Acres: 150 **Town:** Bolton **County:** Warren
NHP Comm: Poor fen (R), black spruce-tamarack swamp (R), floodplain forest (R), deep emergent marsh, shallow emergent marsh, and red maple-hardwood swamp

The isthmus wetlands between Boon Bay and Basin Bay and between Basin Bay and Huddle Bay constitute the only two such wetlands remaining undeveloped on Lake George, the largest lake entirely within the Adirondack Park. Each of these wetlands contains an acidic fen surrounded by forested swamps of tamarack, black ash, and black tupelo, the latter species being uncommon in the Adirondack Park. The Huddle Bay wetland, the third largest on Lake George, is a complex natural system that follows a water level gradient from a deep water marsh in the Bay to forested wetlands. Along the gradient are several vegetational types, including emergent marsh, shrub swamp, coniferous swamp, and bog. The interspersion of these types makes this site very diverse and productive. The wetland is bounded on its upland sides by residential development. Its natural diversity and proximity to human habitation makes it very important for aesthetic, open space, recreational, and educational activities. The Boon Bay wetland, the fourth largest wetland on Lake George, is also a complex system with elements of marsh, bog, shrub swamp, coniferous swamp, and deciduous swamp present.

18. Brant Lake Bog
Acres: 100 **Town:** Horicon **County:** Warren
NHP Comm: Northern white cedar with fen openings (R)

The Brant Lake Bog contains at least five species of orchids, a very unusual — and probably unique — situation in the Adirondack Park. The center portion is a *Sphagnum* mat with scattered northern white cedar growing on it. At the edges, the white cedar is joined by tamarack and an occasional balsam fir. Since public ownership might threaten the perpetuation of the orchids, it is suggested that the state acquire a conservation easement on the bog and the immediately surrounding area to insure protection of the internal drainage patterns of the area which are critical to the survival of the orchids.

19. The Diameter and The Pinnacle
Acres: 5,220 **Towns:** Dresden, Fort Ann
County: Washington
NHP Comm: Maple-basswood rich mesic forest (R), floodplain forest (R), deep emergent marsh, shallow marsh, inland calcareous lakeshore, shrub swamp, calcareous shoreline outcrop, cliff community, calcareous talus slope, and Appalachian oak-pine forest

The Diameter, the surrounding inlet area of South Bay, and The Pinnacle ridge to the south form not only one of the most imposing areas surveyed, but also contain a rich and unusual interspersion of vegetative communities including a number of unusual aquatic plants such as Cypernus, lovegrass,

The cliffs and talus slopes of The Diameter offer habitats rare in the eastern United States.

slender bulrush, and yellow watercrowfoot. In addition, climbing fumitory, an often spectacular flowering creeping plant, is abundant on the rock face of The Diameter. A nearly pure silver maple forest is located along the floodplain of South Bay Creek. The upland adjacent to this floodplain is clearly a rich site with a profusion of basswood, Christmas fern, and marginal shield fern. Greenland Brook tumbles over ledges while coursing through a hemlock stand just before entering the South Bay Creek floodplain. The floodplain between Greenland Brook and South Bay Creek is forested with American elm, slippery elm, shagbark hickory, and bitternut hickory along with some winterberry. The Diameter itself is a spectacular landform with a 700 foot vertical rock face dropping directly into South Bay. A calcareous talus slope woodland occurs at the foot of The Diameter both north and south of the rock face, with the state-protected bittersweet growing under the open canopy of hop hornbeam, white ash, and both red and white oak as well as associated eastern red cedar and occasional northern white cedar. Offshore from the face of The Diameter is a wetland of approximately 200 acres with an apparently highly productive water-plant ratio that should be ideal young fish habitat, offering protection for trout and salmon spawned a short distance up South Bay Creek. An unusual esker-like ridge less than 100 feet wide with hardwood vegetation snakes its way through the ericaceous-mat wetland for nearly one-half mile. The rock face and associated smaller cliffs offer ideal raven, peregrine falcon, bald eagle, and turkey vulture roost and nesting sites. In all, twenty-seven species of trees were identified in the vicinity of The Diameter along with a rich and diverse understory of shrubs. The Pinnacle ridge, running south from The Diameter along the Park boundary, is a dry west-facing rocky slope above a rich agricultural valley. The extensive rock outcrops, talus, and ledge rock offer numerous denning sites for small mammals and reptiles as well as roosting and nesting areas to ravens, vultures, and, perhaps, peregrine falcons and golden eagles.

20. Kettle Lakes

Acres: 530 **Town:** Ohio **County:** Herkimer

NHP Comm: Black spruce-tamarack swamp (R), poor fen (R), sedge meadows, and hemlock-northern hardwood forests

Four named kettle lakes — Tom Kettle, Figgert, Tamarack and Curtis — and a dozen dry kettle holes are clear evidence of the glacial scouring twelve millennia ago. Approximately two dozen camps exist in the area but few are visible from the lakes. Lake Tamarack is a deep, clear kettle lake with a fringe of tamarack surrounded by red and sugar maple, black cherry, and hemlock. Tom Kettle is a deep kettle hole lake with an extensive (five plus acres) floating *Sphagnum* mat containing bog laurel, bog andromeda, round-leafed sundew, pitcher plant, bladderwort, wool grass, and both large-fruited and small-fruited cranberry. A small, unnamed bog pond one-half mile north of Tom Kettle is surrounded by an even larger *Sphagnum* mat as well as a black spruce-tamarack forest. This geologically interesting area, in concert with site 21, would make an ideal educational and interpretive site in the southwestern Adirondacks easily accessible to the population centers of central New York.

Wetlands such as these provide ideal habitat for young fish.

Biologist Dan Spada inspects wetland vegetation at Tom Kettle.

21. Wilmurt Esker, Kettle Holes, and Wetlands
Acres: 480 **Town:** Ohio **County:** Herkimer
NHP Comm: Hemlock-northern hardwood forest, shrub swamp, and poor fen (R)

Located south of Route 8 near Wilmurt Corners, this area is a textbook example of glacial activity. The soils are deep outwash sands. On the property are two eskers and numerous kettle holes. Most of the kettles are dry; others have open water or bog vegetation. The surface topography has been eroded and the eskers have been breached by streams. The more southerly esker, northeast of Butler Lake, is one of the tallest and steepest in the Park. Both eskers have dense canopies of very large hemlock and white pine with sparse ground cover. In addition to the kettle hole wetlands, a wetland along the outlet stream contains shrub swamp, coniferous swamp, and deciduous forested swamp. This site is also an important deer wintering area. Along with the high biological value, this parcel has important recreational value with frontage on West Canada Creek that includes the entrance to the spectacular Ohio Gorge.

22. Ireland Vly
Acres: 7,180 **Towns:** Edinburg, Providence **County:** Saratoga
NHP Comm: Poor fen (R), sedge meadow, shrub swamp, pine-northern hardwoods, Appalachian oak-pine forest, and hemlock-northern hardwood forest

The Ireland Vly area contains a particularly rich mix of songbirds, small mammals, and plant communities. The numerous "vlys", a Dutch term for swamps, are key to the area's diversity. The complex vegetative cover communities include ericaceous wetlands, sedge meadows, tamarack swamps, oak-pine forests, alder carrs, northern hardwoods, and innumerable small scattered patches of white pine and hemlock. It is this complexity of types and their interspersion that results in the biological richness of this area.

23. Jenks Swamp
Acres: 980 **Towns:** Chester, Horicon **County:** Warren
NHP Comm: Rich red maple-tamarack swamp (R), poor fen (R), black spruce-tamarack swamp (R), shrub swamp, northern white cedar swamp (R), and red maple-hardwood swamp

Jenks Swamp has been on almost everyone's list of biologically important Adirondack sites for years. The construction of the Adirondack Northway (I-87) affected the internal drainage patterns in the swamp despite efforts to avoid such disruption. In the last few years, beaver flooding has also changed the swamp character. The swamp remains of great biological value largely because it is composed of a wide variety of wetland vegetative types. At least four distinct forested wetland types exist: northern white cedar-balsam fir-tamarack-red maple; northern white cedar; red maple; and black spruce. In addition, several ericaceous *Sphagnum* fens are within the area. This combination of wetland types in such a compact area makes Jenks Swamp rich in diversity and unique in the Adirondack Park.

24. Kunjamuk Wetlands
Acres: 2,220 **Town:** Lake Pleasant **County:** Hamilton
NHP Comm: Shallow marsh, shrub swamp, and red spruce-balsam fir swamp

The Kunjamuk wetland complex follows the Kunjamuk River from the Wells town line to Routes 8 and 30 in Speculator. North of Elm Lake a nearly 200 acre wetland community of sedges and ericaceous plants is bisected by numerous streams and includes an island of red spruce and balsam fir. A similar but narrower wetland follows the Kunjamuk downstream for approximately one mile from Elm Lake. Extensive wetlands occur again along the lower mile of the river where it joins the Sacandaga River. The entire system is particularly important to waterfowl and furbearers, as it is among the best such habitat within the Park. Acquisition would also protect an important Adirondack canoe route.

25. LaChute River Delta Wetlands
Acres: 220 **Town:** Ticonderoga **County:** Essex
NHP Comm: Floodplain forest (R) and deep emergent marsh

The emergent marsh and adjacent floodplain forest at the mouth of the LaChute River near Ticonderoga has traditionally been a birder's paradise. The canoeable LaChute River itself has an interesting, almost vertical rock cliff border on the north side contrasting with hardwood swamps and marshes on the southern side as it meanders into Lake Champlain. Thick cat-tail growths and open water-lily areas are intermixed with hummocks harboring a tree or two. But it is the birdlife that is unparalleled. Cavity nesting birds — including downy, hairy, and pileated woodpeckers — are frequently seen. Warblers — especially Tennessee, Cape May, blackpoll, and chestnut-sided — frequent the river edge. Grackles, red-winged blackbirds, and brown-headed cowbirds search the mud banks for food. Waterfowl is abundant. Migration in spring and fall brings hundreds of ducks: mallards, blacks, gallinules, mergansers, and wood ducks are summer residents. Least and American bitterns, along with long-billed marsh wren, nest in the cat-tail marsh. Several species of shorebird scavenge along the waterline including ruddy turnstones and semi-palmated plovers. Great blue herons, kingfishers, and green herons routinely feed and nest around the marsh. Gnatcatchers, warbling vireos, mockingbirds, orchard orioles, bluebirds, scarlet tanagers, northern waterthrushes, and flycatchers frequent the edge of the marsh and the hawthorn-infested field below Fort Ticonderoga. In addition to the marsh's great avian diversity and high biomass productivity, it serves hydrologically important functions that help maintain the water quality of Lake Champlain.

26. Lake Champlain Narrows
Acres: 1,050 **Towns:** Dresden, Putnam
County: Washington
NHP Comm: Deep emergent marsh, shallow marsh, and calcareous cliff community

The Lake Champlain Narrows forms a meandering twenty-five miles of the Park boundary on the eastern boundary of Washington County. Emergent marsh occupies nearly fifty percent of the lake's surface area here. The limestone cliffs and tableland on the shoreline insure the rich productivity of these marshes. A dozen rare, threatened, or endangered plant species, including Hill's pondweed, prickly rose, knotweed, Whitlow-grass, slender bulrush, rock-cress, smooth cliff brake, lake-cress, panic grass, and several sedges, have been identified in the area. These marshes are of inestimable value to both the water quality and fishery resource and, in addition, provide habitat for an unusually diverse songbird and waterfowl population similar to that of the LaChute Marsh described above.

27. Lens Lake Bog and Livingston Lake
Acres: 780 **Towns:** Stony Creek/Day
Counties: Warren/Saratoga
NHP Comm: Poor fen (R), sedge meadow, shrub swamp and pine-northern hardwood forest

Lens Lake Bog is an enormous quaking bog with *Sphagnum* mats four to five feet thick. It is comprised of the unusual vegetation, including orchids, generally found in boreal bogs and fens. This is one of the southern-most fens in the Adirondack Park and one of the richest in plant species. Acquisition of the Lens Lake Bog and the undeveloped portion of the lakeshore would consolidate Forest Preserve as well as preserve a very important and unusual biological resource. Livingston Lake is a lovely body of water surrounded by a northern hardwood forest and towering white pines. A mature stand of sugar maple of impressive size and quality lies at the northeast end of the lake. The associated white ash, together with dwarf ginseng in the ground cover, indicate a productive site. Several wetlands along the lake margins contain sedges, cat-tails, *Sphagnum*, sweet-gale, and leatherleaf. Great blue heron, merganser, rose-breasted grosbeak, and Blackburnian warblers all nest in the vicinity. Several camps exist on Livingston Lake but only one on the more biologically important northern half which is nearly "pinched off" from the rest of the lake.

28. Putnam Rookery
Acres: 200 **Town:** Putnam **County:** Washington
NHP Comm: Beaver pond and oak-pine forest

Putnam rookery is a wetland complex with three dozen great blue heron nests in white pine snags. Beaver have flooded what was a coniferous swamp with scattered white pines on hummocks. The wetland vegetation is dominated by sedges, rushes, *Sphagnum* and scattered black ash. The geographic and geologic setting of this wetland — a large irregularly shaped depression in bedrock of a sedimentary origin — make it extremely rich in numerous wildlife species including beaver, muskrat, cavity nesting birds, and a variety of amphibians. The surrounding forest is predominantly red oak and hemlock with associated white oak, paper birch, sweet birch, beech, white pine, and basswood. The understory is predominantly witch-hazel and witch-hobble. Ground cover includes pipsissewa and pink lady's slipper.

29. Shingle Shanty Brook Wetlands
Acres: 3,150 **Town:** Long Lake **County:** Hamilton
NHP Comm: Poor fen (R), black spruce-tamarack swamp (R), red spruce-balsam fir swamp, and sedge meadow

A five-mile long wetland of immense biological value, the Shingle Shanty wetland is one of, if not the most extensive tamarack-spruce swamps in the Adirondack Park. Both black and red spruce are associated with the tamarack, depending on ground water saturation. The meandering stream, scattered white pine, half-dozen *Sphagnum* bog mats, red spruce-balsam fir swamps, and sedge meadows combine with the tamarack-spruce swamps to make this one of the most diverse and valuable wetlands in the Adirondacks. Extensive logging taking place on the adjacent uplands could threaten this ecosystem if it is not protected soon.

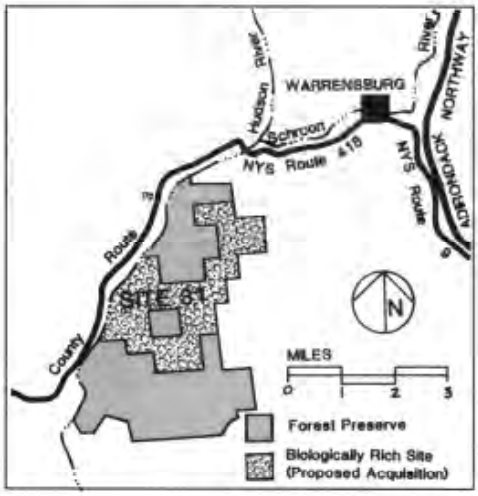
30. Sullivan Pond Wetlands
Acres: 270 **Town:** Chester **County:** Warren
NHP Comm: Black spruce-tamarack swamp (R), deep emergent marsh, shallow marsh, and pine-northern hardwood forest

Sullivan Pond, a mile east of Friend's Lake, consists of about twenty acres of open water and an additional twenty acres of open water interspersed with emergent marsh. Sullivan Pond wetland is neutral to alkaline, with prolific cat-tails, sedges, rushes, and rice mannagrass. This wetland type is rated among the most valuable in the Adirondack Park by the Adirondack Park Agency. A small tamarack swamp is at the north end of the pond while the rest of the pond is surrounded by white pine, although the south end has been heavily cut in recent years. The understory includes such uncommon species as pipsissewa, trailing arbutus, and Christmas fern. There is evident sign of numerous furbearers and waterfowl.

Sedges, rushes, and rice mannagrass abound at Sullivan Pond.

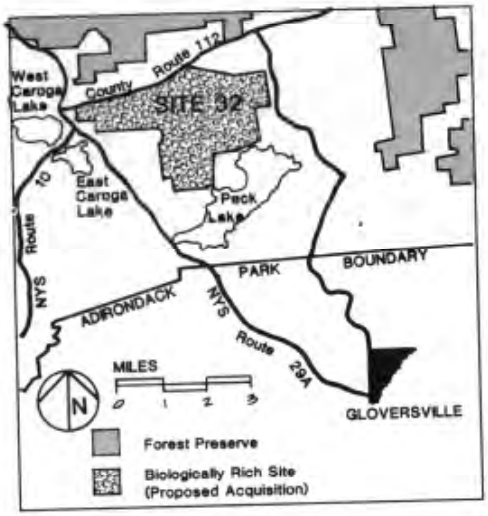
31. Three Sisters - Number Seven Mountains
Acres: 2,830 **Town:** Warrensburg **County:** Warren
NHP Comm: Beaver pond and meadow, shrub swamp, hemlock-hardwood swamp, pine-northern hardwood forest, and Appalachian oak-pine forest

The Three Sisters, Wegley, and Number Seven Mountains rise 1,000 feet directly above the Hudson River. Although a variety of vegetative types exist on the slopes and add greatly to both the flora and fauna diversity, the white pine stands on the ledges and plateaus of the mountains and the hemlock stands overlooking the Hudson River from Wegley Mountain are particularly distinguishing. Sedimentary rock layering in the mountains is reflected in bands of vegetation. Three wetland complexes on the east side of the mountains, the forested Lockwood Swamp and two *Sphagnum*-leatherleaf-sedge wetlands, add to the diversity of the area. This distinctive combination of the river bottom land, hardwood mountain slopes including both oak and northern hardwood stands, pine plateaus, and wetlands results in a great variety of species of small mammals and birds as well as vegetation.



32. West Stony Creek Headwaters
Acres: 3,900 **Towns:** Bleecker, Caroga **County:** Fulton
NHP Comm: Sedge meadow, shrub swamp, hemlock-hardwood swamp, red spruce-balsam fir swamp, pine-northern hardwood forest, and Appalachian oak-pine forest

This area of multiple ecosystems is a complex mix of vegetative cover types including pockets of white pine and hemlock scattered throughout a forest generally made up of the northern hardwoods and oaks. Smaller stands of mixed woods occur along streams on the easterly portion of the area as does a spruce-fir swamp. There are pockets of both heath and sedge wetlands as well as forested swamps.



Wildlife Restorations

Forest Preserve status or other stringent protection for the two major project areas, fourteen exemplary communities, and thirty-two biologically rich sites described above will go a long way toward preserving the considerable biological diversity of today's Adirondack Park. But what about those species lost in the nineteenth century's rush to exploit the Adirondacks? The extinction of the moose, wolf, cougar, wolverine, and lynx is a significant loss of biological diversity.

Unlike most other areas of our increasingly exploited planet, the Adirondacks are wilder today than they were in 1888. The public has acquired nearly two million acres in the last century. This land is now part of the state's Adirondack Forest Preserve, which must remain "forever wild". Today's forest products industry manages much of the private land in the Adirondack Park on a sustained yield basis compared to the "cut and run" mentality of the nineteenth century.

Could the restoration of wildlife species once native to the Adirondacks be successful? Such efforts already appear to be succeeding for the peregrine falcon and the bald eagle, though it is still too early to be certain. Studies have shown that there is a good likelihood that the Canada lynx can be successfully restored to the Adirondacks, and an effort to do so is presently underway.

What about the moose? . . . the wolf? . . . the wolverine? . . . the cougar? Only sound biological studies can give us a good indication of whether or not the restoration of these species might work. Already the moose seems to be making a restoration attempt on its own with a dozen or so moose now roaming the Adirondacks. But for the other species, and probably to secure a breeding population of moose also, sound restoration programs — when indicated to be biologically feasible by objective studies — will be

Moose may again be getting a foothold in the Adirondacks after a century's absence.

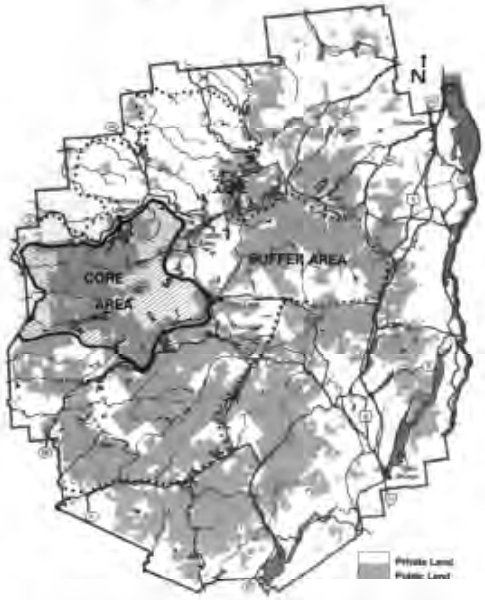
necessary. We recommend that such feasibility studies be undertaken at once by the SUNY College of Environmental Science and Forestry in cooperation with the NYS Department of Environmental Conservation.

In the meantime, the wildness that we have today in the Adirondack Park must be protected if not increased. Unfortunately, many of the large land holdings of the forest products industry and individual estate ownerships appear on the verge of breaking up. The state must act quickly, for once these parcels are subdivided and public roads opened within them, the dream of once again hearing the howl of the wolf in the Adirondacks will be just that — a dream. And the thrill of seeing a 1,200 pound bull moose feeding at the marshy edge of an Adirondack pond will remain elusive.

Three research projects, one from Minnesota, one from Wisconsin, and one from Ontario, give an idea of the measure of wildness necessary for such species. In these studies, Mech et al. (1988), Thiel (1985), and Jensen (1986), found that eastern timber wolves were unlikely to repopulate an area if the public road density exceeded 0.58 kilometers per square kilometer (0.93 miles per square mile) of habitat. It is not the roads that prevent wolves from inhabiting areas with a road density exceeding 0.58 kilometers per square kilometer, it is "the accessibility they allow humans who deliberately, accidentally, or incidentally kill wolves by shooting, snaring or trapping. Furthermore, road densities may be associated with different types of land use, which may also affect wolf security." (Mech 1988). In the Adirondack Park we have identified a contiguous area of 2,230,000 acres with an interior public road density of only 0.08 miles per square mile, including a core area of 440,000 acres that is essentially roadless (see Figure 10). Even when the exterior boundary roads are included in the calculation, the public road density factor for this large area is only 0.10 miles per square mile, well below the critical factor indicated by research. Caution in drawing conclusions from these numbers is prudent. They do not reflect the mileage of private roads, much of which is open to large numbers of lease holders as well as landowners. Furthermore, road density is but one factor in determining restoration potential. Other factors, such as human density and public support, may be equally important. Still, road density is a critical factor, and much of the Adirondack is remote and wild.

It would seem prudent to preserve or enhance the inaccessibility and wildness of this area until biological studies and public opinion have determined the feasibility of restoring the wolf, the moose, the wolverine, and perhaps other former Adirondack inhabitants to this potentially suitable habitat. Land ownership patterns and uses that maintain wildness must be preserved in at least the core area illustrated on Figure 10. Changes in the buffer area should be minimized outside of existing communities.

Figure 10: MOST PROMISING WOLF RESTORATION HABITAT



The Adirondacks may once again be wild enough to be called home by species whose original habitat was destroyed by careless human intervention a century ago. If so, the Adirondack Park will have led the way again, showing other states and nations that wildness can be restored and preserved, and that humans can live in harmony with the natural world.

Photos of Ontario

Objective biological studies should be undertaken to determine if the timber wolf could once again survive in the Park.

VI. To Be Continued . . .

The forty-six specific sites and two major project areas described in the preceding chapter include a substantial portion of the biologically important private sites in the Adirondack Park. Although they result from an extensive ground and aerial survey of the Park and include sites recommended by some of the most knowledgeable biologists familiar with the Park, other sites of equal or perhaps even greater biological importance undoubtedly exist within the Park, and these sites also need to be protected. The Adirondack Council and the author will continue to update this biological survey of the Park in the continuing process of developing 2020 VISION.

In the meantime, it is hoped that the New York State Department of Environmental Conservation will investigate the sites recommended in this study and move quickly to provide lasting protection for them. In this way, the public can insure that the Adirondack Park of the twenty-first century will include the widest possible array of native plant and animal species.

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Appendix A

Inventory of Exemplary Communities on the Adirondack Forest Preserve

The publicly-owned Adirondack Forest Preserve is blessed with great natural diversity. This study inventoried twenty-eight sites that exemplify some of the principal vegetative cover types of the Adirondack Park. Exemplary communities are defined as those vegetative communities and their associated wildlife that can serve as outstanding examples of the principal ecological communities within the Park. Table 2 on page 32 illustrates the cross-section of Forest Preserve sites inventoried and indicates that if the private sites inventoried are acquired, the Forest Preserve will contain at least one exemplary community of each of the Park's sixteen principal cover types. (Two of the sites in this inventory are privately owned rather than Forest Preserve but are protected by a restrictive conservation easement held by the State of New York and are open to the public.)

1. Ampersand Mountain Old Growth
Cover Type: Northern Hardwoods
Acres: 1,400 **Town:** Harrietstown **County:** Franklin
NHP Comm: Hemlock-northern hardwood forest

This hemlock-northern hardwood forest is the most spectacular and accessible old-growth stand in the Adirondack Park. Located west of the Village of Saranac Lake on the south side of Route 3 between Halfway Brook and the Bartlett Carry Road, it is the largest known sugar maple-yellow birch-hemlock old-growth stand in the Adirondack Park. Several short, unmarked trails between Halfway Brook and South Inlet provide easy visitor access to this stand. One venerable old yellow birch measures fifty-eight inches in diameter, and stately sugar maple up to three feet in diameter are common. But it is the extensive, towering, nearly pure hemlock stands of trees up to three feet in diameter that make this forest truly unique. The area is bisected with numerous crystal clear streams. Fern beds and polypody-capped glacial erratics are scattered about. At least thirty-five species of birds are summer residents of the area including the handsome Blackburnian warbler and the crested flycatcher, two species that favor these relatively rare old-growth stands. Although the area escaped disastrous fires and ravenous logging, there is some indication that a few large white pine and red spruce may have been removed from the area over a century ago.

2. Dead Creek Flow Old Growth and Successional Forests
Cover Type: Northern Hardwoods
Acres: 400 **Town:** Clifton **County:** St. Lawrence
NHP Comm: Pine-northern hardwood forest, hemlock-northern hardwood forest, and successional northern hardwoods

Another reasonably accessible, although this time by boat, old-growth hemlock-northern hardwood stand is located in the Five Ponds Wilderness on the east side of Cranberry Lake's Dead Creek Flow. The ten to fifteen acre old-growth stand, with its forty inch diameter yellow birch and hemlock, was never logged, and it was not ravaged by the many fires that skirted the area. This site also allows field study in natural northern hardwood succession. By hiking southeast one-half mile through an old-growth northern hardwood forest and coming to the southern point of the ridge, one enters a nearly pure pine stand that took over this slightly drier site after the fires of the 1880's. Scattered about in the pine forest are the largest bigtoothed aspen known in the Park: trees thirty-two inches in diameter. Both quaking and bigtoothed aspen no doubt took over the site after the fire and nurtured an understory of pine. The shorter-lived quaking aspen is gone now and only isolated bigtoothed aspen remain. Continuing south into the Black Duck Hole drainage and then heading southwest, a nearly perfect example of northern hardwood succession is encountered on the knoll immediately to the north of Black Duck Hole. There is an overstory of intolerant quaking aspen that came in following the fire of 1916, an understory of mid-tolerant yellow birch, and a ground cover of tolerant red spruce and sugar maple seedlings.

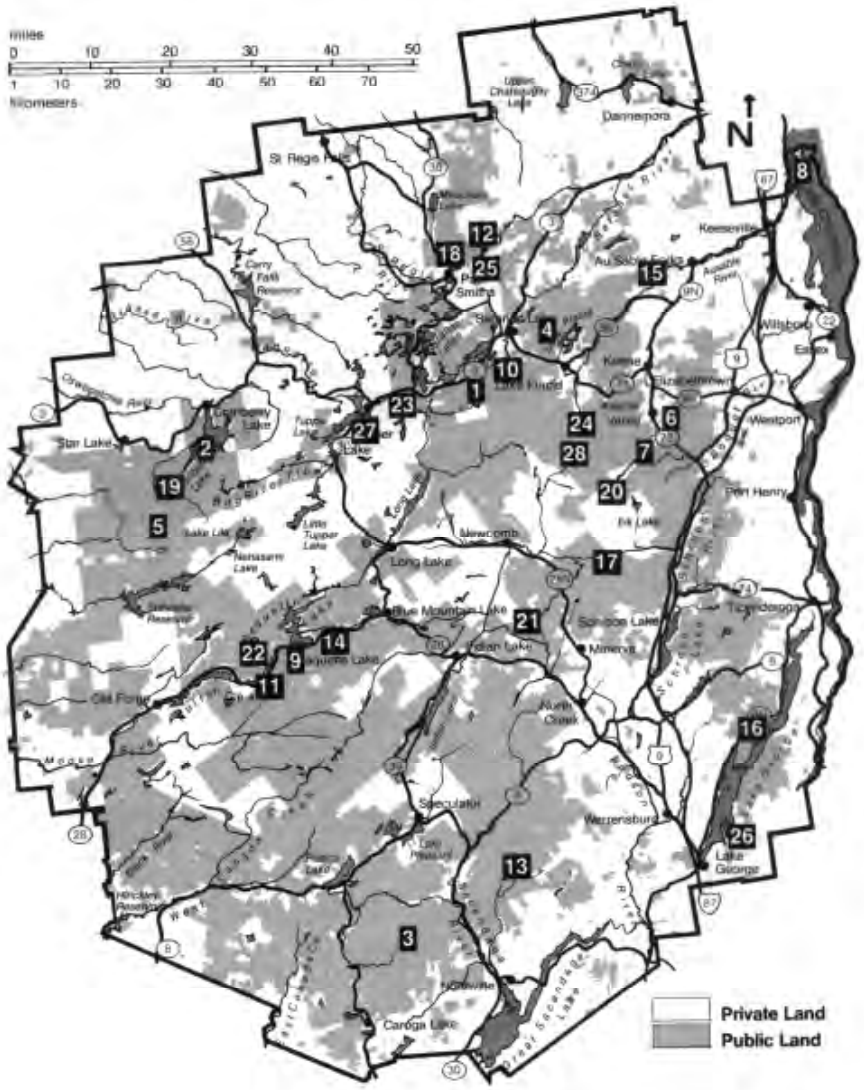
3. Three Ponds Mountain Old Growth
Cover Type: Northern Hardwoods
Acres: 20 **Town:** Benson **County:** Hamilton
NHP Comm: Hemlock-northern hardwood forest

Another stand of huge sugar maple, yellow birch, hemlock, and red spruce is found on the southwestern slopes and summit of Three Ponds Mountain in the Silver Lake Wilderness. Yellow birch over four feet in diameter and eighty feet tall are scattered throughout this stand while spectacular specimens of hemlock and red spruce are found near the drainages. This stand is a two to three mile hike from the trailhead at Upper Benson.

4. Mount Tamarac Old Growth
Cover Type: Northern Hardwoods
Acres: 300 **Town:** North Elba **County:** Essex
NHP Comm: Spruce-northern hardwood forest

This old-growth stand of sugar maple, yellow birch, and red spruce is located on the eastern-facing slope of Mount Tamarac in the McKenzie Mountain Wilderness north of Lake Placid. Access to this site is from the former town road that connects Whiteface Inn to McKenzie Pond, although it is necessary to bushwhack steep slopes. Access up the Two Brooks drainage on the trail to Bartlett Pond is also possible but depends on the continued cooperation of the shoreowners on the west shore of Lake Placid.

Figure 1: ADIRONDACK FOREST PRESERVE EXEMPLARY COMMUNITIES



5. Five Ponds Wilderness Old Growth
Cover Type: Northern Hardwoods
Acres: 47,326 **Town:** Webb **County:** Herkimer
NHP Comm: Poor fen (R), hemlock-northern hardwood forest, pine-northern hardwood forest, spruce-northern hardwood forest, spruce flats, red spruce-balsam fir swamp, sedge meadow, beaver pond and meadow, and shrub swamp

The southern half of the Five Ponds Wilderness, between Stillwater Reservoir and the Herkimer County-St. Lawrence County line, contains the largest contiguous area of unharvested forestland in the northeastern United States, some 47,326 acres. Some of the area has, however, been burned and also suffered from a catastrophic windstorm in November 1950. Many old-growth areas do occur, however, and since both fire and windstorm are natural occurrences, much can be learned from this large area that has been left unaffected by human disturbance. The Society of American Foresters has established three natural areas within the tract to reflect typical forest site types: white pine, red spruce-sugar maple-beech, and red spruce-yellow birch. The most interesting of these is the old-growth stand of red spruce and yellow birch. The red spruce on this site average one hundred feet in height with an average diameter of approximately twenty-two inches. The yellow birch averages ninety feet in height with an average diameter of twenty inches. The average age for the stand is 225 years. Another impressive stand of old-growth sugar maple and yellow birch, some exceeding four feet in diameter, is located in nearby lot 15 of Watson's East Triangle, just to the west of the Wilderness. The primeval character of southern Five Ponds Wilderness surely makes it one of the most valuable tracts of Forest Preserve (from a natural diversity standpoint) in the Adirondack Park. The existence of two major wild rivers within the area also adds to its allure.

6. Roaring Brook Falls Old Growth Hemlock
Cover Type: Northern Hardwoods (Hemlock)
Acres: 170 **Town:** Keene **County:** Essex
NHP Comm: Hemlock-northern hardwood forest

A lovely old-growth stand of pure hemlock just above Roaring Brook Falls in the southwesterly corner of the Giant Mountain Wilderness is easily accessible by a foot trail from Route 73 at the foot of Chapel Pond Pass. This is one of the oldest, although not largest, stands of hemlock in the Adirondack Park with trees dating back to 1599 (Cook 1987). It is a pleasant, moderately steep, one-half mile hike from the highway.

7. Ausable Club Old Growth
Cover Type: Northern Hardwoods (Hemlock)
Acres: 1,150 **Town:** Keene **County:** Essex
NHP Comm: Hemlock-northern hardwood forest

Perhaps the most beautiful and majestic stand of old-growth hemlock and northern hardwoods in the Adirondack Park is located on Ausable Club lands between the High Peaks Wilderness and the Mount Dix Wilderness south of Keene Valley. Although private land rather than Forest Preserve, the state holds a conservation easement on these lands which assures public access and restricts timber harvesting and development. Hemlock three feet in diameter and ninety to one hundred feet tall are not uncommon. Hemlock predominates in the stand, although there are some large specimens of sugar maple and yellow birch as well.

8. Valcour Island
Cover Type: Northern Hardwoods/Mixed Woods
Acres: 1,100 **Town:** Peru/Plattsburgh **County:** Clinton
NHP Comm: Limestone woodland, calcareous cobble shore, calcareous shoreline outcrop, calcareous lakeshore, and northern white cedar swamp (R)

Valcour Island in Lake Champlain is renowned for natural values as well as historical significance. Its thin but rich soils over limestone bedrock produce diverse forests of white cedar, white spruce, balsam fir, sugar maple, and hop hornbeam. In addition to the northern hardwoods and mixed forest, a fifteen acre cedar swamp and three uncommon shore communities — calcareous lakeshore, calcareous cobble shore, and calcareous shoreline outcrop — exist. A great blue heron rookery and at least seven rare or imperiled (statewide) plants add to the area's biological diversity.

9. Eighth Lake Old Growth
Cover Type: Mixed Woods
Acres: 300 **Town:** Inlet **County:** Hamilton
NHP Comm: Rich hemlock-hardwoods swamp (R)

This classic, rich old-growth mixed wood site is immediately south of Route 28 approximately one-half mile north of Eighth Lake between exemplary sites 11 and 14. An unmarked but quite clear trail enters the area from Route 28. Predominant species are red maple, red spruce, yellow birch, and hemlock. The ground cover includes infrequent leafy liverworts, such as *Trichocolea tomentella*, and mosses, such as *Anomodon attenuatus*, that indicate a rich, moist habitat, much more fertile than the typical mixed wood site of the Park. The luxuriant growth of the epiphytic *Neckera pennata* on the hardwood trunks is another indicator of a very productive site. The absence of sugar maple reflects the site's wetness and is characteristic of mixed wood sites.

10. Cold Brook Floodplain
Cover Type: Mixed Woods
Acres: 80 **Town:** Harrietstown **County:** Franklin
NHP Comm: Spruce flats

The Lower Cold Brook floodplain contains impressive old-growth mixed woods in a very wild setting. The red spruce in particular stand out for their size. This mixed wood forest occurs along the lower one and a half miles of Cold Brook, a location which was apparently missed by the forest fire that burned on either side of it.

11. Cathedral Pines
Cover Type: Pine (White)
Acres: 1 **Town:** Inlet **County:** Hamilton
NHP Comm: Pine-northern hardwood forest

A small but spectacular and easily accessible stand of a dozen old-growth white pine lies only one hundred yards off Route 28 near the north end of Seventh Lake in the Fulton Chain of Lakes. An unmarked but distinct trail makes access easy and leads to these majestic pines that soar one hundred feet in the air and have a diameter of three and one-half to four feet. This cathedral-like natural setting offers an ideal educational opportunity, particularly in conjunction with sites 9 and 14, giving Park visitors an opportunity to view three old-growth stands of different forest types, all within one-quarter of a mile of Route 28 between Seventh Lake and Raquette Lake. This particular grove of pines displays deeply furrowed bark reminiscent of West Coast Douglas-fir, a sure sign that the trees are more than 200 years old.

12. Meenahga Mountain Pine
Cover Type: Pine (White)
Acres: 730 **Town:** Brighton **County:** Franklin
NHP Comm: Pine-northern hardwood forest

An extensive old-growth white pine and red spruce forest lies along an east-west ridge, Meenahga Mountain, northwest of Rainbow Lake. Numerous white pine in this stand soar to 130 feet and are four feet in diameter. Red spruce two feet in diameter and seventy-five feet in height are common. Access at present is difficult, necessitating a small boat to enter from the south. Better access should be acquired by the state, across commercial timberlands, to open a northerly approach to this magnificent stand.

13. Pine Orchard
Cover Type: Pine (White)
Acres: 50 **Town:** Wells **County:** Hamilton
NHP Comm: Pine-northern hardwood forest

Pine Orchard is a lovely knoll of old-growth white pine in the Wilcox Lake Wild Forest area a half dozen miles east of the community of Wells. Core samples date the origin of these magnificent trees back to the early nineteenth century. Diameters of the dominate trees average thirty-five inches with the largest tree having an impressive diameter of fifty-four inches.

14. South Inlet Pine
Cover Type: Pine (Red)
Acres: 10 **Town:** Arietta **County:** Hamilton
NHP Comm: Pine-northern hardwood forest and shallow marsh

A small, easily accessible stand of all-aged native red pine is located on a small nubbin next to and south of Route 28 adjacent to the South Inlet of Raquette Lake. A walk of less than one hundred yards puts one in the center of this stand where the fifteen to twenty inch diameter red pine dominate with associated white pine, hemlock, spruce, and balsam fir. As in sites 9 and 11, this readily accessible red pine stand should be part of an Adirondack Park interpretive program. In addition to this example of a rare native red pine stand, an interesting sedge-leatherleaf-white cedar wetland is located immediately west of the pine, offering further interpretive opportunity.

15. Black Brook Red Pine
Cover Type: Pine (Red)
Acres: 580 **Town:** Black Brook **County:** Clinton
NHP Comm: Pine-northern hardwood

The native red pine stand bisected by the Black Brook-Haselton road near the county line south of Black Brook is quite possibly the best red pine site in the entire Northeast. Here, unlike in most northeastern red pine stands, the red pine is of a variety of ages and is clearly regenerating itself, reminiscent of the extensive red pine forests of the northern Lake States. Trailing arbutus is found in the understory.

16. Tongue Mountain Range
Cover Type: Oak-Pine
Acres: 8,600 **Towns:** Bolton/Hague **County:** Warren
NHP Comm: Appalachian oak-pine forest

The Tongue Mountain Range juts into Lake George from the north. As a result of the moderating climatic influence of the Lake, this peninsula is forested with an oak-pine-hickory forest quite unusual in the Park. "Here native chestnut and timber rattlesnake are side by side with hermit thrushes." (Clarke 1970). Access to this area is excellent from Route 9N as well as from the lake itself. Several short, moderately steep trails allow exploration of the area.

17. Durgin Brook
Cover Type: Coniferous Swamps, Bogs, and Fens
Acres: 2,110 **Town:** North Hudson **County:** Essex
NHP Comm: Red spruce-balsam fir swamp and northern white cedar swamp (R)

This extensive stand of red spruce, balsam fir, and white cedar with associated white spruce, white pine, and tamarack is one of the largest accessible coniferous forests in the Park. The site burned early in the century and is essentially an even-aged forest. It serves well as an exemplary red spruce-balsam fir forest.

18. Osgood River Muskeg
Cover Type: Coniferous Swamps, Bogs and Fens
Acres: 1,750 **Town:** Brighton **County:** Franklin
NHP Comm: Black spruce-tamarack swamp (R)

As one canoes out of Osgood Pond and paddles down the Osgood River, an extensive black spruce forest comes into view on the east side of the river. On the west side, an open sedge mat with scattered black spruce reminds the canoeist of the Canadian muskeg. The black spruce forest stays with the traveler for nearly two miles until just below the confluence of a stream from the east and shortly before the "Stone Dam" is encountered.

19. The Oswegatchie Plains
Cover Type: Coniferous Swamps, Bogs, and Fens
Acres: 150 **Town:** Fine **County:** St. Lawrence
NHP Comm: Not identified

The Oswegatchie Plains are located in the Glasby Creek drainage just north of the Oswegatchie River in the heart of the Five Ponds Wilderness. We know from early explorers that the "Plains" have been an open, grassy, brushy area with scattered trees since at least 1815. This savannah-like area in a region of dense forest is undoubtedly related to microclimate (frost pocket) and soils (usually droughty) with fire and wind-throw also playing a possible role. The only tree species that occur in the area are black spruce, tamarack, white pine, and black cherry. Black spruce in this area is particularly interesting as its method of reproducing by "layering" in red-stemmed moss is so conspicuous; the lower limbs of the black spruce touching the soil are engulfed by the upward growth of moss, which provides an ideal environment for the individual branches to take root, producing a ring of second generation trees around the "mother tree". The only other "Plains" areas in the Adirondack Park comparable to the Oswegatchie Plains, although without the same openness, are the "Moose River Plains" in the town of Inlet, Hamilton County, and the "Oregon Plains" in the town of Franklin, Franklin County.

20. Marcy Swamp
Cover Type: Coniferous Swamps, Bogs, and Fens
Acres: 220 **Town:** North Hudson **County:** Essex
NHP Comm: Northern white cedar swamp (R)

Old-growth white cedar characterizes Marcy Swamp through which thousands of hikers march each year on their way to the High Peaks from Elk Lake. Large white cedar two feet in diameter and up to forty feet high predominate with both red spruce and balsam fir as common associates.

21. Kettle Mountain Swamp
Cover Type: Coniferous Swamps, Bogs, and Fens
Acres: 160 **Town:** Minerva **County:** Essex
NHP Comm: Northern white cedar swamp (R)

Many would call this nearly impenetrable white cedar swamp the true "dismal swamp". High winds have blown over many trees and the upturned root masses, coupled with the swamp characteristics, make travel difficult at best. The cedar undoubtedly reflect the area's marble bedrock and calcareous soils. This swamp is located on the north side of Kettle Mountain approximately one-half mile south of the Northwoods Club Road in the Hudson River Gorge Primitive Area.

22. Ferd's Bog
Cover Type: Coniferous Swamps, Bogs, and Fens
Acres: 170 **Town:** Long Lake **County:** Hamilton
NHP Comm: Poor fen (R) and black spruce-tamarack swamp (R)

Ferd's Bog is located just one-half mile north of the Uncas Road in the southern extreme of the Pigeon Lake Wilderness. This bog (actually a fen) is one of the prime Adirondack birding areas, reflecting boreal species found nowhere else in New York State except the limited boreal and bog habitat of the Adirondacks. Species of particular importance include the black-backed three-toed woodpecker, the northern three-toed woodpecker, the boreal chickadee, yellow-bellied flycatcher, spruce grouse, Canada (grey) jay, and rusty blackbird. The bog is surrounded by black spruce and tamarack with the bog proper exhibiting the typical *Sphagnum*, bog rosemary, bog laurel, leatherleaf, and Labrador tea with an open water pond in the center.

23. Philosopher's Landing Floodplain
Cover Type: Swamp Hardwoods
Acres: 610 **Town:** Harrietstown **County:** Franklin
NHP Comm: Floodplain forest

The Raquette River floodplain from the confluence of the Raquette River and the Follensby Pond Outlet to the Philosopher's Landing (a/k/a Trombley Landing) is characterized by a marvelous old-growth silver maple stand. The first goldeneye ducks reported nesting in the Adirondack Park were observed in this area in 1941 (Benson 1988), perhaps using pileated woodpecker's cavities in these old, huge silver maples for their nesting sites.

24. Phelps Brook Old Growth
Cover Type: Upper Spruce Slope
Acres: 180 **Town:** North Elba **County:** Essex
NHP Comm: Mountain spruce-fir forest

One of the few stands of timber in the High Peaks that was not consumed by the ravenous 1903 and 1908 forest fires is an old-growth red spruce and balsam fir forest on an unnamed mountain (elevation 3,720) south of Phelps Brook above Marcy Dam. Unfortunately, this remnant stand is today in serious decline, probably as a result of acid precipitation. It is still, at least for a while, one of the best examples of an old-growth mountain spruce-fir forest in the Adirondack Park.

25. Jones Pond Outlet
Cover Type: Marshes
Acres: 60 **Town:** Brighton **County:** Franklin
NHP Comm: Black spruce-tamarack swamp (R), deep emergent marsh, and shallow marsh

The emergent marsh at the outlet of Jones Pond is not only rich in vegetative diversity and biomass production but also provides the greatest wetland fauna diversity known in the Adirondack Park. A large patch of round stem bulrush gives way to a main channel choked with cat-tail and myriad small openings. These provide a maze of waterways each becoming a potential territory for ducks, coots, and gallinules. Through the outlet the vegetation changes from calcareous to acid and a black spruce bog emerges on the southwesterly side with its characteristic ericaceous growth and *Sphagnums*. The great blue heron, green heron, American bittern, swallows, wrens, warblers, and a half dozen species of ducks — including the uncommon ring-necked duck —abound.

26. Dunham's Bay Wetlands
Cover Type: Marshes
Acres: 1,220 **Town:** Queensbury **County:** Warren
NHP Comm: Deep emergent marsh, shallow marsh, shrub swamp, rich red maple-tamarack swamp (R), and poor fen (R)

Dunham's Bay Marsh is one of the largest wetland complexes in the Adirondack Park. It includes significant productive marshland, fens, shrub swamp, and forested wetlands. The great value of its biologic diversity, as well as its importance in protecting the water quality of Lake George, made it one of the first acquisition projects undertaken by the Adirondack Conservancy Committee of The Nature Conservancy. As a result, most of the marsh, but not all, is now part of the Adirondack Forest Preserve.

27. Tupper Lake Marsh
Cover Type: Marshes
Acres: 1,100 **Town:** Altamont **County:** Franklin
NHP Comm: Deep emergent marsh

In early 1988, the state acquired the extraordinarily rich emergent marsh where the Raquette River empties into Tupper Lake. Route 30 passes through this marsh a few miles south of the Village of Tupper Lake, making it an ideal exemplary marsh accessible to all.

28. High Peaks Tundra
Cover Type: Alpine Tundra
Acres: 85 **Towns:** Keene, Newcomb, North Elba, Wilmington
County: Essex
NHP Comm: Alpine meadow (R)

The eighty-five acres of alpine vegetation scattered among twenty of the "High Peaks" is similar to vegetation usually found hundreds or more miles north in arctic Canada. These alpine species — over a dozen rare, threatened, or endangered — are survivors from the frigid Pleistocene epoch, including the Lapland rosebay, *Diapensia*, bearberry, herbaceous willow, dwarf and glandular birches, and alpine bilberry. These delicate meadows are of continental significance as the southernmost extension of alpine tundra in the eastern United States. Visitors to this fragile zone are urged to stay on established trails and not destroy the Adirondack Park's unique throwback to the Ice Age.

Appendix B

Concepts of Plant Succession, Climax Communities, and Shade Tolerance

No ecosystem is static. The living community is constantly in flux and even the physical environment changes with time.

Plant succession is the most important concept in understanding a natural area's past or its future course. Natural succession is a never-ending re-adjustment of plant populations in response to disturbances. The theoretical end result is a stable plant community that will perpetuate itself with limited variability. This is the climax theory, in which the final successional stage, the "climax", is in equilibrium with the environment (Davis 1977). Even in climax communities, broadly defined, many successional stages may be seen where species come and go and stabilize in response to local disturbances, such as spring flooding, windfalls, or insect epidemics.

Species diversity varies with successional stages. The greatest diversity has recently been found to occur in old-growth, climax forests (Franklin 1983, Schoen et al. 1981, Juday 1978, Norse et al. 1986) as illustrated in the diagram on the following page.

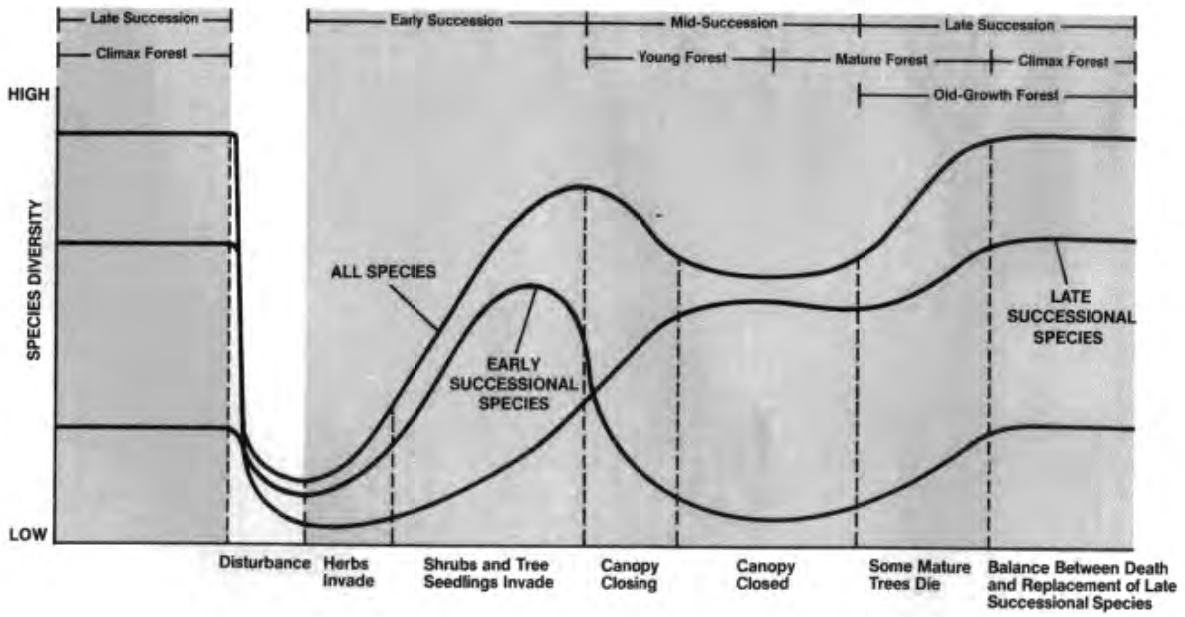
Table 1 illustrates typical stages in Adirondack site succession; secondary succession can start at any of the steps prior to the climax community.

Table 1: STAGES IN ADIRONDACK SUCCESSION

STAGE	DRY AREAS	WET AREAS
1	rock or dry soil	water
2	lichens	submerged plants
3	mosses	floating plants
4	annual herbs	emergents, (e.g. cat-tails)
5	perennial herbs/grasses	sedges/*Sphagnum*
6	shrubs	shrubs
7	trees intolerant of shade	trees intolerant of shade
8	mid-tolerant trees	mid-tolerant trees
9	tolerant trees (climax)	tolerant trees (climax)

On private lands in the Adirondack Park where timber harvesting is practiced, the land managers will often try to hold succession at step number 8, mid-tolerant trees. They do this because trees with a tolerance for some shade, but not dense shade, generally include the higher commercial value species. Thus, as a forest of mid-tolerant trees matures, it will often be cut not only to harvest the timber crop but also to reduce the shade on the site. These trees of mid-tolerance will then be able to reproduce themselves.

Figure 1: CHANGES IN PLANT SPECIES DIVERSITY DURING SUCCESSION IN AN IDEAL FOREST
(from Norse et al. 1986)



After a major disturbance such as a severe forest fire or a clear-cut, species diversity climbs as many early successional and a few late successional plants sprout from below ground or germinate from seeds. It peaks roughly when early successional species peak while late successional species are increasing. When the trees' canopy layer closes, shade-intolerant early successional species decline faster than shade-tolerant late successional species rise, so species diversity falls. It rises again when the deaths of mature trees create light gaps (which are invaded by some early successional species), snags and fallen logs. When late successional trees replace themselves, the forest has reached the climax stage, in which species composition might fluctuate but shows little directional change. Species diversity at the late successional stages can vary markedly. Therefore, diversity at climax might be higher or lower than at some earlier stages. Animal species diversity roughly parallels plant species diversity.

Although many site conditions influence the species of vegetation in any specific area, one of the most important factors in determining the composition of a forest is the individual tree species' need for direct sunlight or, conversely, its tolerance for shade. An understanding of the shade tolerance of Adirondack trees helps the naturalist better understand the history of today's forest. For instance, a forest comprised of shade intolerant trees such as paper birch, pin cherry, and quaking aspen is probably a first generation forest preceded by fire or perhaps agricultural uses. A forest of shade tolerant species, such as sugar maple and beech, is probably a second or third generation forest, having been preceded by a forest of mid-tolerant species which, in turn, was perhaps preceded by a forest of the sun-loving, shade intolerant species.

Table 2 is included to assist the reader in better understanding and enjoying Adirondack forests.

Table 2: SHADE TOLERANCE OF ADIRONDACK TREE SPECIES

VERY TOLERANT	INTOLERANT
hemlock	black ash
American beech	green ash[2]
sugar maple	black cherry
red spruce	chestnut oak[2]
balsam fir	red pine
eastern hop hornbeam[1]	pitch pine
American hornbeam[1]	Scots pine*
	bitternuthickory[2]
	butternut
TOLERANT	paper birch
black spruce	sassafras[2]
white spruce	slippery elm[2]
Norway spruce*	American sycamore
northern white cedar	downy serviceberry
red maple	hawthorne
silver maple	apple
striped maple	pin cherry
mountain maple	common chokecherry
box-elder[1]	mountain paper birch
American basswood[1]	American mountain-ash
black tupelo[2]	showy mountain-ash
MID-TOLERANT	VERY INTOLERANT
yellow birch	balsam poplar
sweet birch[1]	eastern cottonwood
American chestnut	bigtooth aspen
northern red oak	quaking aspen
American elm	Bebb willow
eastern white pine	shining willow
white oak	black willow
swamp white oak[2]	gray birch
rock elm	black locust*
white ash	jack pine
black oak[2]	tamarack
bur oak[2]	
eastern red cedar	
shagbark hickory[2]	
hackberry[2]	
hockthorn*[2]	

* Non-native species now naturalized within the Park.

[1] Less tolerant on acidic soils or higher elevations.

[2] Since the Adirondack Park is on the periphery of this species range it is likely to be less tolerant here.

Appendix C

Glossary

abiotic — Nonliving component of the environment, including soil, water air, light, nutrients, and the like.[1]
anthropocentric — Interpreting nature exclusively in terms of human values and experiences.[2]
association — Natural unit of vegetation characterized by a relatively uniform species composition and often dominated by a particular species.[1]
barrens — Area of sparse vegetation with bare soil, rocks, or organic litter dominating the ground surface.
biomass — Weight of living material, usually expressed as dry weight per unit of area.
biome — Major regional ecological community of plants and animals.[1]
biosphere — Thin layer about Earth in which all living organisms exist.[1]
biota — Animal and plant life of a region.
bog — Wetland ecosystem characterized by an acidic accumulation of peat, acidic conditions, and dominance of *Sphagnum* moss[1]; dependent upon precipitation for sole water supply.
bog, blanket — Continuous bog covering terrain, slopes and all; rare in North America.[3]
bog, flat — Bog with a flat cross-section.[3]
bog, quaking — Bog or fen with a mat of *Sphagnum* over water.
bog, raised — Bog with a convex cross-section.[3]
boreal — Of or pertaining to the forest area and tundras of the north temperate zone and arctic regions.[2]
boreal forest — Needle-leafed evergreen or coniferous forest bordering sub-polar regions; also called taiga[1]; characterized by balsam fir, black spruce, white spruce and tamarack.
bryophyte — Member of the division of the plant kingdom of nonflowering plants, comprising mosses, liverworts, and hornworts.[1]
canopy, forest — Upper leaf layer of the forest.
carr — Alder and willow-dominated wetland adjoining water course[4]; often on eutrophic peat.[1]
climax — Stable end community of succession that is capable self-perpetuation under prevailing environmental conditions.[1]
community — Group of interacting plants and animals inhabiting a given area.[1]
conifer — Cone bearing tree.
conservation easement — Legally binding agreement that restricts type and amount of development that may take place on a parcel of land; it becomes a permanent part of the title regardless of future ownership.
deciduous — Wood vegetation that loses all of its leaves or needles annually.
delta — Alluvial deposit at the mouth of a river.[5]
ecology — Study of the interrelationships existing between plants, animals, and their environments; the interrelationships themselves.
ecosystem — Biotic community of an area combined with its physical environment and the dynamic interaction and energy flow between the two.
ecotone — Transition zone between two structurally different communities.[1]
edge effect — Response of organisms, animals in particular, to environmental conditions created by the edge or ecotone.
environment — Total surroundings including living organisms and physical resources.
epiphyte — Organism that lives wholly on the surface of plants, deriving support but not nutrients from the plants.[1]
ericaceous — Belonging to the heath family of plants.
esker — Long, narrow ridge of coarse sand or gravel deposited by a stream flowing in an ice-walled valley in a decaying glacial ice sheet.[2]
eutrophication — Nutrient enhancement of a body of water.[1]
exfoliating — Coming off in layers or sheets.
extirpated — Exterminated in a portion of a species original range.
fauna — Animal life of an area.
fen — Wetland ecosystem dominated by sedges and *Sphagnum* moss in which the water source is by ground water as well as direct precipitation.
fen, poor — Strongly acid fen low in nutrients.[3]
fen, rich — Weakly acidic to weakly basic fen with a ground water supply high in dissolved nutrients.
floodplain — Area adjacent to a stream channel that is periodically inundated.
flora — Plant life of an area.
food chain — Movement of energy and nutrients from one feeding group of organisms to another in a series that begins with plants and ends with carnivores, detrital feeders, and decomposers.
fragipan — Hard, nearly impervious soil layer that impedes downward flow of water.
glacial erratic — Large boulder moved into present position by glacier; found randomly scattered throughout the Adirondacks.
habitat — Place where a plant or animal lives.[1]
hardpan — Fragipan.
hardwood — Broad-leafed flowering tree.
heath — Low growing shrubs.
kame — Small conical hill or short ridge of sand or gravel deposited by a glacier.
kettle — Depression, often filled with water, resulting from the burial and subsequent melting of a large ice chunk broken off from a retreating glacier.
krummholz (krumholtz) — Stunted form of trees characteristic of transition zone between alpine tundra and subalpine coniferous forest.[1]

lichens — Plants consisting of a fungus living in close combination with certain of the green or blue-green algae, characteristically forming a crust-like, foliose, or branching growth on rocks or tree trunks.[2]
liverworts — A green non-flowering plant of the bryophytes.
microclimate — Climate on a very local scale that differs from the general climate of an area.[1]
mire — Wetland characterized by an accumulation of peat.[1]
niche — Fundamental role of a species in the community, including activities and relationships.[1]
old-growth — Uneven-aged, silviculturally overmature forests that have reached a dynamic steady state condition; characterized by 3-5% canopy gaps, a wide range of tree growth and sizes, and a large quantity of dead wood, both standing and on the ground; in the Adirondacks such forests range in age from 100 to 400 years depending on the dominant species.
oxbow — U-shaped bend in a river, often isolated as ponds as a river ages.
palustrine — Perennial fresh-water wetlands.
patterned peatland — Large area of decomposed organic matter (peat) with the vegetation in a mosaic of high and low areas relative to water levels.
pioneer communities — Communities of early successional stages.
pocket wetlands — Small wetlands formed as a result of microtopographic depressions, often on slopes.
polypody — Ferns of the genus *Polypodium*, having simple or compound fronds and creeping root stocks; often found on boulders and rock ledges with minimal soil.
primary succession — Vegetational development starting from a new site never before colonized by life.[1]
raptor — Bird of prey such as hawks, owls, and eagles.
silviculture — Theory and practice of controlling the establishment, composition, constitution, and growth of forests.
site — Combination of biotic, climatic, and soil conditions that determine an area's capacity to produce vegetation.[1]
softwood — Coniferous tree.
species — Taxonomic classification consisting of organisms capable of interbreeding.
succession — Replacement in time of one kind of community by another; often progresses to a stable terminal community called the climax.[1]
taiga — Boreal coniferous forest.
talus — Broken rock slope.
terrestrial — Living or growing on land.[2]

[1] Smith, Robert Leo. 1986. *Elements of Ecology, Second Edition*. Harper and Row, NY, NY.
[2] Morris, William (Ed.). 1970. *The American Heritage Dictionary*. American Heritage and Houghton Mifflin, NY,NY.
[3] Andrus, Richard E. 1980. *Sphagnaceae (Peat Moss Family) of NYS*. State Museum Bulletin No. 442. Albany, NY.

Appendix D

Nomenclature of Species Cited

Trees[1]

alder, speckled	*Alnus incana*
apple*	*Malus* spp.
ash, black	*Fraxinus nigra*
ash, green	*Fraxinus pennsylvanica*
ash, white	*Fraxinus americana*
aspen, bigtooth	*Populus grandidentata*
aspen, quaking	*Populus tremuloides*
basswood, American	*Tilia americana*
beech, American	*Fagus grandifolia*
birch, gray	*Betula populifolia*
birch, mountain paper	*Betula cordifolia*
birch, paper	*Betula papyrifera*
birch, sweet	*Betula lenta*
birch, yellow	*Betula alleghaniensis*
box-elder	*Acer negundo*
buckthorn, common	*Rhamus cathartica*
butternut	*Juglans cinerea*
cedar, northern white	*Thuja occidentalis*
cedar, eastern red	*Juniperus virginiana*
cherry, black	*Prunus serotina*
cherry, pin (fire-cherry)	*Prunus pensylvanica*
chestnut, American	*Castanea dentata*
chokecherry, common	*Prunus virginiana*
cottonwood, eastern	*Populus deltoides*
dogwood, round-leaf	*Cornus rugosa*
elm, rock	*Ulmus thomasii*
elm, slippery	*Ulmus rubra*
elm, American	*Ulmus americana*
fir, balsam	*Abies balsamea*
hackberry	*Celtis occidentalis*
hawthorne	*Crataegus* spp.
hemlock	*Tsuga canadensis*
hickory, bitternut	*Carya cordiformis*
hickory, shagbark	*Carya ovata*
hop hornbeam, eastern	*Ostrya virginiana*
hornbeam (blue beech, ironwood)	*Carpinus caroliniana*
locust, black*	*Robinia pseudo-acacia*
maple,black	*Acer nigrum*
maple, Freeman's	*Acer rubrum X saccharinum*
maple, mountain	*Acer spicatum*
maple, red	*Acer rubrum*
maple, silver	*Acer saccharinum*
maple, striped	*Acer pensylvanicum*
maple, sugar	*Acer saccharum*
mountain-ash, American	*Sorbus americana*
mountain-ash, showy	*Sorbus decora*
oak, black	*Quercus velutina*
oak, bur	*Quercus macrocarpa*

oak, chestnut	*Quercus montana*
oak, northern red	*Quercus rubra borealis*
oak, swamp white	*Quercus bicolor*
oak, white	*Quercus alba*
pine, jack	*Pinus banksiana*
pine, pitch	*Pinus rigida*
pine, red	*Pinus resinosa*
pine, Scots*	*Pinus sylvestris*
pine, eastern white	*Pinus strobus*
poplar, balsam	*Populus balsamifera*
sassafras	*Sassafras albidum*
serviceberry, downy	*Amelanchier arborea*
spruce, black	*Picea mariana*
spruce, Norway*	*Picea abies*
spruce, red	*Picea rubens*
spruce, white	*Picea glauca*
sycamore, American	*Platanus occidentalis*
tamarack (American larch)	*Larix laricina*
tupelo, black	*Nyssa sylvatica*
willow, balsam	*Salix pyrifolia*
willow, Bebb	*Salix bebbiana*
willow, black	*Salix nigra*
willow, shining	*Salix lucida*

*Non native species now naturalized in the Park

Other Vegetation[1]

alder, speckled	*Alnus incana*
anemone, wood	*Anemone quinquefolia*
azalea, mountain	*Rhododendron prinophyllum*
bearberry	*Arctostaphylos uva-ursi*
bedstraw	*Galium* spp.
bellwort	*Uvularia* spp.
bilberry, alpine	*Vaccinium uliginosum*
birch, dwarf	*Betula minor*
birch, glandular	*Betula glandulosa*
bittersweet, American	*Celastrus scandens*
black crowberry	*Empetrum nigrum*
bladderwort	*Utricularia* spp.
blue cohosh	*Caulophyllum thalictroides*
bluebeads lily	*Clintonia borealis*
blueberry, lowbush	*Vaccinium augustifolium*
bluejoint grass	*Calamagrostis canadensis*
bog andromeda	*Andromeda polifolia v. glaucophylla*
bog laurel	*Kalmia polifolia*
bog rosemary	*Andromeda polifolia*
bulrush, slender	*Scirpus heterochaetus*
bulrush, round stemmed	*Scirpus tabernaemontanii*
bunchberry	*Cornus canadensis*
cat-tail, common	*Typha latifolia*
cliff brake, smooth	*Pellaea glabella*
climbing fumitory	*Adlumia fungosa*
cottongrass	*Eriophorum angustifolium*
crabapple	*Malus* spp.
cranberry, highbush	*Viburnum trilobum*
cranberry, large	*Vaccinium macrocarpon*
cranberry, small	*Vaccinium oxycoccos*
Cyperus	*Cyperus squarrosus*
Diapensia	*Diapensia lapponica*
Dicranum	*Dicranum undulatum*
dogwood, round-leaf	*Cornus rugosa*
duckweed	*Lemna minor*
feathermoss	*Hylocomium splendens*
fern, Christmas	*Polystichum acrostichoides*
fern, cinnamon	*Osmunda cinnamomea*
fern, long beech	*Phegopteris connectilis*
fern, marginal shield	*Dryopteris marginalis*
fern, ostrich	*Matteuccia struthiopteris*
fern, polypody	*Polypodium virginianum*
fern, royal	*Osmunda regalis*
fern, sensitive	*Onoclea sensibilis*
fern, spinulose wood (evergreen)	*Dryopteris carthusiana*
fern, sweet	*Comptonia peregrina*
ginseng, dwarf	*Panax trifolius*
goldthread	*Coptis trifolia*
ground-fir	*Lycopodium sabinaefolium*
hazel, beaked	*Corylus cornuta*
honeysuckle, fly	*Lonicera canadensis*
honeysuckle, plains	*Lonicera oblongifolia*
ivy, poison	*Toxicodendron radicans*
juniper	*Juniperus communis*
knotweed	*Polygonum douglasii*
Labrador tea	*Ledum groenlandicum*
lady's slipper, pink (white)	*Cypripedium acaule v.albiflorum*
lake-cress	*Armoracia aquatica*
Lapland rosebay	*Rhododendron lapponicum*
leatherleaf	*Chamaedaphne calyculata*
lily-of-the-valley, wild	*Pyrola americana*
lilypads	*Nymphaea odorata*
lovegrass	*Eragrostis hypnoides*
mannagrass	*Glyceria acutiflora*
mannagrass, rice	*Glyceria canadensis*
moss, red-stemmed	*Pleurozium schreberi*
nanny-berry	*Viburnum lentago*
orchid, grass pink	*Calopogon tuberosus*
panic grass	*Panicum flexile*
pickerel-weed	*Pontederia cordata*
pipsissewa	*Chimaphila umbellata*
pitcher plant	*Sarracenia purpurea*
pondweed, Hill's	*Potamogeton hillii*
redroot	*Ceanothus herbaceus*
Rhodora	*Rhododendron canadense*
rice, mountain	*Oryzopsis canadensis*
rice, wild	*Oryzopsis* spp.
rock-cress	*Draba glabella*
rose, prickly	*Rosa acicularis* ssp. *sayi*
rush, Vasey's	*Juncus vaseyi*
sand-cherry	*Prunus pumila*
sandwort, mountain	*Mimuartia groenlandica*
sedge	*Carex* spp.
sedge, tussock	*Cares stricta*
sheep laurel	*Kalmia angustifolia*
Sphagnum moss	*Sphagnum* spp.
Sphagnum, woodland	*Sphagnum girghensohnii*
sundew, round-leaf	*Drosera rotundifolia*
sweet-gale	*Myrica gale*
trailing arbutus	*Epigaea repens*
violet, dog-tooth	*Erythronium albidum*
watercrowfoot, yellow	*Ranunculus flabellaris*
Whitlow-grass	*Draba arabisans*
willow, balsam	*Salix pyrifolia*
willow, bearberry	*Salix uva-ursi*
willow, dwarf (herbaceous)	*Salix herbacea*
winterberry	*Ilex verticillata*
witch-hobble	*Viburnum lantanoides*
witch-hazel	*Hamamelis virginiana*
wood-sorrel	*Oxalis dillenii*
woolgrass	*Scirpus cyperinus*
yew, Canadian	*Taxus canadensis*

Birds[2]

bittern, American	*Botaurus lentiginosus*
bittern, least	*Ixobrychus exilis*
blackbird, red-winged	*Agelaius phoeniceus*
blackbird, rusty	*Euphagus carolinus*
bluebird, eastern	*Sialia sialis*
chickadee, boreal (brown capped)	*Parus hudsonicus*
cowbird, brown-headed	*Molothrus ater*
crossbill, white-winged	*Loxia leucoptera*
duck, black	*Anas rubripes*
duck, goldeneye	*Bucephala clangula*
duck, mallard	*Anas platyrhynchos*
duck, ring-necked	*Aythya collaris*
duck, wood	*Aix sponsa*
eagle, bald	*Haliaeetus leucocephalus*
eagle, golden	*Aquila chrysaetos*
falcon, peregrine	*Falco peregrinus*
flycatcher, great crested	*Myiarchus crinitus*
flycatcher, yellow-bellied	*Empidonax flaviventris*
gallinule, Florida	*Gallinula chloropus*
gnatcatcher, blue-gray	*Polioptila caerulea*
grackle, purple	*Quiscalus quiscula*
grosbeak, rose-breasted	*Pheucticus ludovicianus*
grouse, ruffed	*Bonasa umbellus*
grouse, spruce	*Canachites canadensis*
hawk, red-tailed	*Buteo jamaicensis*
heron, black-crowned	*Nycticorax nycticorax*
heron, great blue	*Ardea herodias*
heron, green	*Butorides virescens*
jay, Canada (grey)	*Perisoreus canadensis*
kingfisher, belted	*Megaceryle alcyon*
kinglet, ruby-crowned	*Regulus calendula*
loon, common	*Gavia immer*
merganser, American	*Mergus merganser*
mockingbird	*Mimus polyglottos*
oriole, orchard	*Icterus spurius*
osprey	*Pandion haliaetus*
pigeon, passenger	*Ectopistes migratorius*
plover, semi-palmated	*Charadrius semipalmatus*
raven	*Corvus corax*
snipe, Wilson's	*Capella gallinago*
sparrow, Lincoln's	*Melospiza lincolnii*
swallow, bank	*Riparia riparia*
swallow, cliff	*Petrochelidon spp.*
swallow, tree	*Tachycineta bicolor*
tanager, scarlet	*Piranga olivacea*
tern, black	*Chlidonias nigra*
turkey, wild	*Meleagris gallopavo*
turnstone, ruddy	*Arenaria interpres*
vireo, warbling	*Vireo gilvus*
vulture, turkey	*Cathartes aura*
warbler, Blackburnian	*Dendroica fusca*
warbler, black-poll	*Dendroica striata*
warbler, Cape May	*Dendroica tigrina*
warbler, chestnut-sided	*Dendroica pensylvanica*
warbler, Tennessee	*Vermivora peregrina*
waterthrush, northern	*Seiurus noveboracensis*
waxwing, cedar	*Bombycilla cedrorum*
whip-poor-will	*Caprimulgus vociferus*
woodcock, American	*Philohela minor*
woodpecker, black-backed three-toed	*Picoides arcticus*
woodpecker, northern three-toed	*Picoides tridactylus*
woodpecker, downy	*Dendrocopos pubescens*
woodpecker, hairy	*Dendrocopos villosus*
woodpecker, pileated	*Dryocopus pileatus*
wren, long-billed marsh	*Cistothorus palustris*

Mammals[2]

bear, black	*Ursus americanus*
beaver	*Castor canadensis*
coyote	*Canis latrans*
deer, white-tailed	*Odocoileus virginianus*
fox, red	*Vulpes fulva*
lemming, southern bog	*Synaptomys cooperi*
lynx, Canada	*Lynx canadensis*
moose	*Alces alces*
muskrat	*Ondatra zibethicus*
shrew, long-tailed (gray)	*Sorex dispar*
vole, rock (yellow-checked)	*Microtus chrotorrhinus*
wolf, eastern timber	*Canis lupus*

Primary sources:

[1]Mitchell, Richard S. 1986. *A Checklist of New York State Plants.* NYS Museum Bulletin #458, Albany, NY. 272 pp.

[2]Blair, W. Frank, Albert P. Blair, Pierce Brodkmow, Fred R. Cagle and George A. Moore. 1957. *Vertebrates of the United States.* McGraw-Hill, New York, NY. 819 pp.

About the Author

George D. Davis is a land use policy and wildland conservation consultant residing in Wadhams, New York. He has served as program director and executive director of The Adirondack Council and as executive director of the Adirondack Land Trust. A native of the Adirondack region, Davis has worked in the land use and natural resource management field, in both the public (federal and state) and private sectors for twenty-five years. He has also served as director of planning for the Adirondack Park Agency and as staff ecologist for Governor Rockefeller's Temporary Study Commission on the Future of the Adirondacks. In addition, Davis has served as executive director of The Wilderness Society and as a national coordinator for the U.S. Forest Service's 62,000,000 acre roadless area review and evaluation (RARE II).

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