Appendix G.

Albany Pine Bush Preserve
Resource Protection and Visitor Experience
Vision

Albany Pine Bush Preserve
Resource Protection and Visitor Experience Vision

February 2010

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ALBANY PINE BUSH
PRESERVE COMMISSION

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Executive Summary

The Albany Pine Bush is a unique inland pine barrens community located between the cities of Albany and Schenectady, New York. It is home to the globally-rare pitch pine-scrub oak barrens ecological community and the state and federally endangered Karner blue butterfly. The Preserve is currently 3,100 acres with a 4,610 acre Preserve envisioned.

In December of 1988 the people of the State of New York, represented in the Senate and Assembly, declared it to be in the public interest to protect and manage the Albany Pine Bush Preserve by establishing the Albany Pine Bush Preserve Commission to —. .protect and manage the Albany Pine Bush by establishing an Albany Pine Bush Preserve consisting of dedicated public and dedicated private land and a commission made up of representatives of state and local governments and private citizens to manage the Preserve for purposes of its protection and controlled and appropriate recreation and education purposes. Its location at the center of a major urban area makes it especially valuable as an open space resource and, if properly managed, as a passive recreation area and educational laboratory" (ECL 46).

Upon the recommendation of the 2002 Management Plan and Final Environmental Impact Statement for the Albany Pine Bush Preserve, the Commission has produced this Resource Protection and Visitor Experience Vision (RPVEV) for the Albany Pine Bush Preserve. This RPVEV addresses public use of the Preserve as it relates to the protection and management of the natural and cultural resources of the Pine Bush and the quality of the visitor experiences at this site. This plan also provides monitoring criteria and management actions necessary to protect both the natural resources and the visitor experience of the Albany Pine Bush.

The Preserve is a popular recreational and educational destination for people who live and work in the Capital District of New York State as well as for people visiting from beyond the immediate area. Public use of the Preserve continues to increase and the accompanying recreation and education related stresses to the natural systems of the Pine Bush are also increasing. This plan addresses the stresses created from recreation and education activities on these natural systems as well as the quality of the visitor experience. The RPVEV serves as a management tool for the Commission, providing a set of standards to ensure the long term protection of the Albany Pine Bush Preserve as it relates to public use of this natural resource.

All of the elements in this RPVEV relate directly to previously developed statements of Preserve purpose and significance as well as primary interpretive themes expressed in the 2002 Management Plan and Final Environmental Impact Statement for the Albany Pine Bush Preserve and the 2003 Interpretive Planning Report for the Albany Pine Bush Preserve Discovery Center. The elements of this plan include assembling a team to draft and review the plan, solicit public involvement, analyzing existing Preserve resources and visitor use, describing resource conditions and potential visitor experiences, creating public use management zones, and setting up a monitoring plan with associated management actions.

This RPVEV also establishes trail review and development standards for the existing multi-use trails and sets standards and limits for trails that may be proposed in the future. The standards established, along with an analysis of the existing trails and a conceptual proposed future trail system for the Preserve, provide a level of protection designed to minimize fragmentation within the Preserve, limit the ecological impact of recreation and education activities and carefully protect the plants and animals of the Pine Bush. At the same time, public use and visitor experiences are encouraged at a level that allows visitors to enjoy much of what the Pine Bush has to offer as a recreational and educational resource.

The plan includes several recommendations to be implemented within the next five years including trail system review and changes, review of legal off-trail recreational and educational activities as related to federally endangered species habitat, monitoring public use, review of this plan on the same five year schedule as the APBP Management Plan, working closely with Commission enforcement agencies to enforce the Preserve rules and regulations while continuing to explore trail linkages within the regional context.

Conclusions of the RPVEV for the Albany Pine Bush Preserve include providing opportunities for the public to experience the various habitats of the Pine Bush where appropriate, standards with which to review the existing trail system, standards for present and future trail construction as well as maintenance, monitoring standards, and the need for increased regular enforcement of the Albany Pine Bush Preserve rules and regulations. Regular monitoring is a critical component of this plan; when impact thresholds are reached appropriate management actions must be initiated.

The Albany Pine Bush Preserve is a significant environmental, recreational, and educational resource that provides people with many opportunities. The long term viability of the Preserve is enhanced when public use is appropriately managed to maximize appropriate visitor experiences while minimizing negative impacts on the plants, animals, ecological systems and cultural resources of the Albany Pine Bush Preserve.

Albany Pine Bush Preserve
Resource Protection and Visitor Experience Vision

November 2009

Introduction

The Albany Pine Bush is a unique inland pine barrens community located between the cities of Albany and Schenectady, New York, that originally covered more than 25,000 acres (Barnes 2001). It contains the world's best remaining example of an inland pitch pine-scrub oak barrens ecological community and provides habitat to more than forty at-risk animals considered to be Species of Greatest Conservation Need in New York State (NYSDEC 2006). Most notably, the Pine Bush is the original discovery site of the state and federally endangered Karner blue butterfly, and contains the only known location for New York State's rarest plant, Bayard's malaxis. The Preserve is currently 3,100 acres (2009) with a 4,610 acre Preserve envisioned.

In December of 1988 the people of the State of New York, represented in the Senate and Assembly, declared it to be in the public interest to protect and manage the Albany Pine Bush Preserve by establishing the Albany Pine Bush Preserve Commission (APBPC) to ~~...~~.protect and manage the Albany Pine Bush by establishing an Albany Pine Bush Preserve consisting of dedicated public and dedicated private land and a commission made up of representatives of state and local governments and private citizens to manage the Preserve for purposes of its protection and controlled and appropriate recreation and education purposes" (ECL Article 46).

The Albany Pine Bush Preserve is located in the City of Albany and the towns of Guilderland and Colonie ~~...~~.and is a landscape of rare and endangered natural communities and species identified by the New York Natural Heritage Program. Its location at the center of a major urban area makes it especially valuable as an open space resource and, if properly managed, as a passive recreation area and educational laboratory" (ECL Article 46).

Upon the recommendation of the 2002 Albany Pine Bush Preserve Management Plan and Final Environmental Impact Statement for the Albany Pine Bush Preserve, the Albany Pine Bush Preserve Commission (APBPC) has produced this Resource Protection and Visitor Experience Vision (RPVEV) for the Albany Pine Bush Preserve (APBP). This plan addresses public use of the Preserve as it relates to the protection and management of the natural and cultural resources of the Pine Bush and the quality of the visitor experiences.

The Albany Pine Bush Preserve is a popular destination for visitors interested in a wide variety of recreational and educational pursuits. Since the creation of the Albany Pine Bush Preserve Commission in 1988 and the adoption of the 2002 APBP Management Plan, population growth in New York's Capital District has resulted in a corresponding increase in the demand for additional recreational, educational venues, and options. Awareness of the Pine Bush as a valuable ecological, open space, recreational, and educational resource is well established in the Capital District.
The Albany Pine Bush Preserve is centrally located at the crossroads of the Capital District. Each day, several thousand ~~"u~~nofficial visitors" traverse the Preserve on existing roads while traveling between home and work. In their travels, these visitors experience some aspects of the unique open

space character offered by the Preserve. Tens of thousands of people visit the Preserve each year to enjoy the passive recreational and educational opportunities it provides. The network of trails provide Preserve access and the opportunity for a variety of seasonal recreational activities such as cross-country skiing and snowshoeing, walking, jogging, hunting, fishing, bicycling, and horseback riding. School groups, scouting clubs, and other groups visit the Preserve regularly for the outdoor education opportunities it presents. Because of its semi-urban location, the Preserve is highly accessible by a variety of modes of transportation, including walking, biking, public transit, and automobile.

The Albany Pine Bush Preserve Commission, created in 1988, consists of representatives of the New York State Department of Environmental Conservation (NYSDEC), the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), The Nature Conservancy (TNC), Albany County, the City of Albany, the Town of Colonie and the Town of Guilderland. The Commission also includes three citizen representatives and a corporate liaison appointed by the Governor. The Commission meets on a quarterly basis to review the status of Preserve protection and management.

Scope of Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

The Resource Protection and Visitor Experience Vision for the Albany Pine Bush Preserve considers all public use of the Albany Pine Bush Preserve. A plan of this type, as recommended by the 2002 APBP Management Plan, is necessary to address both the quality of the recreational visitor experience and the impacts public use may have on the natural and cultural resources of the area. This plan also provides monitoring criteria and management actions necessary to protect both the visitor experience and the natural resources of the Albany Pine Bush.

Development of this plan is based on the goals and objectives of the 2002 APBP Management Plan. The APBP Management Plan recommends " a comprehensive public use/recreation plan be developed for the Preserve…Such a plan would evaluate recreational demand and address appropriate public use of and access to Preserve lands, while providing a strategy to ensure that the goals of the Commission for management of the Preserve are met."

The Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision utilizes the Visitor Experience and Resource Protection (VERP) Framework, developed by the National Park Service (1997), which has been well recognized as a useful tool for this process. VERP has successfully been used by many organizations, both inside and outside of the National Park Service. VERP was developed primarily for park use where the emphasis on the visitor experience takes a slightly higher priority than is the case in the Albany Pine Bush Preserve. Consistent with the Preserve's enabling legislation, the RPVEV places a higher priority on resource protection while still providing –controlled and appropriate" use of the Preserve (ECL Article 46, 1988) and exceptional visitor experience and recreational opportunities.

VERP

Overview of the VERP Framework

The Visitor Experience and Resource Protection (VERP) framework consists of nine elements and takes a team approach to developing a public use management plan. One of the most important parts of the VERP framework is determining and describing management zones. These zones, when applied to geographical areas within the preserve, determine how recreation is managed. How the zones are determined depends on the specific goals for a given preserve. As each preserve is unique, so are the management zones.

For the Albany Pine Bush Preserve, management zones describe levels of acceptable use and encompass priority conservation areas including globally rare species and communities, wildlife habitats, fragile areas, and archeological resources. Consistent with ECL Article 46 (1988), traditional use patterns of the Preserve and established trails are typically secondary considerations in how management zones are determined. The management zones fix the limits of recreational use for an area or zone. Each zone has a unique set of guidelines, restrictions, and desired levels of resource protection that helps to identify thresholds of acceptable public use within each zone.

Once the zones are determined and applied to specific areas, developing a monitoring program becomes an essential element of the VERP framework, needed to ensure that each zone's standards are maintained. To protect the standards, the final element of VERP entails developing management actions to be taken when standards are not maintained. Other elements of the VERP framework include involving the public and developing a mission statement and interpretive themes. VERP is a modification of the Limits of Acceptable Change (LAC) system that was developed by the U.S. Forest Service in the 1980s. LAC was a turning point in recreation management as it shifted the emphasis from how much use an area could tolerate to maintaining desired resource conditions.

The VERP Elements:

1. *Assemble an Interdisciplinary Project Team*
2. *Develop a Public Involvement Strategy*
3. *Develop Statements of Preserve Purpose, Significance, and Primary Interpretive Themes*
4. *Analyze Preserve Resources and the Existing Visitor Use*
5. *Describe a Potential Range of Visitor Experiences and Resource Conditions*
6. *Allocate the Potential Zones to Specific Locations in the Preserve (Prescriptive Management Zoning)*
7. *Select Indicators and Specify Standards for Each Zone; Develop a Monitoring Plan*
8. *Monitor Resources and Social Indicators*
9. *Take Management Action*

Element 1: Interdisciplinary Project Team

Albany Pine Bush Preserve RPVEV Project Team -

The RPVEV planning team consists of two groups, the core team and the review team. The core team met regularly to work on the draft RPVEV for the Albany Pine Bush Preserve. Upon completion of the draft plan, the review team was invited to review and comment on the draft. Comments on the first draft of this plan were accepted in May 2005. The review team will continue to assist the core team by providing additional expertise and perspective to the plan. In addition the APBPC Technical Committee will review the draft plan before the plan is considered for adoption by the Albany Pine Bush Preserve Commission.

Core team:
Joel Hecht, Stewardship Director –APBP RPVEV Facilitator
Neil Gifford, Conservation Director
Erin Kinal, Education Program Director
Wendy Borden, Communications and Outreach Director
Mike Venuti, Discovery Center Director

Review team:
APBPC Technical Committee
APBP Commission Members

Lindsay Childs	Guilderland Pathways Committee
Bob Collin	APBP Volunteer
Don Csaposs	Town of Guilderland
Dr. James Danoff-Berg	Columbia University Professor
Chad Dawson	SUNY ESF Professor
Paul Dean	APBP Volunteer
Jeanne Dross	APBP Volunteer
Allen Fiero	Farnsworth Middle School Teacher
Ray Gawlas	Schenectady County Conservation Council
Karen Glesmann	NYSDEC Forest Ranger
Chris Hawver	APBPC Executive Director
Joseph Hess	NYSDEC Forest Ranger
Dave Hooper	APBP Volunteer
Lynn Jackson	Save the Pine Bush
Roland Kays	NYS Museum Curator of Mammals
Frank Knight	APBP Volunteer
Warren LeGere	Albany County Conservation Alliance
Karl Parker	NYSDEC Wildlife Biologist
Nancy Pierson	NYSOPRHP
Pat Pisanello	APBP Volunteer / Mountain bike representative
Steve Rice	Union College Biology Professor
Bob Ringlee	APBP Volunteer
Paul Russell	APBP Volunteer
Gary Thomann	Mohawk Hudson Cycling Club

Rosemarie Tobin	APBP Volunteer
John Wolcott	Save the Pine Bush
James Zambardino	Town of Colonie Parks Department

Element 2: Public Involvement Strategy -

Public involvement is an important part of the planning process for the Albany Pine Bush Preserve. Upon completion of the draft Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision, the review team will have opportunity to provide comments on the plan to the core team. This review of the first draft occurred in May 2005.

During the 1999 public hearing process for the APBP Rules and Regulations, many comments related to public use of the Preserve were accepted by the Commission and reviewed. Responses to these comments were provided to the public. The core team has reviewed these comments and incorporated many of these ideas to help guide a number of components of this planning process.

Element 3: Preserve Purpose, Significance and Primary Interpretive Themes -

A. Albany Pine Bush Preserve Purpose and Significance:

The Albany Pine Bush Preserve was created to "include dedicated public and dedicated private lands that have the necessary size, contiguity, and condition to maintain the natural ecological processes that support the long term viability of the pitch pine-scrub oak community, the Karner blue butterfly, and the full range of natural upland and wetland communities (and associated native species) that make up the Pine Bush. The Preserve will also protect cultural resources (historic and archaeological sites), accommodate a variety of appropriate recreational uses, and provide educational and outreach opportunities for the public" (2002 APBPC).

Natural resources in the Pine Bush include ecological communities (Figure 1), soils, wildlife, vegetation, water and air quality. The Albany Pine Bush Preserve contains the world's best remaining example of an inland pitch pine scrub oak barrens, globally rare pine barrens vernal ponds, six rare plants, and more than 40 kinds of wildlife considered to be Species of Greatest Conservation Need in New York State, including many legally protected species such as the state and federally endangered Karner blue butterfly and the NY State threatened frosted elfin butterfly (NYSDEC 2006, NYNHP 2006). Located within the 7.5 million-acre Upper Hudson Basin, the 3,100 acre Albany Pine Bush Preserve represents only 0.04 percent of the Upper Hudson Basin, yet contains more than one-third of the Species of Greatest Conservation Need located within the basin.

The legislature envisioned a Preserve that would provide educational and recreational opportunities to the people of New York State while still allowing for the successful conservation of the Preserve's unique natural resources (ECL Article 46). With this RPVEV the Commission is providing a set of guidelines and recommendations to balance natural resource protection with the need to provide controlled and appropriate recreational and educational use of the Preserve consistent with ECL Article 46 and the 2002 Management Plan and Final Environmental Impact Statement for the Albany Pine Bush Preserve (APBPC 2002). Given the truly unique natural

resources and management practices in the Preserve, the recreational and educational experiences provided are similarly unique and unlike any that can currently be experienced elsewhere in upstate New York.

B. Ecological Resource Protection and Management Goals of the 2002 Plan include:

1. Protect and manage an ecologically viable pitch pine-scrub oak barrens community. Use prescribed burns and other management techniques to achieve the long-term goal of at least 2,000 fire-manageable acres.

2. Protect and manage linkages that improve Preserve contiguity and enhance species dispersal opportunities.

3. Protect and manage buffer areas, particularly those that facilitate the Commission's fire management program.

4. Protect and manage significant cultural and environmental resources, including Karner blue butterflies, water resources, as well as historic and archaeological sites.

C. Program Goals for the Preserve address recreational use as well as education and outreach.

1. Maintain and enhance public access to the Preserve in locations where doing so will not adversely impact ecological resources.

2. Enhance and expand educational and outreach efforts to increase the visibility and image of the Preserve, develop and maintain a sense of stewardship on the part of the public, and create a better appreciation and awareness of Pine Bush ecology and management.

D. Albany Pine Bush Preserve Primary Interpretive Themes

The Albany Pine Bush Preserve Interpretive Plan defines the primary educational themes for the Preserve (Earthwise 2003).

<u>Four key interpretive themes:</u>

1. The Albany Pine Bush is a globally unique and endangered landscape.

2. Visitors to the Preserve will discover the details of nature and the rare plants and animals that are part of Preserve's unique natural landscapes.

3. The Albany Pine Bush is preserved by active land management practices, including prescribed burning and large-scale mowing, which are as unique as the Preserve's landscapes.

4. The Preserve and its management are evidence of a history of human relationship to the natural landscape, representing past and present environmental and cultural history and future models of environmental stewardship.

Element 4: Analyze Preserve Resources and the Existing Visitor Use.

The purpose of element four is to assess potential conflicts between visitor use and resource protection so that the instances of such conflicts can be minimized or eliminated as much as possible. This is accomplished through identifying sensitive resource areas of the Preserve–which then can be looked at in the context of traditional use patterns–desired visitor experiences, and existing trails and facilities. This element describes existing conditions and does not prescribe future conditions.

Resource Experience Opportunity Areas, as described in this element, are places within the Preserve that differ from each other in some significant way. They are places that Preserve visitors may encounter depending on the type of experience they are seeking. Visitors may also unintentionally encounter these areas during a visit. Either way, these areas are what visitors will experience as they spend time in the Preserve. These Resource Experience Opportunity Areas are found in Table 1 below and are described in detail following the table. Figure 1 provides additional ecological community information.

A. Preserve Resource Attributes and Resource Experience Opportunity Area Descriptions

1. Resource Attributes for Visitor Use (Table 1)

Table 1 - Resource Attributes for Visitor Use

	Relative Availability of Preserve Resources		Visitor interest	Relative Importance of Preserve Areas		Sites or features of Critical Importance	
Resource Experience Opportunity Areas	In Preserve	Out of Preserve	Potential Interest of Resource to Visitor (destination oriented vs. happenstance)	Relative Importance of Area Related to Preserve Purpose	Relative Importance of Area Related to Preserve Interpretive Themes	Sites or features of Critical Importance to Preserve Purpose (trailhead #)	Sites or features of Critical Importance to Preserve Interpretive Themes (trailhead #)
Appalachian oak-pine forest	Uncommon	Abundant	Moderate	Moderate	Moderate	#6,7,8	#6,7,8 Corridors along ravines
Pitch pine - scrub oak barrens	Uncommon	Unique	Very High	Very High	Very High	#1,5,7,9	#1 Blue Trail
Pitch pine - scrub oak thicket	Common	Unique	Very High	Very High	Very High	#5,7,9	#1 Blue Trail
Pitch pine - scrub oak forest	Uncommon	Unique	Very High	Very High	Very High	# 1,7,8	#1 Red Trail
Pine - northern hardwood forest	Uncommon	Abundant	Moderate	Low	Moderate	# 2,9	#9 Red Trail
Red maple hardwood swamp	Common	Abundant	Moderate	Low	Low	#1,9	#1 Yellow Trail
Shallow emergent marsh	Unique	Common	High	Low	High	#9	#9 Red Trail
Pine barrens vernal ponds	Unique	Unique	Moderate	Very High	Very High	#1,9	#1 White Trail

Table 1 (Cont.).	Relative Availability of Preserve Resources		Visitor interest	Relative Importance of Preserve Areas		Sites or features of Critical Importance	
Resource Experience Opportunity Areas	In Preserve	Out of Preserve	Potential Interest of Resource to Visitor (destination oriented vs. happenstance)	Relative Importance of Area Related to Preserve Purpose	Relative Importance of Area Related to Preserve Interpretive Themes	Sites or features of Critical Importance to Preserve Purpose (trailhead #)	Sites or features of Critical Importance to Preserve Interpretive Themes (trailhead #)
Successional northern hardwoods	Common	Common	Moderate	Low	Moderate	#1,8	#1 Yellow Trail
Successional southern hardwoods	Common	Common	Low	Very Low	High	#4,6,7,8	#8 Red Trail
Successional old field / Brushy cleared land	Uncommon	Abundant	Very Low	Very Low	Moderate	#4	#4 Blue Trail
Savannah restoration sites	Unique	Unique	Very High	Very High	Very High	#9	#9 Red Trail
Ravine	Uncommon	Common	High	Moderate	High	#6,7,8	#8 Red Trail
Ravine Rim	Uncommon	Common	High	NA	NA	#6,8	#8 Red Trail
Dune Ridge/Top	Common	Unique	Very High	Moderate	Very High	#1,5,8,9	#1 Blue Trail
Frost pocket	Unique	Unique	Low	Very High	Very High	#1,5,7,8,9	#1 Blue Trail
CULTURAL TYPES				A:Purpose* B:Recreation*			
Trail or unpaved road	Common	Common	Very High	A:NA B:Very High	High	#1-9	#1 Blue Trail
Sand mine/dune cut	Common	Common	Very Low	A:Very Low B:Very Low	High	#1,5	#5 Red Trail
Ponds, lakes	Unique	Abundant	Very High	A:Moderate B:Very High	Moderate	#1, 2, 3, 9	#1 Yellow Trail
Rensselaer Lake Park (Fuller Rd)	Unique	Abundant	Very High	A:Moderate B:Very High	High	# 3	#3 Paved Trail
MANAGEMENT AREAS				A:Purpose* B:Recreation*			
Mowed area	Unique	NA	Low	A:Very High B:Moderate	Very High	Varies	Varies
Burned area	Uncommon	Unique	High	A:Very High B:High	Very High	Varies	Varies
Invasives treatment area	Uncommon	NA	Very Low	A:Very High B:Low	Very High	Varies	Varies
Cleared forest area	Unique	Common	Low	A:Very High B:Very Low	Very High	Varies	Varies

*The Relative Importance of areas described as Cultural Types and Management Areas in Table 1, A and B, is the importance of the area related to either the A) **Purpose** of the Preserve ecologically or B) **Recreation** and education opportunities in the Preserve.

2. Resource Experience Opportunity Area Descriptions:

Appalachian oak-pine forest represents the largest forest type in the Albany Pine Bush. Black oak, red oak, white oak, and scarlet oak (*Q. coccinea*) dominate the canopy. Canopy and sub-canopy pines include white pine (*Pinus strobus*) and pitch pine. There is some red maple (*Acer rubrum*), hemlock (*Tsuga Canadensis*) and beech (*Fagus grandifolia*). Shrubs include blueberries and huckleberry, with a sparse herbaceous layer (Schneider et al. 1991). This community tends to occur in or adjacent to ravines in the Albany Pine Bush.

Mature trees and a more enclosed feeling dominate the visitor experience in these areas, especially when the forest is located on dune slopes and the bottom of ravines. Shade dominates during the growing season while winter experiences in these areas are more open and bright. The Hungerkill and associated tributaries are examples in the Preserve of this type of area.

Pitch pine-scrub oak barrens are a savanna community with 20 to 60 percent cover of pitch pine (*Pinus rigida*). Scrub oak (*Quercus illicifolia* and *Quercus prinoides*), huckleberry (*Gaylussacia baccata*), and blueberry (*Vaccinium angustifolium* and *V. pallidum*) dominate the shrub layer. Grasses include big bluestem (*Andropogon gerardii*), little bluestem (*Schyizachyrium scoparium*) and Indian grass (*Sorghastrum nutans*). Common herbaceous species include several bush clovers (*Lespedeza capitata*, *L. hirta*, *L. procumbens*), Pennsylvania sedge (*Carex pensylvanica*), and, in some areas, blue lupine (*Lupinus perennis*).

Visitor experiences in the barrens are filled with colors, shapes and primarily an open feeling with vast expanses of sky complementing the relatively short and patchy blend of vegetation. Visual attention is drawn in many directions for great distances and the scattered trees are often seen as more of a silhouette in the distance. Seasonal changes are dramatic, with vegetation colors and types quite variable. Landforms, including dune shapes and profiles, are quite apparent. Moving through the barrens is relatively simple due to the grassy openings between the shrubs. Air movement throughout these areas is very noticeable and protection from the sun is difficult to find.

Pitch pine-scrub oak thickets resemble barrens, but have a much higher density of scrub oak. In addition, according to Gebauer et al. (1996), some portions of this community have been invaded by black locust (*Robinia pseudoacia*) and may have higher densities of huckleberry.

Scrub oak thickets create a sense of disorganization and closeness. The general sense of tangle and thickness of the vegetation creates a closed atmosphere. Sight distance is extremely limited and there is less diversity in the dominant vegetation. Movement within these areas is difficult and one can easily get caught if trying to move through these dense thickets. Sounds are confined within the closeness of the vegetation. Temperature extremes are very noticeable, as there is little or no tree canopy to provide shade or wind protection in most of these areas.

Pitch pine-scrub oak forests (Gebauer et al., 1996) or pitch pine-oak forest (Schneider et al., 1991) also contain similar species but include white oak (*Quercus alba*), red oak (*Quercus rubra*), or black oak (*Quercus velutina*). The shrub and herbaceous layers may be sparser than in the two variants described above.

Areas forested primarily with Pitch Pine trees create a sense of protection in this more park-like atmosphere. These areas are more shaded than either barrens or thickets, but still relatively bright as the pitch pine trees allow significant light to reach the forest floor. The area is visually open and dry with a forest floor of pine needles, sparse grasses, sedges and wildflowers and open, sandy patches throughout. The air is permeated with the smell of pine and dry leaves in this relaxing and calming atmosphere. Sounds echo through the forest and are then captured by the tree canopy.

Pine-northern hardwood forests are dominated by white pine, scattered paper birch (*Betula papyrifera*), and aspen (*Populus tremuloides*). Shrub species include wild raisin (*Viburnum cassinoides*) and shadbush (*Amelanchier canadensis*). Herb diversity may be high and include Canada mayflower (*Maianthemum canadensis*), bunchberry (*Cornus canadensis*), star flower (*Trientalis borealis*) and trillium (*Trillium undulatum*).

Similar to the Appalachian oak-pine forest, the Pine-northern hardwood forest is dominated by mature trees and a more enclosed feeling. Graceful white pine trees allow dappled sunlight to create visual contrasts on the forest floor. This forest is generally more shaded than the pitch pine-scrub oak forest during the warmer months. Emotional experiences of privacy and grandness are triggered by some of the more mature areas of these forests.

Red maple-hardwood swamps, described by both Schneider et al. (1991) and Mattox (1994). This community is dominated by red maple and may have black ash (*Fraxinus nigra*), American elm (*Ulmus Americana*) or other co-dominants. The shrub layer can be very dense and include winterberry (*Ilex verticillata*), dogwoods (*Cornus sericea, C. ammomum, C. foemina*), viburnums (*Viburnum recognitum, V. cassinoides*), and highbush blueberry (*Vaccinium corymbosum*). The herbaceous layer includes cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), and sensitive fern (*Onoclea sensiblis*). There may be openings with other herbaceous species such as skunk cabbage, (*Symplocarpus foetidus*) and sedges (*Carex stricta Carex sp.*). Shrub swamps are found where the canopy is sparse or nonexistent, and the shrubs listed above are dominant.

Within the red maple-hardwood swamp the visitor is enclosed by the overhead canopy, while the ground is often damp or wet. During the warmer months these areas are darker due to less sunlight filtering through the leaves and the light reducing influence of the dark, decomposing leaf litter covering the ground. There is a sense of lushness about the area created by the vegetation and often the visitor will notice an increase in humidity as well as a musty scent in the air.

The **shallow emergent marsh** is a wetland community dominated by herbaceous plants, including bluejoint grass (*Calamagrostis canadensis*), reed canary grass (*Phalaris arundinacea*), rice cutgrass (*Leersia oryzoides*), sedges (*Carex stricta, C. interior C.*

lacustris), three-way sedge (*Dulichium arundinaceum*), and loosestrife (*Lysimachia thrysiflora, L. terrestris*). Other species include bur-reed (*Sparganium americanum*), tear thumb (*Polygonum sagittatum*), and Joe-Pye-Weed (*Eupatorium maculatum*). Mattox (1994) provides detailed descriptions of this community type. This type may grade into the deep emergent marsh where deeper water and aquatic plants, such as pond lily (*Nuphar luteum*), water-lily (*Nymphaea odorata*), cattail (*Typha latifolia*), and bulrush (*Scirpus tabernaemontanii*) become dominant (Mattox 1994; Reschke 1990). Shallow emergent marshes may also grade into sedge meadows where lower water levels and sedges become dominant.

In this open wetland the visitor notices the diversity of the vegetation as well as the sights and sounds of its inhabitants. This experience can be described as looking out into a ~~"~~wet prairie." A walk along the marsh may provide visitors with the opportunity to experience the softness of the moist sphagnum moss, or to observe the grass hummock structures or the cattails wavy motion as they bend in the wind. There is a sense of life and movement within this environment.

Pine barrens vernal ponds are associated with the pitch pine-scrub oak community. Vernal ponds are generally small (<5 acres) and consist of three-way sedge, woolgrass (*Scirpus cyperinus*), cinnamon fern, leatherleaf (*Chamaedaphne calyculata*), mountain holly (*Nemophanthus mucronatus*), and sphagnum (*Sphagnum fallax*). Small trees such as red maple, gray birch (*Betula populifolia*), and pitch pine may occur along the edges or on hummocks. Most of the pine barrens vernal ponds occur in low valleys between the dunes.

Visitors are often surprised by this unexpected discovery. Vernal ponds are relatively open areas with a well-defined boundary. Depending upon the season, the area may appear to be abundant with life or on the apparent verge of lifelessness. Standing water is open in some areas and filled with moisture loving plants in others. The overall visitor experience reflects a sense of a continuously changing environment.

Successional northern hardwoods are a mixed forest of quaking aspen, big-tooth aspen (*Populus grandidentata*), balsam poplar (*P. balsamifera*), pin cherry (*Prunus pensylvanica*), black cherry, red maple, white pine, paper birch, gray birch, white ash, or American elm. Reproduction of canopy dominants is generally low, as these are early successional, shade intolerant species. Shrub and herbaceous species, if present, are similar to those found in successional old fields, such as meadowsweet (*Spiraea latifolia*) or hazelnut (*Corylus americana or C. cornuta*), or fire suppressed pine barrens, such as scrub oak.

The dense three-dimensional stand of trees creates a uniform and tranquil appearance. In this mostly deciduous experience the leaves, especially of the aspen trees, are often in motion even with the slightest breeze. Sounds and breezes are caught in the dense vegetation and, except in winter, the sky is rarely visible.

Southern successional hardwoods include gray birch, hawthorns (*Crataegus spp*.), sassafras (*Sassafras albidum*), and introduced species such as black locust. Shrub and herbaceous layers are similar to successional northern hardwoods, though blackberry (*Rubus allegheniensis*), dewberry (*R. flagellaris*), and raspberry (*R. occidentalis*) are more common.

Stepping into a southern successional hardwood community, the woods seem dark and shaded. Thick thorny shrubs and creeping vines border the trail. High above this layer of raspberry, hawthorn and honeysuckle is a closed canopy of black locust trees. In the late spring the air is sweet with the fragrance of locust flowers and the trail is littered with tiny white petals fallen from the locust flowers. In winter the crooked trunks of the locust trees are more apparent, creating a disorganized look to this forest.

Successional old fields/Brushy cleared land has some of the tree species found in both Northern and Southern hardwoods, but is generally younger and sparser. There may be a mix of shrubs such as scrub oak, blackberry, dewberry, red raspberry, and meadowsweet, along with some of the characteristic herbaceous species found in pine barrens (Schneider et al., 1991). Many of the successional communities are adjacent to pitch pine-scrub oak barrens, while others are adjacent to farmlands or development within the study area.

Successional old fields resemble a typical abandoned agricultural field. They are open, sunny and fairly uniform looking with tall grass and some wildflowers dispersed throughout. These old fields are a pleasing and familiar environment to most people.

Savannah restoration sites are areas previously dominated by invasive plants like black locust trees, cold season grasses, and other non-native plants. The Commission is removing the invasive vegetation and restoring these areas to Savannah with an emphasis on habitat for the federally endangered Karner blue butterfly. These sites are then planted with native warm season grasses including big bluestem, little bluestem, and Indian grass. Wild blue lupine, along with other nectar species for the Karner blue butterfly, will also be planted in these Savannah type sites. Woody species including shrubs and trees will also be planted over time.

In a restoration site, it is obvious that something happened because the contrast with the surrounding Pine Bush areas is dramatic. The landscape is open and sunny with grasses alternating with patches of sand. Trees and woody shrubs such as scrub oak are largely absent. In the openness of these sites the breeze rustles through the plants and kicks up small whirls of dusty sand. This dry, young landscape invites the visitor to take a closer look.

Ravines slice through the sandy soils of the Pine Bush and have year-round, spring-fed streams flowing in their bottoms. The banks of a ravine are often very steep, flattening out toward the bottom. Ravines are quite deep and heavily vegetated with low growing sedges, grasses and wetland plant species. Most ravines are also heavily forested.

Experiences in ravines create a sense of isolation, dampness, and solitude. Overall, the view is limited and more vertical, with steep dunes and the sound of water flowing in the bottom of the ravine. Vegetation is damp and dense, especially during the warm summer months.

Ravine Rims follow the top of the ravines and are an abrupt change from relatively flat land to the steep ravine slopes.

Creating some of the most interesting perspectives, ravine rims, especially when only partially vegetated, allow for views down, across, and up all at the same time. A sense of danger is most evident in some of the steep portions where height is emphasized. A feeling of "being in the treetops" is emphasized by the birds and associated sounds that are usually more above the observer in typical forest settings, but on ravine rims may be at the same level as the observer.

Dune Ridge / Top are some of the highest points on the parabolic sand dunes that were originally shaped by the winds after glacial lake Albany first drained thousands of years ago.

Open sky, distance and space dominate the tops of dunes. Exposed to the weather, these sites are more abrupt and changeable. Often dominated only with short vegetation, the vastness of the pine barrens and beyond is most noticeable and views provide a greater context of the Pine Bush within the surrounding landscape.

Sand Mine is a man-made feature found in various locations throughout the Pine Bush area. Sand was mined from small sites or entire dunes were removed. Because Pine Bush sand is pure and clean it has been mined for many projects during the historical period of human involvement in the area.

Sand mines provide a seemingly abrupt and sterile environment dominated by a sense of instability and unnatural change, but can in-fact abound with unique life. Rare tiger beetles and a variety of ants can be observed rebuilding life systems in the pure, finely textured sand. These sites can be very hot in the summer as the light and heat are reflected back from the sandy surface.

Pond/Lakes are almost always man-made and vary from less than an acre to many acres in size.

Standing surface water is rare in the Pine Bush, but when encountered, as in many other places, creates a refreshing and calming atmosphere. Sounds echo across the surface of lakes and ponds, the occasional splash of wildlife breaks the stillness. Wind activity and the impact of the raindrops are displayed on the surface of the water. At certain times of day, wildlife is most evident in these areas as water is critical to survival and surface water is limited in the Preserve.

Frost Pockets are low-lying areas where cooler air can settle between dunes and, in the spring repeated nightly frosts may stunt or kill tender plant growth. Scrub oak is sparse in these frost-pockets, which are dominated by sedges and grasses, but also support scattered willows, heath shrubs, and pitch pine.

Contrasting dramatically with surrounding areas, these low depressions stand out when looking across the landscape. Visually in every direction, the landforms slope upward and the cool air that settles into these sites can be felt when entering from higher areas nearby.

Mowed areas are areas managed with the use of mechanical mowers. Mowing may have one or more objectives to include: reducing fuel loads for wildfire reduction and prescribed fire purposes; maintaining more open areas in the pine barrens until fire can become more of the primary tool to meet this objective; restructuring fuel beds for prescribed fire program reasons; creating more open habitat areas and diverse habitats for various plants, animals, and communities.

The impact of human activity is very apparent in these areas, especially immediately after an area has been mowed. Because it is primarily the pine barrens that are mowed, an already open experience above is brought to within inches of the ground. Nothing remains except chopped vegetation and a sense of rows where the mower passed over the area. These areas are often burned soon after mowing. Several months later these areas are lush and almost reminiscent of an agricultural setting where the vegetation is all of similar height and spacing across the exposed landscape.

Burned areas are areas that have been burned primarily through prescribed fire management, but occasionally as the result of natural or unplanned ignitions. Fire is the critical component of successful Pine Bush management and historically defined the pine barrens, preventing them from transitioning to a more forested condition.

The senses are bombarded when nearing an area that has recently burned. Smells are strong and often filled with a hint of pine and other aromas from the burned vegetation. Visually the areas seem bleak and lifeless (immediately after a fire), except that the birds are often active and sounds are clearly heard in the otherwise barren environment left by the fire. Colors are largely absent except the black of charred ground and tree trunks. Winds bring dust and ash swirling though the air, possibly creating a choking sense and clouding the visual impact of the area.

Several weeks after a fire, these areas are once again full of the vibrant colors of young, re-sprouting vegetation. Almost everything seems healthy again, in stark contrast to the blackened stems and tree trunks in these areas. The black ground is less apparent, although the smell of fire still lingers. Depending on the time of year, these areas are full of the sounds of new life as insects, birds, and other animals quickly move back into the setting.

Invasive plant treatment areas are areas where invasive plants are either being removed or treated in various ways including: cutting, pulling, chemical treatments, burning, girdling. These areas create a unique set of experiences for Preserve visitors and are a result of specific management activities occurring in the Preserve. Several examples include:

- **Aspen girdling area**—Aspen girdling is a technique used to control the expansive spread of aspen trees that would otherwise be limited by fire. Bark around the base of the tree is peeled away, allowing the tree to die while preventing this clonal species from re-sprouting. The trees usually begin to fall within two to three years of girdling. Native vegetation under the aspen clones again is exposed to sunlight and begins to flourish.

Aspen clones that have been girdled create a variety of experiences depending on how much time has elapsed since the trees were girdled. Where aspen trees are dense; an atmosphere of sameness and uniformity is experienced. As the trees die and fall, the areas become brighter and understory vegetation begins to grow and become more apparent. As the trees fall, the areas are visually more distracting, with 20 foot high stumps and fallen tree trunks scattered about. Walking though these areas during this time is very difficult. Weather and open sky become more dominant and sounds of woodpeckers tapping on the dead trees are a temporary but special experience.

- **Black Locust re-sprout treatment area** Black locust re-sprouts**,** generally one to three inches in diameter and two to 20 feet tall, are cut at the base and treated chemically at the stump to kill the root system. This prevents additional re-sprouting. The cut vegetation is usually left on the site.

  Locust re-sprouts are visually mixed with pine barrens vegetation as they spread into pine barrens and scrub oak thickets. Immediately after treatment the stems and branches create a tangle of thorns and cannot be navigated. These areas may not be noticed immediately and within several years are once again dominated by the native vegetation or have subsequently been treated with mowing and/or burning.

- **Purple Loosestrife treatment area** Purple loosestrife is often associated with wetlands and other low lying areas. Approximately two to five feet tall, it is either pulled or cut and treated with an herbicide in an effort to eliminate this persistent invasive plant.

  Most noticeable are cut stems lying in areas where vegetation was once standing. Repeated yearly treatments may create a feeling that something has gone on but it is not so dramatic as to visually impact the areas significantly.

- **Bittersweet treatment area** Bittersweet is a woody vine often found climbing high into trees, often smothering them and other shrubby vegetation. The vines are treated by cutting and chemical treatment of the stump.

  Dead vines clinging to the trees are most visible. A sense of deadness may, for several years after treatment, predominate while the vines fall and the trees they have enveloped begin to grow vigorously again. The tangle that exists in these areas will eventually give way to more typical forest atmospheres of calmness and structure.

- **Other** invasive plants will be treated in similar fashion to those listed above as they are identified throughout the Preserve.

Clear-cut, deforested areas are areas where non-native, invasive black locust trees are completely removed. Because these trees effectively eliminate most of the native pine bush vegetation from the areas where they are found, these clonal trees are removed in larger blocks of one to 50 acres. Once the sites are reduced to sand and organic soils, they are replanted with native pine barrens plants as described under Savannah Restoration Sites above.

Abrupt change is most obvious in these areas. Large, heavy equipment, loud mechanical noises, and a sense of destruction pervade these sites during the clearing process. During this process, these areas are devoid of any natural sounds of wildlife and are exposed to intense weather and light extremes typical of a pine barrens but without any vegetation.

The topography and rolling sand dunes are most obvious and the open sand stretches onward like
nowhere else in the Pine Bush. Movement, once the site is cleared, is most obvious as the sand blows and moves, creating a reminder of what it was like when these dunes first formed. Adjacent, undisturbed, and vegetated areas contrast greatly with these habitat restoration sites. These sites are short-lived in this ~~"d~~isturbed" condition as they are soon planted with Pine Bush species that rapidly grow throughout the sites.

B. Existing Preserve Public Use and Facilities Analysis

The Albany Pine Bush Preserve is a wonderful resource to the people who live and work in the Capital District of New York State. It is a place to relax, enjoy nature, hike or bike and pursue a number of other passive recreational and/or educational activities.

The following analysis section documents facilities and infrastructure that are currently present in the Preserve, legal activities that people are enjoying in the Preserve, illegal Preserve uses, where these activities are occurring and how many people are using various Preserve areas.

1. **Trails and Trail Access Locations** - Currently the Preserve has eight trailheads with kiosks and parking, one access with parking but no official trails or kiosk (East Lydius Street) and one trailhead with official trails and no kiosk (Kaikout Kill Barrens). There are currently 18.8 miles of official trails in the Preserve. All of the official trails are marked with a color coded system as shown on the Preserve trail map (Figure 2).

   Table 2 below describes the trail facilities that can be found at each of the 10 official access points (Figure 2). The last three columns in Table 2 show the percentage of the total 18.8 miles of trails in each area of the Preserve, the approximate total acres in which each portion of the trail system is found and the ratio of acres per mile of trail in that area. This analysis provides a general sense of the density of trails in each area of the Preserve but does not analyze the relationship of the trails to each other, a variable that will be considered later in this plan during the discussions of fragmentation and zone of influence.

Table 2 - Trail Related Facilities

Trailhead (#) (Road location)	**Parking spaces**	**Kiosk**	**Trails (miles)** **(Mi.)**	**% of total Preserve trails in this area**	**Approx. acres in each Preserve area (Ac.)**	**Approx. acres per mile of trail in this Preserve area (Ac./Mi.)**
(1) Karner Barrens East / West (New Karner Road)	50 + at APBP Discovery Center	Yes	3.9 East 1.4 West	20.7 % East 7.4 % West	300 East 103 West	77 East 74 West
(2) Rapp Barrens (Rapp Road)	2 (parallel parking)	Yes	1.3	7%	162	124
(3) Rensselaer Lake Preserve and Park (Fuller Road)	60 (Albany city park)	Yes	0.4 (hardened surface)	2%	70	175
(4) Blueberry Hill East (Columbia Circle)	6	Yes	1.8	9.6%	120	67
(5) Blueberry Hill West (Pitch Pine Road)	4+ (street parking)	Yes	1.6	8.5%	73	46
(6) Kaikout Kill Barrens (Frontage Road)	20+ (unhardened surface)	No	1.3	7%	92	70
(7) Madison Avenue Pinelands (Madison Avenue Ext.)	20+	Yes	1.5	8%	169	113
(8) Great Dune (Willow Street)	12+	Yes	4.6	24.5%	450	98
(9) Kings Highway Barrens (Kings Road)	2 (unhardened surface)	Yes	1.0	5.3%	175	175
(10) Hunger Kill (East Lydius Street)	6	No	0.0	0%	185	0
Totals	**182+**	**9**	**18.8 miles**	**100%**		
Illegal paths	NA	NA	~14 miles	----	---	---

2. **Buildings and Structures (Public and Non-Public) –** A variety of structures and facilities (both public use and Preserve management related structures) are found in the Preserve and are identified in the list that follows.

   a. 1219 Kings Road - Barrens house, barn, and garage management complex. Non-public facility.
   b. 1232 Kings Road - One bay storage garage. Non-public facility.
   c. Rensselaer Lake Preserve and Park - Pavilion, concession stand, restrooms, guard shack, pump house, picnic area, kiosk. Park is operated by the City of Albany water department. Public Facility.
   d. 1123-1125 Kings Road - Old barn/garage. Non-public facility.
   e. 195 New Karner Road - APBPC Discovery Center/ Commission and Nature Conservancy Offices. Public / Private Facility.

3. **Standards and/or Functions of Facilities** - Overall, the Preserve lands are undeveloped, maintaining as natural an atmosphere as possible. Visible impacts of human recreational and educational activities within the Preserve are generally kept to a minimum. Several docks and bridges are located along some of the trails as well as trail markers on wooden

posts to help guide visitors through the Preserve. All trails are currently multiple-use and only the 0.4 mile-trail at Rensselaer Lake Preserve and Park has a hardened surface. Most boundaries of the Preserve are identified with Preserve boundary signage.

Rensselaer Lake Preserve and Park is, in part, a City of Albany Park managed by the Albany Water Department. As such, it differs considerably from the rest of the Preserve. It is developed with picnicking facilities, playground equipment, restrooms, waste barrels, and a concessionaire. The Discovery Center at 195 New Karner Road will provide visitors with environmental education exhibits and programs, rest rooms, classroom and program space as well as the Discovery Trail, an all access interpretive trail. The Field Station, eventually to be located at 1250 Kings Road, will include a modest structure for assembling groups for environmental education programs (Figure 2).

Many of the trails also serve as access for Preserve management activities including the prescribed fire program, invasive species management, and trail maintenance. Trails also double as firebreaks for the prescribed fire activities that are a regular part of ongoing Preserve management.

4. **Albany Pine Bush Preserve Activity Types –** The Albany Pine Bush Preserve is popular as a recreational and educational destination. Many passive, non-motorized activities are popular in the Preserve and include but are not limited to the following:

- hiking
- cross-country skiing
- nature study
- snowshoeing
- hunting, fishing, and trapping
- ice-skating
- jogging
- mountain biking
- pet walking/exercising
- horseback riding
- orienteering
- relaxing
- boating
- research
- volunteering
- art such as painting and photography
- educational group activities

5. **Patterns of Preserve Use** – Sign-in sheets collected at formal trailheads, preliminary data collected and analyzed during the summer of 2004 (Gray 2005), and APBPC staff experience throughout all seasons of the year generally indicate the following:

   a. Karner Barrens East, Madison Avenue Pinelands, The Great Dune trails, and Blueberry Hill West generally receive the most visits annually.

   b. The most common activities in the Preserve (from most to least popular) include walking, mountain biking, jogging, wildlife observation, walking pets, hiking, relaxing, hunting, fishing, and research.

   c. Annual Preserve use patterns indicate that the Preserve experiences higher visitation during the spring and fall and less use during the summer and winter seasons. Winter

use may increase significantly with good snowfall as cross-country skiing and snowshoeing are popular winter activities in the Preserve.

d. Daily use patterns indicate that weekday mornings (before 10 a.m.) and evenings (4 to 7 p.m.) are popular with variable but higher use during the lunch hour. Weekend use varies and tends to peak between 11 a.m. and 3 p.m. Use at night is very low to non-existent.

e. Approximately one-quarter of annual visitors are visiting the Preserve for the first time. Over two-thirds of Preserve visitors are visiting for at least the second time and over 70 percent are frequent visitors who live or work nearby.

f. Visitor use research in 2004 (Gray, 2005) provides a conservative calculation of Preserve visitation at 17,600 during the 13-week period extending from May 23 through August 29, 2004. This equates to a conservative annual estimate of more than 70,000 Preserve visits for 2004.

Additional surveys and research in the Preserve are needed during the spring, fall and winter seasons as these times of year were not surveyed as part of the 2004 research and will serve to complete these preliminary findings.

6. **Popular Albany Pine Bush Preserve Destinations** - A number of sites or portions of the Preserve are popular destinations for Preserve visitors. These sites are popular for a number of reasons, whether because of the resource experience opportunity areas they offer or because they provide a recreational outlet. Those currently considered most popular and receiving the heaviest use include the following (Figure 2):

- *Karner Barrens East Overlook* - A short walk to the top of a dune provides access to the typical pine barrens of the Pine Bush. Accessible from the best known trailhead–located off of New Karner Road behind the Discovery Center–this destination is very popular especially for first time visitors. (#1, Karner Barrens East/West)

- *Madison Avenue Pinelands Trails* - Providing access to one of the largest contiguous portions of the Preserve, this area provides more of a wilderness experience with several miles of trails that traverse a variety of habitat types. (#7, Madison Avenue Pinelands)

- *Rensselaer Lake Preserve and Park* - Managed by the City of Albany Water Department, the Park portion of this area provides typical park amenities not found elsewhere in the Preserve and include picnic tables and grills, playground equipment, a food vendor, large parking areas and restrooms. This is also the only significant area available in the Preserve for fishing and boating. (#3, Rensselaer Lake Preserve and Park)

- *Karner Blue Butterfly Sites* - Visitors typically are interested in the federally endangered Karner blue butterfly. These sites are carefully visited as part of educational walks led by staff and volunteers.

- *Trailheads and beginning portions of trails near businesses and homes* - Portions of trails closest to access points have the highest use levels because visitors will often walk a short distance along a trail and then turn around and come back out the same way they entered. Also, people who work and live near trail access points often use these areas on a very regular basis throughout the year.

7. **Preserve Areas with Special Use Designations** – Some areas of the Preserve may have temporary or permanent designations based on the activities or items found at these locations. Designated areas may be temporarily or permanently closed to some or all public use activities or may have specific rules and regulations that apply to public use activities in these areas.

    a. Hunting, fishing, trapping areas
    b. Rensselaer Lake Preserve and Park (City of Albany Park)
    c. Albany Pine Bush Preserve (natural area)
    d. Endangered Species Habitat areas
    e. Cemeteries
    f. Historic sites
    g. Preserve management areas

8. **Illegal Preserve Uses** – Illegal activities, whether directly related to recreation or education activities or not, occur in some areas of the Preserve on a regular basis and in other areas more sporadically. Either way, these activities are illegal according to the Albany Pine Bush Preserve Commission Rules and Regulations because they may impact the plants, animals, soils and overall functioning of the Pine Bush system as a whole in negative ways and/or may pose a safety concern related to other Preserve visitors. Illegal activities observed over the last nine years, since the Preserve Rules and Regulations were adopted (Appendix I), include the following:

    a. Use of motorized vehicles including all terrain vehicles, motorcycles and snowmobiles
    b. Picking vegetation such as fern fiddle heads and flowers
    c. Cutting vegetation
    d. Removing soils (sand)
    e. Traveling on closed trails
    f. Disturbing signs such as temporary trail closed signs and boundary signs
    g. Defacing / removing trail markers
    h. Traveling off of the legal trail system on approximately 14 miles of illegal paths or firebreaks by mountain bikers, hikers, equestrians, joggers and others (Figure 3).
    i. Pets off leash
    j. Pet feces not removed from trail
    k. Target practice with firearms and bow and arrow
    l. Dumping trash
    m. Littering
    n. Feeding wildlife
    o. Camping

p. Campfires
q. Erecting and storing personal property on Preserve lands
r. Erecting permanently affixed tree stands
s. Holding contests such as running events without a permit
t. Performing research without a permit
u. Failure to pre-notify the Commission of group events with more than 25 participants

Efforts to limit illegal activities have included signage, erecting gates and barriers, meetings with user groups, volunteer naturalist, volunteer Preserve Steward and volunteer mountain bike patrols, NYSDEC Forest Ranger and Environmental Conservation Officer enforcement, local municipal enforcement, enhanced way-finding devices along legal trails, rules and regulation postings at trailheads and on Preserve trail maps, etc. All of these techniques have been helpful to a certain degree. To date, a strong educational component along with NYSDEC Ranger and Environmental Conservation Officer educational enforcement are considered to be the most effective deterrents to these illegal activities.

C. Albany Pine Bush Preserve within the Context of the Capital District of New York State

1. **Key attractions in the Capital District (Ranked by # of visitors) –** The Albany Pine Bush Preserve is a popular destination for many people and while it may not be listed as one of the most popular attractions in the Capital District, it is important to note that visitor use of the Preserve is steadily increasing and that some visitors–especially those from outside the area–often visit the Preserve as part of a trip to another attraction in the area. Many of the other top 15 attractions are less than a two hour drive from the Albany Pine Bush Preserve.

   According to the March 2003 Business Review, the most popular attractions in the Capital District are:

   a. The Empire State Plaza
   b. Saratoga Race Course
   c. Great Escape and Splashwater Kingdom
   d. New York State museum
   e. Times Union Center
   f. Saratoga National Historic Park
   g. John Boyd Thacher State Park
   h. Howe Caverns
   i. Albany River Rats
   j. Glens Falls Civic Center
   k. Catskill Game farm
   l. Saratoga Performing Arts Center
   m. Clermont State Historic Site
   n. Proctor's Theatre
   o. Eagle Mills Cider Co. and Family Fun Center

2. **Development and Land Use Practices External to the Preserve**

   According to analyses of historic aerial photographs that covered a 4,800 acre portion of the Pine Bush Study Area, 39.4 percent of that area has been developed since 1940, with over 1,500 acres of pitch pine-scrub oak barrens and grassland/heath communities lost during that period (Finton 1998).

Between 1940 and 1990, the Capital District's population grew 32 percent, from 530,000 residents to 778,000 residents (CDRPC Population Data). The existing transportation network and municipal infrastructure (e.g. sewer, water, roads) in the area has contributed to increased development pressure within the municipalities that surround the Preserve and within the Albany Pine Bush Preserve Study Area. The utilities generally follow the road infrastructure, resulting in a pattern of road frontage development typical of suburban sprawl-based growth.

Zoning in and around the Preserve is a mixture of residential, commercial and industrial districts. Residential and industrial zoning districts are the most predominant zones within the Study Area boundary, followed by commercial. Residential land use has historically been the predominant developed land use. Overall, the amount of residential growth (in terms of housing units) between 1980 and 1999 within the municipalities that include the Pine Bush study Area has increased significantly. Between 1980 and 1999, the total number of residential building permits issued increased approximately 37 percent, while the total number of dwelling units within those buildings increased 98 percent (Capital District Regional Planning Commission [CDRPC], Capital District Residential Building Permits 1980-1999). While residential growth is increasing in more suburban communities such as the towns of Guilderland and Colonie, the City of Albany is experiencing growth in commercial, office, and warehouse uses (Morelli 2000, in APBPC 2002).

By year 2030, the Capital District's population is expected to reach 845,048 based upon population projections provided by the Capital District Regional Planning Commission (CDRPC Population Data). Increases in the local population will result in greater demands on infrastructure and community services, and will continue to change current land use characteristics and patterns. Even in communities with flat or slow population growth, changing demographics, especially smaller household sizes is leading to new household formation and hence increased demand for and production of residential dwelling units (APBPC 2002).

3. Potential Trail Connections Beyond the Albany Pine Bush Preserve

Within the context of local natural areas and trails within and connecting these areas, there are several possible plans to link the Albany Pine Bush Preserve to other locations by trail. An example is the proposed Patroon Greenway Trail, a project outside of the Albany Pine Bush Preserve and under separate management and planning guidelines. This is recommended to be a roughly six mile path between the Albany Pine Bush Preserve and the Corning Preserve. The trail would follow the flow of the Patroon Creek from its beginning near Rensselaer Lake in the Albany Pine Bush to its terminus at the Hudson River in Albany's Corning Preserve. It will most likely utilize a portion of the utility paths and Albany County Sewer rights-of-way. Approximately 1.5 miles from the Hudson River, the trail will traverse through the 80 acre Tivoli Preserve. The Patroon Greenway has vast potential as a major east-west connection to other regional trail/transportation systems. It is expected that this connection will attract many recreational and commuter users.

The proposed Patroon Greenway Trail, once completed, would provide trail access from the APBP to the 42 mile long Mohawk-Hudson Bike-Hike trail. There is also the possibility of a trail being designed to continue west beyond the Albany Pine Bush Preserve and connect with the Erie Canalway Trail in Schenectady. Other trail connections in the future could continue to link the APBP to more and more places over the years.

D. Resource Concerns and Threats / Resource Sensitivity Analysis

1. **Resource Concerns** - This portion of the RPVEV identifies the primary Preserve resources that are sensitive to human use and environmental change. These include plants, animals and their activities, natural systems and system functions, important habitat areas, historical and archeological sites, and structures.

a. **Rare, Threatened, and Endangered Species**, their habitats and special plant communities or associations.

Schneider et al. (1991) identified six plants, 14 invertebrates, and four amphibians and reptiles in the Albany Pine Bush that are listed as rare by the New York Natural Heritage Program. This list includes state and federally-listed endangered and threatened species. For the 2002 Preserve Management Plan, this list has been expanded, based on more recent Heritage data and by including declining and vulnerable species identified by the Albany Pine Bush Preserve Commission, The Nature Conservancy, and/or Partners in Flight. More than 40 wildlife species considered to be Species of Greatest Conservation Need in the New York State Comprehensive Wildlife Conservation Strategy (NYSDEC 2006) are documented within the Preserve. The association between rare, declining, and vulnerable species and ecological communities in the Albany Pine Bush is shown in Table 3. Pine barrens communities hold the greatest number of rarities, though there are several rare plant and animal species within the forest and wetland communities as we**ll.**

Table 3. Ecological Systems in the Albany Pine Bush Showing Communities and Rare Species within each System.

Ecological Communities	Rare, Declining, and Vulnerable Species
Pitch pine-scrub oak barrens Pine Barrens Vernal Pond Pitch Pine-Scrub Oak Barrens Pitch Pine-Scrub Oak Forest Pitch Pine-Scrub Oak Thicket	*Invertebrates* Barrens Dagger Moth A Noctuid Moth (*Apharetra dentate*) Dusted Skipper Broad-Lined Catopyrha Bird Dropping Moth A Noctuid Moth (*Chaetaglaea cerata*) A Noctuid Moth (*Chytonix sensilis*) Mottled Duskywing Skipper Inland Barrens Buckmoth Henry's Elfin Frosted Elfin Barrens Itame Karner Blue Butterfly A Noctuid Moth (*Macrochilo bivittata*) Edwards' Hairstreak Pine Barrens Zanclognatha *Plants* Yellow Giant-Hyssop Side-Oats Grama Schweinitz's Flatsedge Bayard's Malaxis Virginia False Gromwell Slender Marsh Bluegrass *Amphibians and Reptiles* Jefferson Salamander Spotted Turtle Eastern Hognose Snake Eastern Spadefoot Worm Snake Fowler’s Toad

Ecological Communities	Rare, declining, and vulnerable Species
Table 3. (Cont.).	*Birds* Prairie Warbler Sharp-Shinned Hawk Cooper's Hawk Wood Thrush Blue-Winged Warbler Golden-Winged Warbler Black-Throated Blue Warbler Yellow-Breasted Chat Whip-Poor-Will
Forests Appalachian oak-pine forest Pine-northern hardwood forests	*Birds* Sharp-shinned Hawk Cooper's Hawk Wood Thrush Blue-winged Warbler Golden-winged Warbler Black-throated Blue Warbler Yellow-breasted Chat
Wetlands Pine Barrens Vernal Pond Red Maple Hardwood Swamp Shallow Emergent Marsh	*Amphibians and Reptiles* Jefferson Salamander Spotted Turtle Eastern Hognose Snake Eastern Spadefoot Fowler's Toad

b. **Wetlands and Vernal Ponds** - Wetlands and vernal ponds serve as the breeding site for many amphibians and insects. They are also critical in the Pine Bush as there is often little surface water available for wildlife, especially during the dry summer months. (See Figure 1.)

c. **Erosive Soil and Steep Slopes** - Sandy soils, erosive by wind and water if exposed, especially in steep areas of ravines and sand dunes.

d. **Corridors for and Barriers to Plant and Animal Movement and Ecological Processes -** Functional ecological systems provide for the successful movement of plant and animal species from one location to another and the maintenance of critical ecological processes. As an ecosystem is fragmented it becomes increasingly difficult for plant and animal species to move successfully and either complete critical life stages or colonize available habitat. Maintaining viable plant and animal populations requires that animals regularly move from one place to another in search of food, mates, shelter, water, a new home

range, or to escape predators. These activities can be interrupted by a number of human activities including recreational and educational activities as well as development of roads, buildings and other infrastructure. While less obvious, this is also true for plants which rely on the successful introduction of seeds into available habitats across a landscape for their long term persistence within the ecosystem.

1. **Roads and Road Crossings** - Roads are barriers to movement for many types of animals and plants, often restricting movement or causing death to those animals that attempt to cross from one fragmented habitat patch to another.

2. **Recreational Trails** – Recreational trails and the associated activities on these trails can be a barrier or accelerator of some animal and plant movement. The physical tread and unvegetated character of a trail can reduce cover, allowing for greater predation, for example. Regular use of the trail by people can disrupt feeding, nesting, and other activities otherwise essential to healthy and viable wildlife populations and functioning of the natural system. At the same time trails can attract some animals to an area that would not otherwise be present or be present in such great numbers or frequency, disturbing the natural balance of the area. Recreational trails are also often vectors for plant movement as seeds are brought in either by Preserve visitors or on animals that regularly use the trail as a way to travel through an area.

3. **Streams and Ravine Drainages** - Stream corridors are very important to the movement of animals within and between ecological systems and can be disturbed by nearby trails, trails that cross the drainage, or excessive use of a stream area by an activity such as fishing. Roads and bridges often interrupt these corridors as well. Movement of aquatic wildlife such as fish, amphibians, or mollusks within these systems is often disrupted as well by human barriers or disturbances such as wading or crossing at locations where no bridge exists.

4. **Specialized Habitat** – Karner blue butterflies, Frosted elfins and other insects regularly move within their specialized habitat and may be disrupted or even killed by human activity within these habitat areas. Such disruptions to threatened and endangered species may be illegal under current state and federal wildlife laws.

5. **Movement Between Suitable Habitat Sites and Types** – Many animals including birds, mammals, insects, amphibians, and reptiles are also regularly moving to new locations. The distances for such movements vary greatly. The range for some mammals, for instance, is much greater than for some amphibians, as the mammals may travel many miles during the day. Interactions animals have with human recreation and education activities can disrupt these otherwise natural movements and potentially place the wildlife at greater risk to predation, starvation, nesting disturbance or other negative factors. Plants are also expanding their ranges by seed or other methods of reproduction and use of the Preserve by people can preclude or unnaturally accelerate these movements.

e. **Wildlife Winter Range** – Winter is typically the most difficult time of year for many animals because of the need to find food and water regularly while keeping warm and expending as little energy as possible. Disturbance by human activity during these times can be especially difficult and stressful for wildlife.

f. **Critical Nesting, Mating or Breeding Areas** -

1. The Karner blue butterfly is the New York State and federally endangered butterfly found in the Pine Bush and the Frosted elfin butterfly is a New York State threatened species. Dependent exclusively on the wild blue lupine during their larval stage, these butterflies are relegated to the few, small patches of lupine that currently exist in the Preserve.

2. A number of rare, at-risk, and protected bird species utilize the Albany Pine Bush Preserve in the breeding season as well as at other times during the year. For a number of the species the Preserve contains important breeding habitat of range-wide significance (Berger and Liner 2005; APBPC 2002; NYSDEC 2006). In particular, several protected raptors and a variety of shrub-land birds that depend heavily on the pitch pine-scrub oak barrens, including American woodcock, brown thrasher, prarie warbler, field sparrow, eastern towhee, and indigo bunting are documented in the Preserve (APBPC 2005).

3. The Inland Barrens Buckmoth, a rare moth of the Pine Bush, is found exclusively within the pitch pine-scrub oak barrens. The buckmoth caterpillars are common along trails in July and appear especially vulnerable to trampling during this larval stage.

4. Vernal ponds, streams, and other wetlands provide a critical resource to wildlife of the Pine Bush. Surface water not only serves as a source of drinking water for wildlife, but also as critical breeding sites and important habitats for a number of rare and common amphibians, reptiles, and insects.

g. **Historical and Archeological Sites and Structures** – It is important that all of the historic and archeological resources found in the Preserve be protected from vandalism, theft, and damage. They remain as a record of the ever-changing human history of the Pine Bush.

1. **Historic Military Sites** - Historic military structures exist in some portions of the Preserve and need to be protected from vandalism and unnatural rates of deterioration.

2. **Cemeteries** - Cemeteries dating back to the mid 1800s are sensitive to vandalism or theft and provide a sense of the human history of the area and should be preserved.

3. **Travel Routes** - The Pine Bush was once criss-crossed with sand roads. Some, like the Kings Highway, were used extensively in the past while others were very temporary in nature. Often the existing Preserve recreational trails follow some of these old sand roads and provide a portion of the record of the human history of the

Pine Bush as a destination and a connection between Albany and Schenectady and other locations.

4. **Tavern, Mill, and Home Sites** – Located along the sand roads were a number of establishments and homes that have long since disappeared such as the Truax tavern. Evidence of their existence is still noticeable as a depression in the ground where a foundation once was, a pile of stones along an old road or a stream that was impounded for irrigation or to possibly turn a water wheel.

5. **Settlement Sites** – These sites are scattered throughout the Preserve and are often identified by one or more depressions in the ground where a house or outbuilding once stood. Some building foundations are still partially intact and easily identifiable while others have been filled in or otherwise disturbed.

2. Resource Threats

a. **Contribution of Albany Pine Bush Preserve Recreational and Educational Activities to Ecological Stresses -** Typically, the negative impacts to plants, wildlife, and the ecosystem as a whole are not as great from trails and passive recreation as from more intensive development such as roads and buildings. However, trails and use of natural areas by people most often does affect wildlife and the system as a whole in various and often significant ways. By entering an area, people may change the ecology of a system that is complex and often hard to understand. Any trail and/or human use of the natural area will have impacts on the ecosystem. These impacts must be balanced with the recreational and educational benefits of the trail and/or the allowed use and objectives established for the Albany Pine Bush Preserve.

b. **Potential Recreational and Educational Stresses to the Pine Bush Ecosystem -** The following list of potential recreational threats, as determined for the Albany Pine Bush Preserve, is ranked from the highest to the lowest sources of stress from recreational activities and associated infrastructure on the ecology and wildlife of the Albany Pine Bush Preserve. "Planning Trails With Wildlife in Mind," produced by the Colorado State Parks Trails and Wildlife Task Force (Macdonald 1988) is a helpful resource providing additional detail on the potential recreational stresses listed below. It is also important to note that many of these stresses overlap and may result from one or more recreational and/or educational activities that occur in the Preserve.

1. **Habitat Fragmentation** - Fragmentation of the natural environment into smaller and smaller blocks or fragments is a common concern and significant threat to many natural areas. Habitat fragmentation is considered to be the single greatest threat to biological diversity (Macdonald 1998). Fragmentation reduces the size of available habitats, which can be problematic for area sensitive plant and animal species. These effects are often cumulative and can lead to the establishment of non-native plants, pests, and pathogens that can further reduce ecosystem health and viability.

Habitat fragmentation affects not only the movement of plants and animals, but also the functioning of natural processes critical to completing plant and animal life cycles. Processes such as periodic flooding, nutrient cycling, hydrology, or wildland fire are essential for successful reproduction of certain species and/or maintaining suitable plant and animal habitat. Fragmentation often interferes with or completely eliminates these larger ecological processes (Barnes 2003). The Pine Bush is an example of how an area can be "disconnected" so that the system can no longer function naturally and therefore requires intense management. Fragmentation can be caused by development, roads, trails, and other human disturbances of an area. Recreational trails in otherwise natural areas fragment these areas even further into smaller and smaller trail free areas. Careful trail planning is therefore necessary to minimize the damaging impacts associated with these recreational and educational uses of the Preserve. Minimizing fragmentation within the Preserve is essential, considering that strategies to reduce fragmentation beyond the Preserve boundaries are extremely limited.

In the Albany Pine Bush Preserve the effects of habitat fragmentation are especially evident. Less than 10 percent of the original extent of inland pitch pine-scrub oak barrens remains. Beyond the Preserve boundaries roads, railways, utility corridors, and development dissect the remaining Pine Bush ecosystem into fragments of varying size. Within the Preserve legal trails, illegal paths, firebreaks and other infrastructure further reduce the size of contiguous uninterrupted wildlife habitat. In addition to the 18.8 miles of legal trails currently in the Preserve, there are approximately 14 miles of illegal paths that cause additional fragmentation within the Preserve.

As a result, many plant and animals species are no longer found within the Pine Bush, populations of remaining species have declined, reproduction and recruitment of native species is reduced and non-native as well as native invasive plants are increasingly common. The greater than 90 percent decline of the Karner blue butterfly population in less than 30 years is but one example of the combined effects that fragmentation can have on ecological systems and wildlife populations.

2. **Erosion** - Erosion of soils and surface litter is often initiated and accelerated as a result of regular use of an area. Soils along trails are exposed and are no longer naturally protected by vegetation or organic litter such as leaves and fallen twigs and branches. Once exposed, these areas are prone to increased erosion from water and wind as well as from continued regular uses associated with recreation such as hiking, biking, equestrian use, walking and running.

3. **Wildlife Stresses** – Recreational activities can affect individuals, populations, wildlife communities, and entire ecosystems (Knight and Cole 1995). Wildlife stresses from recreation can take many forms varying from direct trail construction and use to the creation of new ecological edges to stresses from pets like dogs (Miller et. al. 2001). Factors affecting the impact of human disturbance on wildlife include the types of species and flushing distances, spatial arrangement of activities, the human activity type, predictability and intensity, the time of year, day and the type of wildlife activity (feeding, nesting, roosting) and habitat type (Miller et. al. 1998; Miller et. al 2001;

Taylor and Knight 2003). Disturbance by humans can cause wildlife to avoid otherwise suitable habitat, abandon nests, and reduce parental care. It can result in reduced fitness (Miller et. al. 2001) and even death (buckmoth caterpillar trampled on trail). These effects can be particularly problematic in fragments of urban open space where wildlife can have little if any opportunity to move into less-disturbed habitat and are more pronounced for off-trail activities (Miller et. al. 2001; Taylor and Knight 2003) which can reduce the ability of the habitat to support viable populations (Light and Weaver 1973, in Taylor and Knight 2003).

Hunting, fishing, and trapping by design affect wildlife as well. Generally these activities reduce specific animal populations and are carefully regulated by state and federal wildlife management agencies and can also serve as a wildlife management tool.

4. **Zone of Influence** –

"As with anything we build in the landscape, a trail changes its surroundings. Some of these changes are minor and temporary - such as when a deer moves away from an approaching hiker to return to browse once the hiker has gone. Other changes have wider ramifications and duration - such as when aggressive bird species follow trails expanding their habitat, displacing sensitive species, and preying on songbirds and other sensitive neotropical birds.

These changes to a trail's surroundings may extend for hundreds or even thousands of feet on either side of a trail. Collectively these effects define a ***zone of influence*** *associated with a trail" (Macdonald 1998).*

Because the Albany Pine Bush Preserve is already highly fragmented by transportation corridors and commercial and residential development, the impact of recreation and trails on the wildlife and ecology of the system is a particularly important factor to be considered. The negative impacts within the zone of influence along recreational trails, while different than zone of influence impacts from roads and other infrastructure outside the Preserve, is a variable that can be managed by the Commission and that must be considered when evaluating overall impacts to the Preserve from recreation. Some research related to some species of birds and mammals and impacts of passive recreational use has been performed and provides a reasonable basis for defining a zone of influence for the Preserve in the absence of recreational use research for the Preserve itself. Research is ongoing, however, and will provide additional information on the zone of influence and fragmentation for the Albany Pine Bush Preserve.

Existing research on passive recreational use of trails in natural areas indicates that the zone of influence for wildlife species can vary greatly depending on the species, vegetation, and topography of an area. For example, research of some species indicates the flight distance (distance when an animal actually moves as a result of the disturbance) can vary from 15 meters to 400 meters depending on the recreational activity and the species (Miller 1994, in Macdonald 1998). The animals may first respond to or be aware of the disturbance before they actually take flight as a result of

the disturbance. Effects on wildlife from recreational uses are measured by comparing alert distance, flight distance, and distance moved. Topography, vegetation type, characteristics of the trail itself, type of wildlife present, types of trail use, and frequency of use all play a part in determining this zone of influence and its variability along any trail. Available research indicates that roughly 75 meters to each side of a trail is an average zone of influence for the majority of bird species studied (Miller et. al.1998).

For the purposes of this plan this recommended average 150-meter zone of influence has been chosen for the Preserve and will be used when a trail's appropriateness is being reviewed. This entire area, or zone of influence, is a corridor 150 meters wide with the trail down the middle. Recreational activity that occurs on the trails as well as the physical characteristics of the trail itself may affect in some way the plants and animals that live or move within or through this 150-meter wide corridor and beyond (Figure 6).

When the 150-meter zone of influence is applied to the existing 18.8 miles of Preserve trails, 1,119 acres are within the zone of influence of the official trails. This is 37 percent of the area of the total 3,100 acre Preserve in 2009. Illegal paths–also described under the illegal activities (#9 below)–would add 417 acres of additional zone of influence based on approximately 14 miles of illegal paths that currently exist in the Preserve. The total acres within the zone of influence of the combined legal trails and illegal paths is 1,538 acres, or 51 percent of the Preserve area (Figure 7).

5. **Trampling of Biota** - One of the most easily observed impacts, trampling along trails, while usually localized, can alter habitat conditions and affect wildlife. Trampling can reduce the density of plants near the trail, alter the composition of plants by favoring exotic species that are more tolerant to trampling, and change the overall structure of the vegetation in the landscape. In addition, species that benefit from the microclimate of a trail may be easily trampled while on the trail surface.

6. **Soil Compaction** – Regular travel on soils can lead to compaction and compression of soils. Because the soil cannot absorb water as easily, compaction will often lead to erosion. Soil compaction can also impact the ability of plant roots to penetrate and stabilize these soils and can change the overall physical and chemical functioning of the soils, destroying soil structure and altering the hydrology of the area.

7. **Pollution** - Pollution can take many forms and impact the natural environment in many ways. Dumping trash and littering are common forms of pollution related to recreational use of natural areas. Pollution can also occur when high numbers of pets frequent certain areas and their concentrated droppings contaminate soils and surface water.

8. **Invasive Plants and Animals** - Non-native, invasive plants and animals can enter natural areas in a multitude of ways. Recreation can provide one avenue of entry. Weed seeds can enter in pet droppings and seeds can enter on hikers clothing and footwear. Aquatic pests may enter on boating equipment or in association with fishing

equipment. Once introduced and established, many invasive species can be difficult, if not impossible to eradicate from a natural area.

9. **Illegal Activities** – (Not included in the ranking system as this category may and often does cause one or more of the stresses listed and ranked above). Activities that are illegal may often be recreation- or education-related and may impact the plants, animals, and overall functioning of the Pine Bush system as a whole. These activities often have impacts that are included in one or more of the stresses previously discussed. Several examples may be travel on illegal paths by mountain bikers or hikers (Figure 3), camping in the Preserve, leaf collection by a school group without a permit or pets off leash. These illegal activities often lead to erosion, soil compaction, trampling, wildlife stresses, habitat fragmentation and possibly the additional spread of invasive plants, littering, and overall increased degradation of the natural area. Other illegal activities such as plant collection, dumping trash, or cutting vegetation can also have a number of direct and indirect stresses associated with them.

   Consistent law enforcement of the Preserve's rules and regulations is critical to the long-term success of this plan and the protection of the Preserve in general. A lack of regular enforcement is a significant threat to the Preserve because some recreational and educational users regularly violate the rules that were established to protect the Preserve and other Preserve users from damaging or otherwise inappropriate activities. Regular, consistent and long-term enforcement will greatly reduce the damage from illegal activities as well as providing an enhanced level of protection to all Preserve visitors.

c. Facilities Constructed on Preserve Lands for Recreation and Education Purposes.

Overall, the impacts of recreation and education on the Preserve fit into a number of categories. These include on-trail use impacts, off-trail use impacts, zone of influence impacts, and impacts associated with buildings, parking areas, trailheads and hardened trails such as the bike path at Rensselaer Lake. According to Article 46 of the NYS Environmental Conservation Law the Commission may "construct, or cause to have constructed, necessary facilities including trails and paths, an environmental education center and related parking areas on no more than 5% of the Preserve" (ECL Article 46 - Section 46-0109 (10)).

Preserve facilities including buildings, parking areas and trails

▪ Barrens House -	2 acres
▪ Discovery Center / Parking Lots -	3 acres
▪ Field Station (planned future) -	1.5 acres
▪ Rensselaer Lake Preserve and Park -	5 acres
▪ Parking areas: Willow and E. Lydius Street -	0.5 acres
▪ Trails (average 10 feet wide) -	22.78 acres
Total Preserve Acres with Facilities	**34.78 acres**

The Commission is well below the 5 percent figure with facilities (currently 1.15 percent) as described in this law and based on a 3,100 acre Preserve in 2009. This law reinforces the need, however, to continue to strive to minimize the impact of public use on the Preserve while still allowing and providing for controlled and appropriate public use. Construction of a parking area has an obvious negative impact on the ecology of the area. Less obvious are the effects of recreational and educational activities of some of the less obvious facilities and activities as reviewed in this plan.

Element 5: Describe a Range of Resource Conditions and Visitor Experiences; apply them to Geographic Locations within the Preserve

Element 5 describes the desired future conditions for the Preserve. It outlines what resource and managerial conditions and visitor experience opportunities will exist at the Preserve. Through developing and describing management zones for the Preserve, the carrying capacities of recreational use are defined. The management zone descriptions detail the type and extent of recreational use that will be permitted for each landscape area. It is intended that the recreation management zones below describe a perpetual and long-term vision for the natural resource conditions at the Preserve. Passive recreational uses are currently permitted on the Preserve. Each zone will allow varying levels of these uses from no use to some acceptable limit of use.

Four resource sensitivity management zones have been defined for the Albany Pine Bush Preserve, to include *Low*, *Medium* and *High Sensitivity Zones* as well as an *Off-Limits Resource Zone* (Figure 4). The management zones described below are not specifically defined in the Preserve Rules and Regulations, 6NYCRR Part 648, *Public Use of the Albany Pine Bush Preserve* (Appendix I). Rather, the rules apply to all public use activities within all these zones and provide the regulatory structure for the Commission to temporarily or permanently restrict activities in any part of the Preserve.

A. ***Low Sensitivity Resource Zone*** – Low Sensitivity Resource Zones of the Preserve are planned and managed so that large numbers of visitors can access and use these facilities. These areas include the Albany Pine Bush Discovery Center and Discovery Trail and Rensselaer Lake Preserve and Park. Descriptors in the table below convey the type of experience to be expected at these sites. Overall, low sensitivity resource zones are locations in the Preserve that include structures providing some level of indoor protection and separation from the outdoors. Restroom facilities, parking areas, and the potential for a variety of other conveniences are also found here. These zones are generally very active and noisy with little opportunity for solitude. The outdoor component of low sensitivity resource zones is generally the area immediately around the infrastructure and may include certain high use trails or other outdoor areas that receive high levels of use on a regular basis. Signage levels in these zones may be quite high. The acceptable level of visitor impact on the natural environment is greatest in this zone.

B. ***Medium Sensitivity Resource Zone*** – Medium Sensitivity Resource Zones of the Preserve are areas that are much less developed, provide a much lower level of visitor infrastructure, and allow for a more natural interaction with the Pine Bush environment. Medium sensitivity resource zones include trailheads and official trails throughout the Preserve. Multiple use trails are included in this zone and allow for controlled and appropriate use of the Preserve for recreational purposes.

Signage levels in these areas are limited to basic way-finding markers and signs. The acceptable level of visitor impact on the natural environment is much lower than in the low sensitivity resource zone. Trail planning and management principles are employed rigorously in this zone. The medium sensitivity resource zone allows for passive recreational uses and provides visitor access to the Resource Experience Opportunity Areas it contains.

C. ***High Sensitivity Resource Zone*** – High Sensitivity Resource Zones of the Preserve include areas where little if any visitor impact or infrastructure is easily observable. These areas include the greatest percentage (over 97 perent) of the land area of the Preserve. The opportunity for solitude is greatest in this zone and there is generally little if any interaction with other visitors while in a sensitive resource zone. Off-trail experiences in these zones are self-guided with no signs, trails or other way-finding devices. There are no structures or other developed visitor resources in this zone. Acceptable levels of visitor impact on this zone are very low.

D. ***Off - Limits Resource Zone*** **-** An off-limits resource zone is an area that would be temporarily or permanently closed to all public use because of the extreme sensitivity of the area to human uses and impacts and /or because of management activities occurring in that area. An off-limits resource zone may include a rare plant occurrence, an isolated sensitive animal population, a unique archaeological feature, or some other resource that should not be exposed to any public use. It would also include temporary closure when management activities such as controlled burning, mowing or tree removal work are taking place and on-site signage informs the public that the area is temporarily closed. In 2006 there are no permanent Off-Limits Resource Zones in the Albany Pine Bush Preserve.

Each of these zones described above has a corresponding set of visitor experiences and management actions as described in detail in Table 4.

Table 4. Management Zone Attributes, Albany Pine Bush Preserve

Management Zones	Low Sensitivity Resource Zone	Medium Sensitivity Resource Zone	High Sensitivity Resource Zone	Off-Limits Resource zone
DESCRIPTORS				
Challenge and Adventure of experience	Low	Medium	High	NA
Other visitor encounters	Very high	Medium	Very Low	NA
Tolerance for resource degradation	Medium	Low	Very Low	None
Trail highest standards	Surfaced, 8' wide	Unsurfaced, 10' wide	NA	NA
Opportunity for solitude	Very Low	Medium	High	NA
Management action for resource protection and visitor safety	Very High	Medium	Low	Very High
Dependence on Roads, trails or other facilities	High	Low	NA	NA
Trail development potential	High	Low	Very Low	None
Trail reduction potential	Low	Medium	NA	High
Maximum group size permitted	200	25*	25*	0
Noise level	High	Low	Very Low	Very Low
Need for offsite interpretation	Low	High	High	Very High
APBPC staff encounter expectations	High	Low	Very Low	Medium
Appropriateness of onsite interpretation	High	Low	Very Low	Very Low
Resource Experience Opportunity Area(s) interaction potential	Low	High	High	NA

***** Groups of 25 or more visitors must notify the Commission staff at lest five days in advance of a Preserve visit**.** ***6NYCRR Part 648, Public Use of the Albany Pine Bush Preserve.***

Element 6: Allocate the Potential Recreation Management Zones to Specific Locations in the Preserve (Prescriptive Management Zoning)

Element 6 takes the potential recreation management zones described in Element 5 and allocates them to specific geographic areas in the Preserve.

In Element 5 above, the Recreation Management Zones were described in text only. The primary method used in Element 6 to allocate these zones to the Albany Pine Bush Preserve is visually demonstrated on Figure 4. This map shows those portions of the Preserve in each zone and the locations of the zones in relation to each other.

Element 7: Select Indicators and Specify Standards for Each Zone; Develop a Monitoring Plan

Element 7 selects measurable characteristics or conditions that reflect the status of Preserve resources and visitor experiences and establishes standards, which when maintained, ensure that acceptable conditions are perpetuated. Principles and standards for trail appropriateness and construction are also defined in Element 7.

Table 5 below translates the management zone descriptions into quantitative variables and measurements. Indicators are specific, measurable physical, ecological, or social variables that reflect the overall condition of a zone. Standards describe the maximum acceptable condition for each indicator. Monitoring will be performed on a predetermined frequency and will guide the management action as needed to maintain the desired conditions.

Table 5 - Indicators, Standards, Monitoring and Management Actions

Indicator	Standard	Monitoring Frequency	Management Actions
Low Sensitivity Resource Zone Indicator			
Encounters between recreational visitors	No more than 20 encounters with other groups within one visit.	Daily as observed by staff, volunteers, and the public	• Manage use • Redirect use • Limit use
Evidence of any illegal use per APBP rules and regulations*	Illegal use per APBP rules and regulations not to exceed 10 reports annually.	As reported by volunteers / public or noted by staff and enforcement personnel.	• Education of user groups • Signage • Physical barrier • Enforcement • Rehabilitate Resource
Presence of priority exotic plant species	An exotic plant is observed that was not noted the previous season or an exotic plant is noted in a new location.	Annual presence / absence and distribution survey	• Manage occurrence as detailed in APBP Weed Plan

Table 5 (Cont.).

Medium Sensitivity Resource Zone Indicator	**Standard**	**Monitoring Frequency**	**Management Actions**
Trail Compaction and / or Erosion	Water gullying more than 2 inches deep from any one weather event. More than 2 inches of soils lost within 3 years.	Biannually walk trails. Monitoring stations along trails, annually.	• Install waterbars • Refill area w/ sand • Reroute trail • Close trail • Enforcement
Trail Width (tread) is expanding beyond established standard tread width	10' maximum tread for trails that also serve as firebreaks and will need to be drivable with a truck for Preserve management purposes; 6' maximum for non-driveable trails	Once each season; four times annually	• Resolve issue causing trail expansion • Physical barrier • Signage • Enforcement • Rehabilitate resource
Vegetation disturbance along trails	Vegetation impacted no more than 5' beyond trail centerline for drivable trails; 3' on non-drivable trails	Once each season; 4 times annually	• Education of user groups • Physical barrier • Enforcement • Signage • Rehabilitate resource
Encounters between recreational visitors	No more than 3 encounters with other groups within one visit.	Monthly	• Manage use • Redirect use • Limit use
Evidence of any illegal use per APBP rules and regulations*	Illegal use per APBP rules and regulations not to exceed 5 reports annually.	As reported by volunteers / public or noted by staff and enforcement personnel.	• Enforcement • Education of user groups • Signage • Physical barrier • Rehabilitate resource
Wildlife mortality	No more than 5 carcasses per 1000 feet of trail. (ex: buckmoth larvae crushed on trails)	Monthly, weekly or daily, especially during critical life stages for rare, declining, and vulnerable APB species.	• Seasonal trail / area closure • Enforcement • Signage
Presence of priority exotic plant species	An exotic plant is observed that was not noted the previous season or an exotic plant is noted in a new location.	Annual presence / absence and distribution survey	• Manage occurrence as detailed in APBP Weed Plan

Table 5 (Cont.).

High Sensitivity Resource Zone Indicator	**Standard**	**Monitoring Frequency**	**Management Actions**
Evidence of any illegal use per APBP rules and regulations*	Illegal use per APBP rules and regulations not to exceed 3 reports annually.	As reported by volunteers / public or noted by staff and enforcement personnel.	• Enforcement • Education of user groups • Signage • Physical barrier • Rehabilitate resource
Encounters between recreational visitors	No more than 1 encounter with another group within 1 visit.	As reported by volunteers / public or noted by staff and enforcement personnel.	• Manage use • Redirect use • Limit use
Trampling / soil disturbance	Trampling of vegetation and/or surface litter or soil on more than 1 square meter.	Monthly, weekly or daily, especially during critical life stages for rare, declining, and vulnerable APB species.	• Enforcement • Rehabilitate resource • Education of user groups • Physical barrier • Signage
Presence of priority exotic plant species	An exotic plant is observed that was not noted the previous season or an exotic plant is noted in a new location.	Annual presence / absence and distribution survey	• Manage occurrence as detailed in APBP Weed Plan
Illegal path construction and use	An illegal path is found with evidence of regular public use including trampling, erosion, or other vegetation or soil disturbance	Once each season; 4 times annually	• Enforcement • Rehabilitate resource • Improve nearby legal trail definition and marking • Education of user groups • Physical barrier • Signage
Off - Limits Resource Zone Indicator	**Standard**	**Monitoring Frequency**	**Management Actions**
Evidence of any public use	Any evidence of use by preserve visitors	Monthly, weekly or daily, especially during critical life stages for rare, declining, and vulnerable APB species.	• Enforcement • Signage • Physical Barrier

* See Appendix A – Education through law enforcement on a regular and consistent basis is critical to long term protection of the Preserve.

A. Albany Pine Bush Preserve Multi-Use Trail Review and Development Standards

In an effort to minimize the recreational and educational stresses associated with public use of the Preserve and the Preserve trails, while allowing for an acceptable level of controlled and appropriate public use, the following trail review and development standards have been established for the Albany Pine Bush Preserve. These standards will be used at least every five years to review the existing trails of the Preserve. They will also guide the review process for any new trails that are proposed for the Preserve.

1. Review of Existing Preserve Trails & Proposed Conceptual Revised Trails

"A trail that is contributing to the sustainability of an area is meeting people's fundamental desire to experience nature while not compromising the ecological integrity of the area. This implies careful planning of trails so that they do not seriously degrade biodiversity" (Macdonald 1998).

The existing Albany Pine Bush Preserve official multi-use trail network will be reviewed by the Commission every five years to ensure that the following objectives are being met.

a. **Provide access** along at least one Preserve trail to each Resource Experience Opportunity Area or ~~r~~oom." As described earlier in this plan the quality of the visitor experience and the opportunity to experience these different spaces is an objective of this plan. Visitors will have access to trails in most regions of the Preserve as appropriate to provide opportunity for these experiences. However, not all experience rooms will necessarily be available on each trail or within every region of the Preserve.

Table 6 – **Resource Experience Opportunity Areas found in each Preserve Region**

Region	**Total Acres**	**Resource Experience Opportunity Areas (REOA's) in this Preserve region.**	**# of REOA's (24 max)**	**REOA's not in this Preserve region**
Karner Barrens East	293	1,2,3,4,6,8,10,11,12,15,16, 17,18,19,21,22,23,24	18	5,7,9,13,14, 20
Karner Barrens West	100	2,3,4,10,16,17,21,22,23	9	1,5,6,7,8,9,11,1213, 14,1518,19,20,24
Blueberry Hill East/West	195	1,2,3,4,9,10,12,15,16,17, 18,19,21,22,23,24	16	5,6,7,8,11,13,14,20,
Kaikout Kill Barrens	92	1,2,3,4,5,9,10,13,14,15,17, 22	12	6,7,8,11,12,16,18, 19,20,21,23,24
Great Dune	450	1,2,3,4,5,6,7,9,10,11,12, 13,14,15,16,17,18,19 21,22,23,24	22	8,20
Madison Avenue Pinelands	251	1,2,3,4,5,9,10,13,14, 15,16,17,21,22,23	15	6,7,8,11,12,18,19,20 ,24
Kings Highway Barrens	621	1,2,3,4,5,6,7,8,9,10,11,12,1 5,16,17,19,21,22,23,24	20	13,14,18,20
Rapp Barrens	164	1,2,3,4,5,6,7,9,10,17,19,21, 22,23,	14	8,11,12,13,14,15,16, 18,20,24

Rensselaer Lake Preserve and Park	68	1,2,3,4,5,6,9,10,17,19,20,23	12	7,8,11,12,13,14,15,16,18,21,22
West of Morris Road***	218	1,2,3,4,5,6,7,9,10,11,12,16,17,19	14	13,14,15,18,20,21,22, 23,24
Trailer Park to Rapp Road	102	No trail current Landfill mitigation trail??		
Siver / Old State Road area	454	1,5,6,9,10,11,12,13,14,17,23,24	12	2,3,4,7,8,15,16,18,19,20,21,22
TOTALS	3008			

Resource Experience Opportunity Areas, descriptions begin on p. 15
1. Appalachian oak-pine forest
2. Pitch pine – scrub oak barrens
3. Pitch pine – scrub oak thicket
4. Pitch pine – scrub oak forest
5. Pine – northern hardwood forest
6. Red maple hardwood swamp
7. Shallow emergent marsh
8. Pine barrens vernal ponds
9. Successional northern hardwoods
10. Successional southern hardwoods
11. Successional old field / Brushy cleared land
12. Savannah restoration sites
13. Ravine
14. Ravine Rim
15. Dune Ridge/Top
16. Frost pocket
17. Trail or unpaved road
18. Sand mine/dune cut
19. Ponds, lakes
20. Rensselaer Lake Park (Fuller Rd)
21. Mowed area
22. Burned area
23. Invasives treatment area
24. Cleared forest area

b. **Reduce fragmentation** by reviewing trails that bisect larger otherwise trail free Preserve areas. Some trails may need to be eliminated or rerouted to reduce the fragmentation of the site, creating larger areas that are not regularly visited by recreational and educational visitors on an official trail (Figures 11 & 12).

c. **Eliminate overlapping zones of influence** – The zone of influence of some trails may either overlap with the zone of influence of another trail or the zone of influence of a road, railroad, or other fragmenting feature. Roads and railroads have also had a 75 meter zone of influence applied to them in this plan although the zone of influence for these use types is often considered to be much greater than the zone of influence for a trail. Trails or portions of trails could be modified or eliminated in these areas. Trails

could also be rerouted within the zone of influence of a road to take advantage of the already highly influenced area and keep the trail out of the more interior portions of the Preserve. Trails should be consolidated whenever possible (Figures 7, 10, 11 & 12).

2. Albany Pine Bush Preserve Trails Analysis –

The existing Albany Pine Bush Preserve trail network has been reviewed using the standards found in this RPVEV including the rationale for patch size and core area as described in the Albany Pine Bush Pine Barrens Viability Assessment (Bried and Gifford, 2008). Based on this review an analysis of the existing and conceptual revised trail systems along with corresponding maps are provided to illustrate what the application of this RPVEV may look like when applied to the existing Preserve trail system and the Preserve as a whole. The conceptual revised trail system serves to visually clarify the trail review and development standards as they would be applied to the Preserve (Figure 8). Further revisions and review of the conceptual revised trail system may be needed and changes may be made. The revised trail system would be implemented over a period of years with changes being phased in either by region or trail within the Preserve. Also, some of these trail recommendations as illustrated in figure 8 would require trail easements or acquisition of properties currently under private or corporate (ROW's) ownership to be fully realized.

Table 7 – Trails Analysis of Existing Trails and Conceptual, Revised Trails

Preserve Region	Total Acres in Preserve Region	Total current "Core Area" acres*	Total proposed "Core Area" acres*	Increase/ decrease in "Core Area" acres	Current largest patch in acres	Proposed largest patch in acres	Increase/ decrease in largest patch size in acres	Current trail miles	Proposed trail miles	Increase/ decrease in trail miles
Karner Barrens East	293	66	106	+40	33	81	+48	3.9	3.16	-.74
Karner Barrens West	100	8	17	+9	6	16	+10	1.4	0.7	-0.7
Blueberry Hill East/West	195	27	66	+39	4	50	+46	2.8	2.6	-0.2
Kaikout Kill Barrens	92	11	23	+12	6	21	+15	1.4	0.8	-0.6
Great Dune	450	166	220	+54	34	149	+115	4.6	3.5**	-1.1
Madison Avenue Pinelands	251	72	78	+6	8	40	+32	1.5	1.8**	+0.3
Kings Highway Barrens	621	275	210	-65	160	131	-29	1	2.2^^	+1.2
Rapp Barrens	164	38	51	+13	33	48	+15	1.4	1.7	+0.3
Rensselaer Lake Preserve and Park	68	12	12	0	12	12	0	.87	.37	0
West of Morris Road* **	218	108	101	-7	24	24	0	0	1.2^^	+1.2^^
Trailer Park to Rapp Road	102	16	16	0	16	16	0	0	0	0
Siver / Old State Road area	585	360	288	-77	107	67	-40	0	2.6	+2.6
TOTALS	3139	1159	1188	+29				18.8	20.73	+2.36

*acres not within any 150-meter road Zone of Influence (ZOI), 75M trail ZOI or 150 M Railroad ZOI.
**Portions of these trails are in the National Grid PROW, not on Preserve lands
*** Non-contiguous Preserve parcels west of Morris Road and North of the NYS Thruway.
^This number represents the largest contiguous patch in a given region of the Preserve that is unaffected by a ZOI from either roads or trails.
^^Not all proposed trails in this area are on lands currently owned as part of the Preserve. Some proposed trail is also on Utility ROW's.

A number of figures (maps) are provided at the end of this RPVEV to illustrate the concepts of fragmentation and the zone of influence as applied to the Preserve. Additional maps show the fragment size changes based on the proposed conceptual revised trail system, specifically the increase in the size of many core areas, particularly in some of the highest quality pine barrens portions of the Preserve. Also shown is the proposed conceptual revised trail system total miles of trails which, if fully implemented, would increase from 18.8 to 20.73 miles. This trail concept also incorporates Preserve end to end trails both north and south of the NYS Thruway. See Figures 5 through 13.

Figure 5 – APBP existing trail network – this map shows the 18.8 miles of trails that currently exist in the Preserve.

Figure 6 – APBP existing trail network with a 75M zone of influence applied to each side of the trail.

Figure 7 – APBP existing trail network with a 75 meter zone of influence applied to each side of the trail AND a 150 meter zone of influence applied to all roads and railroads in the Preserve.

Figure 8 – APBP proposed conceptual revised trail system with locations of existing, new, ROW, private, road-crossing trails indicated.

Figure 9 – APBP proposed conceptual revised trail system with a 75 meter zone of influence applied to each side of the trail.

Figure 10 – APBP proposed conceptual revised trail system with a 75 meter zone of influence applied to each side of the trail as well as a 150 meter zone of influence applied to all roads and railroads in the Preserve.

Figure 11 – APBP proposed conceptual revised trail system with trails to be closed indicated.

Figure 12 – APBP proposed conceptual revised trail system and largest core area changes before/after trail system changes.

3. **Trails Development Standards** – The following questions provide guidance in determining if an existing trail or proposed new trail is appropriately located. Questions with a "no" answer must be reviewed and alternatives proposed as part of the determination of trail appropriateness.

    a. Does the trail avoid fragmenting an otherwise large, contiguous portion of the Preserve into smaller areas? (Trails along edges are generally more appropriate than a trail through the center of an area).

    b. Does the zone of influence of the trail (75 meters from trail center to each side, 150 meter-wide corridor total) avoid overlapping with the zone of influence of other trails along more than 90 percent of the trail length?

    c. Does the trail avoid crossing or otherwise impacting habitat that is ranked high or very high in Table 1, column titled Relative Importance of an Area Related to Preserve Purpose?

    d. Does the trail avoid crossing or paralleling a stream or otherwise impacting a riparian area?

    e. Does the trail use existing disturbance patterns for its location (old sand road, powerline right-of-way, firebreak, etc.) and is that the desired location as well? Specify percent of proposed trail not using existing disturbance patterns and requiring new construction.

    f. Does the trail provide access to one or more Resource Experience Opportunity Areas that cannot already be experienced along another trail elsewhere in the Preserve? Describe.

g. Does the trail fulfill a social, educational, or other special need that is not already met elsewhere in the Preserve? Describe.

h. Is there a plan and resources for long-term maintenance of the trail?

i. Does the trail also allow for motorized Preserve management access (multi-purpose)?

j. Does the trail adhere to accepted trail planning and management principles (described below)?

k. Does the trail allow for or incorporate the removal of another trail elsewhere in the Preserve or does the trail effectively combine two or more other trails with a cumulative "no net gain" in miles of trails for the Preserve.

l. Does the trail and its future usage avoid impacting areas of the Preserve important to traditional uses (such as hunting and trapping) which can be sensitive to even low levels of human use?

4. Trail Planning and Management Principles

The following planning and management principles will be employed when constructing any new trail or repairing or reviewing any existing trail in the Preserve.

a. **Wildlife Sensitive Trail Planning Principles** (Macdonald 1998)

1. Consider the zone of influence of the trail and the areas being influenced
2. Keep unfragmented, trail-free habitat areas as large as possible
3. Route trails around edges rather than through undisturbed habitat
4. Avoid small patches of quality habitat
5. Run trails outside of riparian areas
6. Minimize stream crossings
7. Maximize stream buffers
8. Avoid areas known to contain threatened or endangered species
9. Work with existing patterns of disturbance
10. Weigh the alternatives carefully

11. Concentrate recreational use rather than dispersing it

b. **Trail Planning General Principles for Sustainable and Aesthetic Trail Construction** (Fink et. al. 2001, Anon. 2001)

1. Eliminate the potential for erosion by avoiding steep areas where erosion could become a problem. Grades along trails should not exceed 10 percent and between zero and five percent is best.

2. Minimize soil disturbance to allow plants and animals the best chance for survival.

3. Use correct and aesthetic pruning for removal of tree limbs.

4. Minimize drainage problems by removing water at the first opportunity.

5. Maintain existing drainage patterns; do not force nature.

6. Outslope the trail to dispose of sheet drainage; accurately shape backslope to prevent erosion.

7. Attain proper slope and compaction through a detailed analysis of on site conditions during wet and dry periods.

8. Where appropriate narrow the clearing width by leaving brush close to the trail's edge; excessive clearing allows bicycles to travel faster and leave the trail when cornering.

9. Trails should be cleared to a height of 10 to 12 feet to allow horseback riding and to accommodate drooping branches heavy with rain or snow.

10. Wide, gentle curves with good forward sight distances are critical for safety, aesthetically pleasing, and easier to maintain.

11. Whenever possible provide forward sight distances of 100 feet (50 feet minimum) because the trail will be shared by hikers, equestrians and bikers.

12. Keep water crossings to a minimum and avoid wet areas and slopes.

The Commission may, based on the standards and principles above, determine that it is necessary to close, re-route, or add some trails in the Preserve. All trails under consideration for closure as well as any newly designated official trails would be phased in over time so visitors may be made aware of the need to close some trails and/or open others.

5. Future New Trails –

As additional land is added to the Preserve, continuing toward a goal of 4,610 acres, the opportunity will potentially exist for additional trails to be designed and constructed in the Preserve. These trails could either connect existing loop trails to provide end-to-end Preserve travel, or serve as new loop trails in areas that are currently without trails. Some possible new trails are shown on the trails analysis maps described in more detail in the trails review previously described. New trails could also connect to trails outside of the Preserve, allowing for greater overall regional recreation and transportation opportunities (Figure 8).

Within the various regions of the Preserve, as defined by roads such as the New York State Thruway and New Karner Road (Route 155) that fragment the Preserve into regions, a variety of visitor experience opportunities currently exist. For example, regions with no official trails may provide opportunity for more solitude for those comfortable without wayfinding devices such as marked trails. Regions with longer trail loops provide a different opportunity and experience than those regions where shorter loop trails are provided, such as the future discovery trail, a trail associated with the Albany Pine Bush Preserve Discovery Center.

The trail development standards and management principles outlined above will be used to consider each new trail, whether proposed internally by Commission staff or externally by an individual or organization. All trail construction within the Preserve is the responsibility of the Commission and will be supervised by Commission staff to ensure that the standards are followed and that overall trail design and construction are appropriate.

Elements 8 & 9: Monitor Resource and Social Indicators and Take Management Action

Elements 8 and 9 shift the focus from planning to implementation. The indicators identified are monitored and decisions are made as to what, if any, management action is warranted.

Commission staff and volunteers will monitor resources and social indicators as described in this plan. Data from this monitoring process provides the feedback and documentation necessary so that appropriate management actions as described above can be implemented.

Monitoring may indicate one or both of the following situations requiring management action.

1. Deterioration – Management action required based on deteriorating resource or social conditions that are moving toward the standard but have not yet reached it. Management action could be initiated to slow or reverse the trend before it reaches the standard and possibly requires a more drastic management action.

2. Out of Standard – Management action required because the resource or social condition has gone below (or above) the pre-determined standard and the conditions are unacceptable. Management action may need to be more drastic to restore and maintain acceptable conditions.

Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision Recommendations and Conclusions –

The Albany Pine Bush Preserve is a wonderfully unique natural area that serves as a recreational and educational resource in the Capital District of New York State. People have enjoyed and will continue to enjoy the Albany Pine Bush Preserve for years to come, especially because it is protected and properly managed. Protection of this resource is the primary goal of the Commission and this includes managing all public use of the Preserve.

This plan recommends that the monitoring and management actions within this plan be initiated upon approval of the plan by the APBPC Technical Committee and final approval by the APBP Commission. The following recommendations will be initiated within the five years following Commission approval:

- The existing Preserve trail system and associated infrastructure will be reviewed based on the standards described in this plan. Necessary changes will be implemented.

- Legal, off-trail public recreational and educational Preserve activities will be reviewed, particularly as they relate to federally endangered species occupied habitat, consistent with the Endangered Species Act.

- Monitoring of the resource zones will be implemented at the frequencies recommended by the plan and the necessary management actions will be implemented if necessary.

- The RPVEV will be reviewed on the same five year cycle as the APBP Management Plan. This regular review will consider if the RPVEV is still effectively protecting the natural resources of the Preserve as intended while also providing Preserve recreational and educational users with the experiences and opportunities outlined in this plan. Any necessary revisions could be made at this time.

- Consistent enforcement of the Preserve rules and regulations will continue to be a Preserve protection priority with additional enforcement capacity needs considered.

- Continue to explore the feasibility of linking the Albany Pine Bush Preserve with other paths and trails within the regional context.

The RPVEV process described in this document provides a useful management tool for the Commission as it seeks to fulfill its responsibility to protect and manage a landscape of rare and

endangered natural communities and species while allowing controlled and appropriate use of the Preserve for recreational and educational purposes. This plan, along with the associated monitoring and management actions, will guide future management actions and allow visitors to enjoy this natural area while minimizing the potential negative impacts that recreational and educational use can have on the unique and threatened resources of the Albany Pine Bush Preserve.

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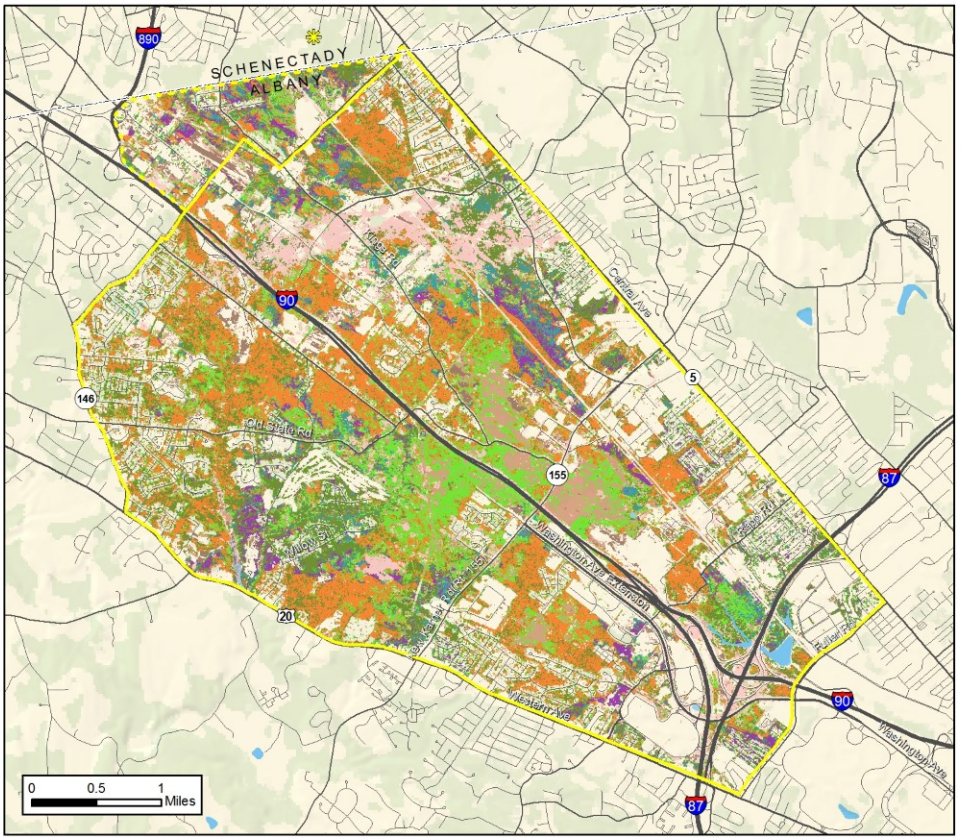


Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- Albany Pine Bush Study Area
- Study Area Expansion
- Woodlawn Preserve

Land Cover Types

- Developed - 4200 ac
- Open Field - 300 ac
- Appalachian Oak Pine Forest - 2200 ac
- Pitch Pine Scrub Oak Forest - 1400 ac
- Black Locust - 2200 ac
- Aspen - 1200 ac
- Water - 30 ac
- Red Maple Swamp - 400 ac
- Wetland - 450 ac
- Pitch Pine Scrub Oak Barrens/Thicket - 620 ac

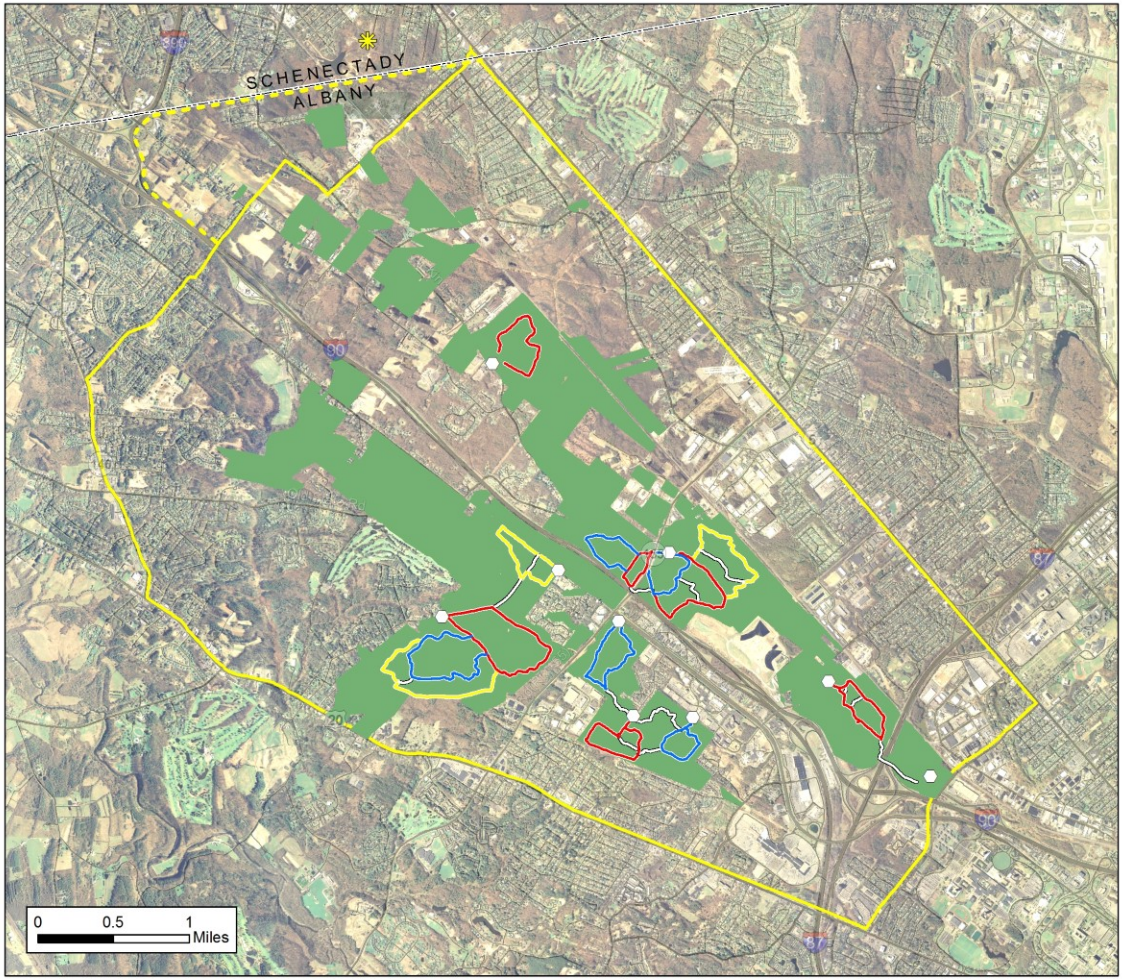
Sources:
Land Cover - 2003, Kinal, Based on Quickbird CIR 2.8 m imagery
Tree Canopy Cover - 2001, USGS
Roads - 2009, NY CSCIC

Prepared For: Albany Pine Bush

Prepared By: The Nature Conservancy "Protecting nature. Preserving life"

November 2009

Figure 1
APBP Ecological Communities



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- Albany Pine Bush Study Area
- Protected Lands
- Study Area Expansion
- Woodlawn Preserve
- Trailheads

Trails

- Blue
- Red
- White
- Yellow

Sources:

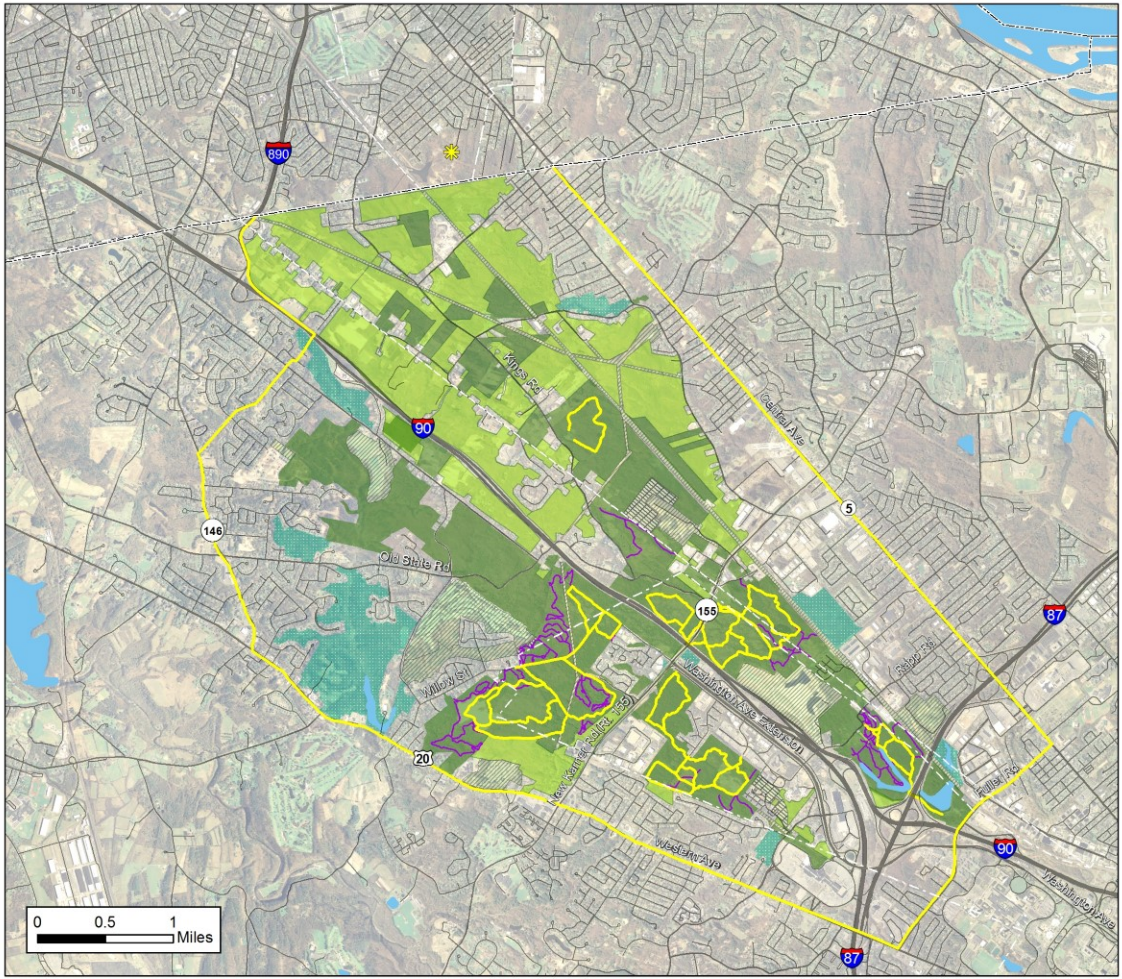
Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.
Trails - 2009, Albany Pine Bush Preserve
Roads - 2009, NY CSCIC

Prepared For: Albany Pine Bush Preserve Commission

Prepared By: The Nature Conservancy — Protecting nature. Preserving life.

May 2009

Figure 2
APBP Recreation and Education Facilities



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP Existing Trails
- Illegal Paths
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:

Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

Prepared By:

Albany Pine Bush Preserve Commission

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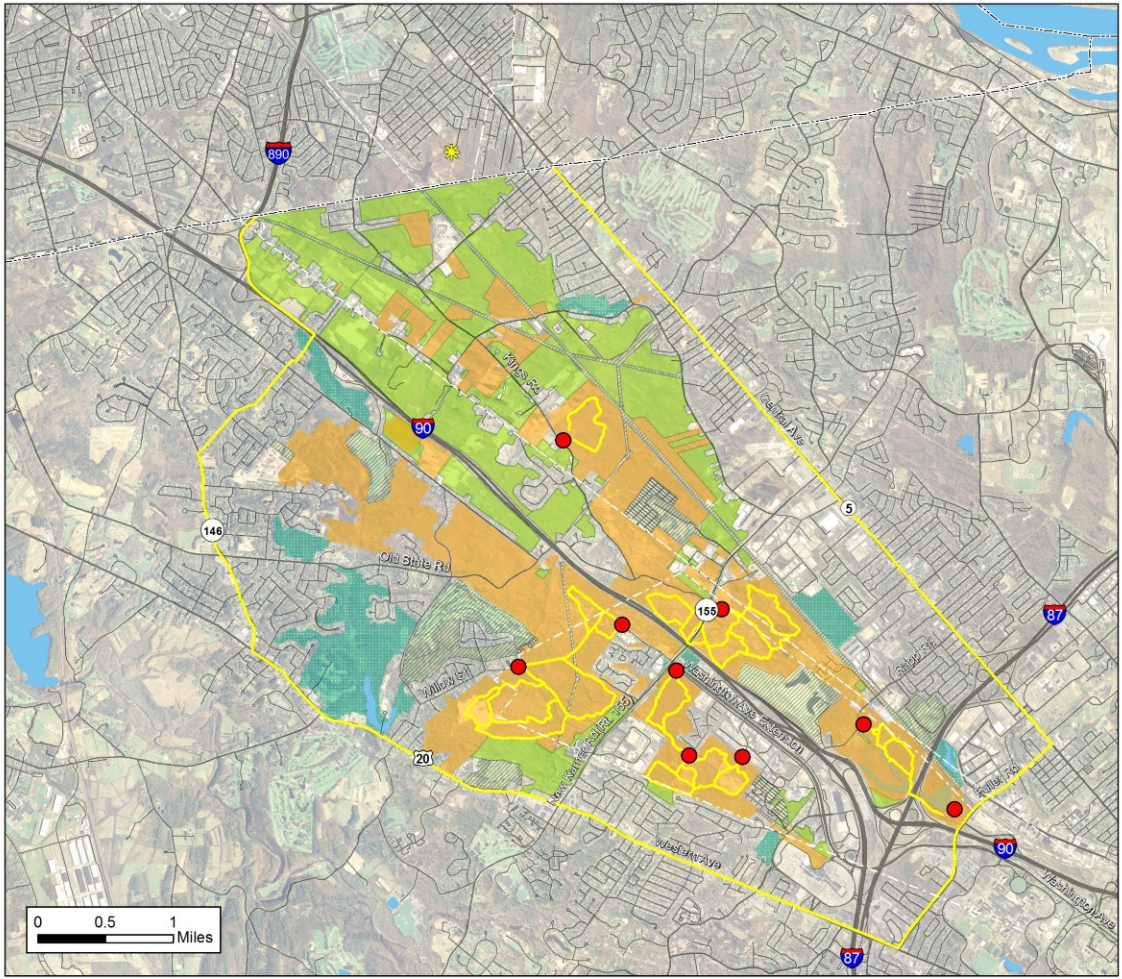
Figure 3
Legal Trails and Illegal Paths



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- Low Sensitivity Resource Areas
- Medium Sensitivity Resource Zone
- High Sensitivity Resource Zone
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Albany Pine Bush Study Area

Sources:

Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

Prepared By:

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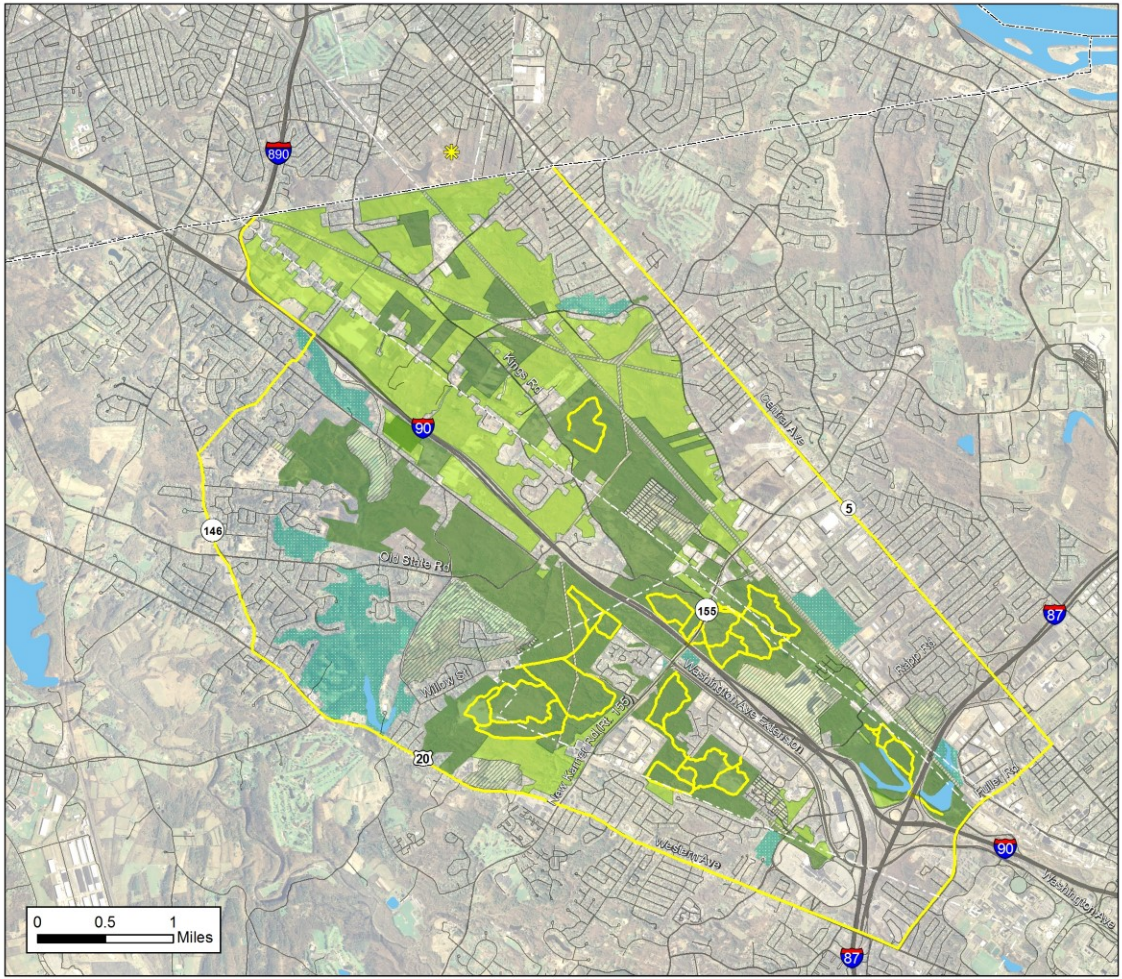
Figure 4
Resource Sensitivity Zones



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP Existing Trails
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:

Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

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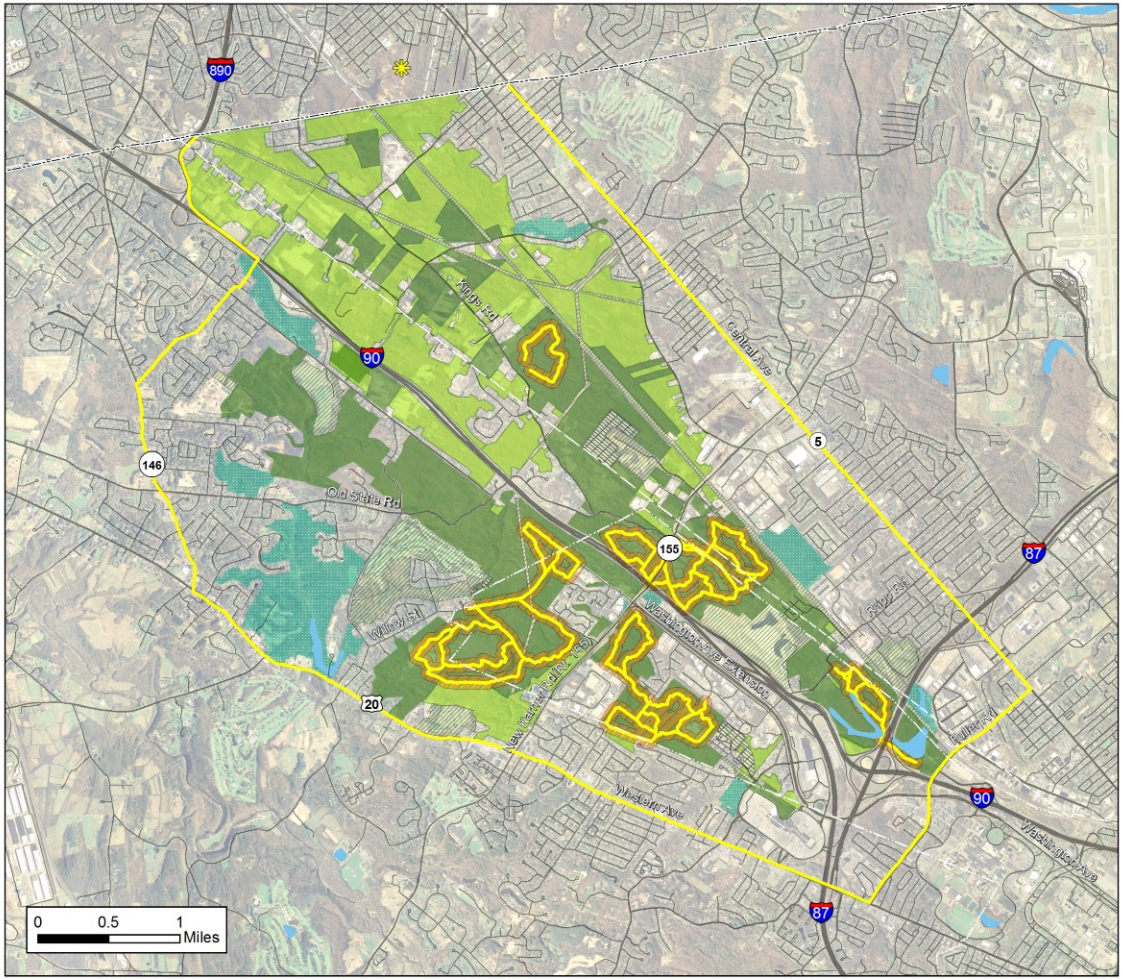
Figure 5
APBP Existing
Trail System



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP Existing Trails
- 75 M Trail Zone of Influence
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:

Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

Prepared By:

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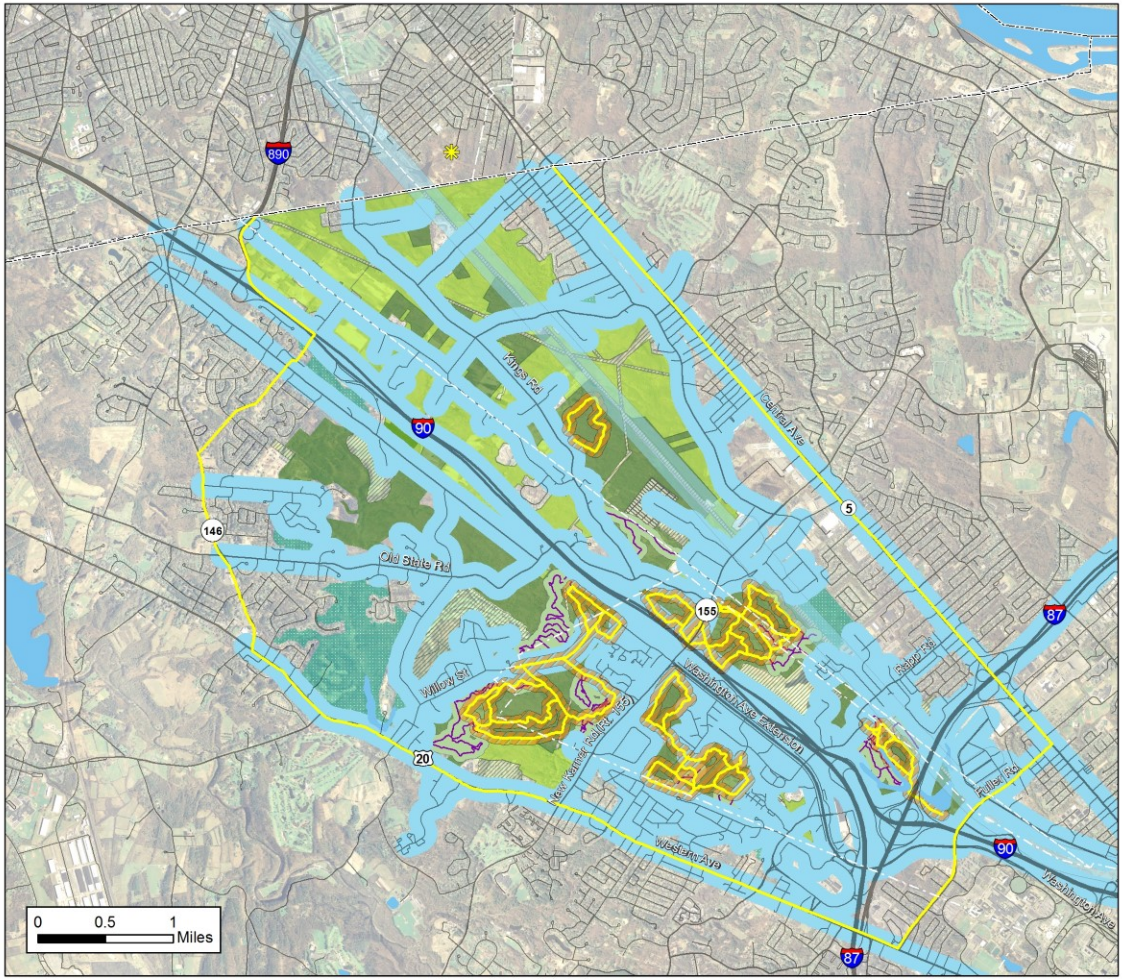
Figure 6
Current Trail System
with Zone of Influence



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP Existing Trails
- 75 M Trail Zone of Influence
- Illegal Paths
- 75 M Illegal Path Zone of Influence
- 150 M Road Zone of Influence
- 150 M Railroad Zone of Influence
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:

Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

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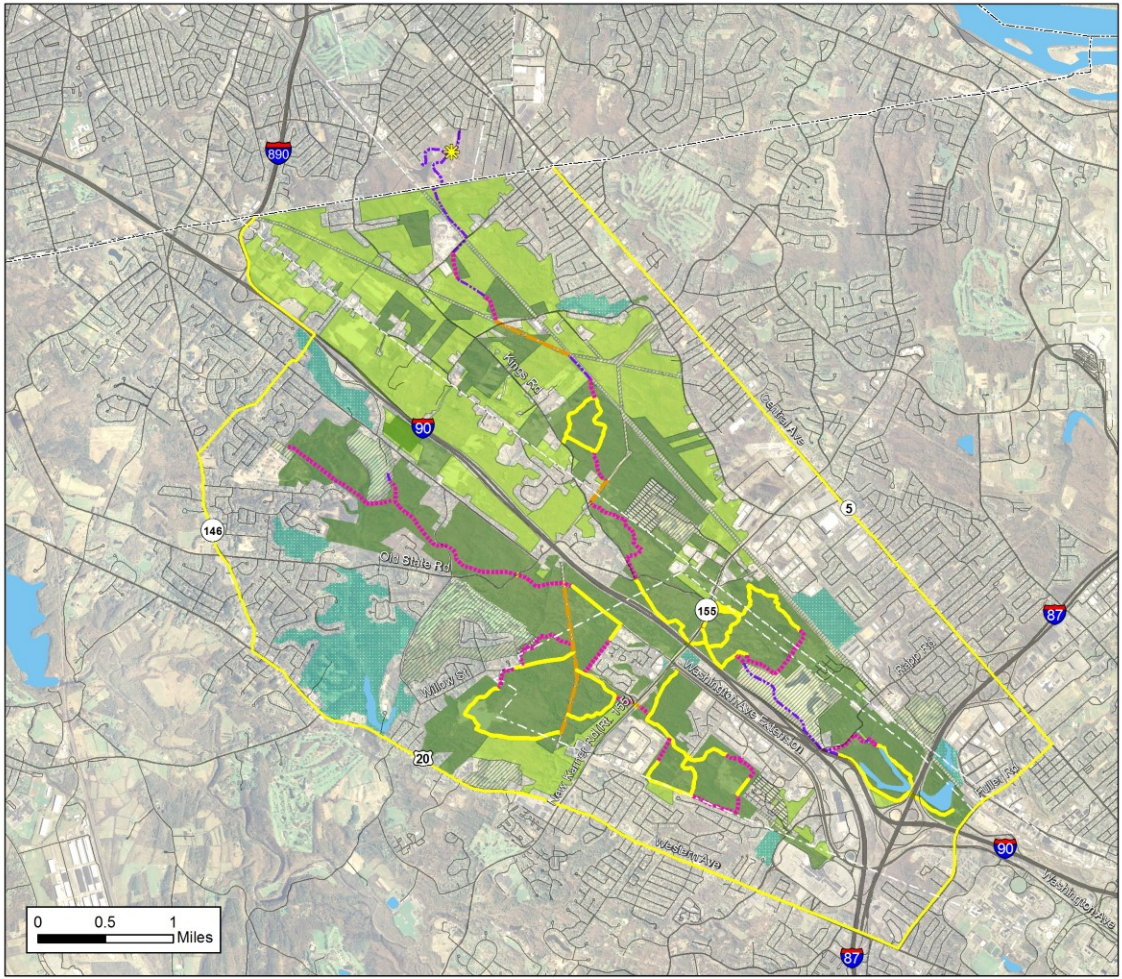
Figure 7
Existing Trail System w/ Trail, Illegal Path, Road and Railroad Zones of Influence



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP existing trail
- APBP new trail
- ROW
- private
- road crossing
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:

Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

Prepared By:

ALBANY PINE BUSH Preserve Commission

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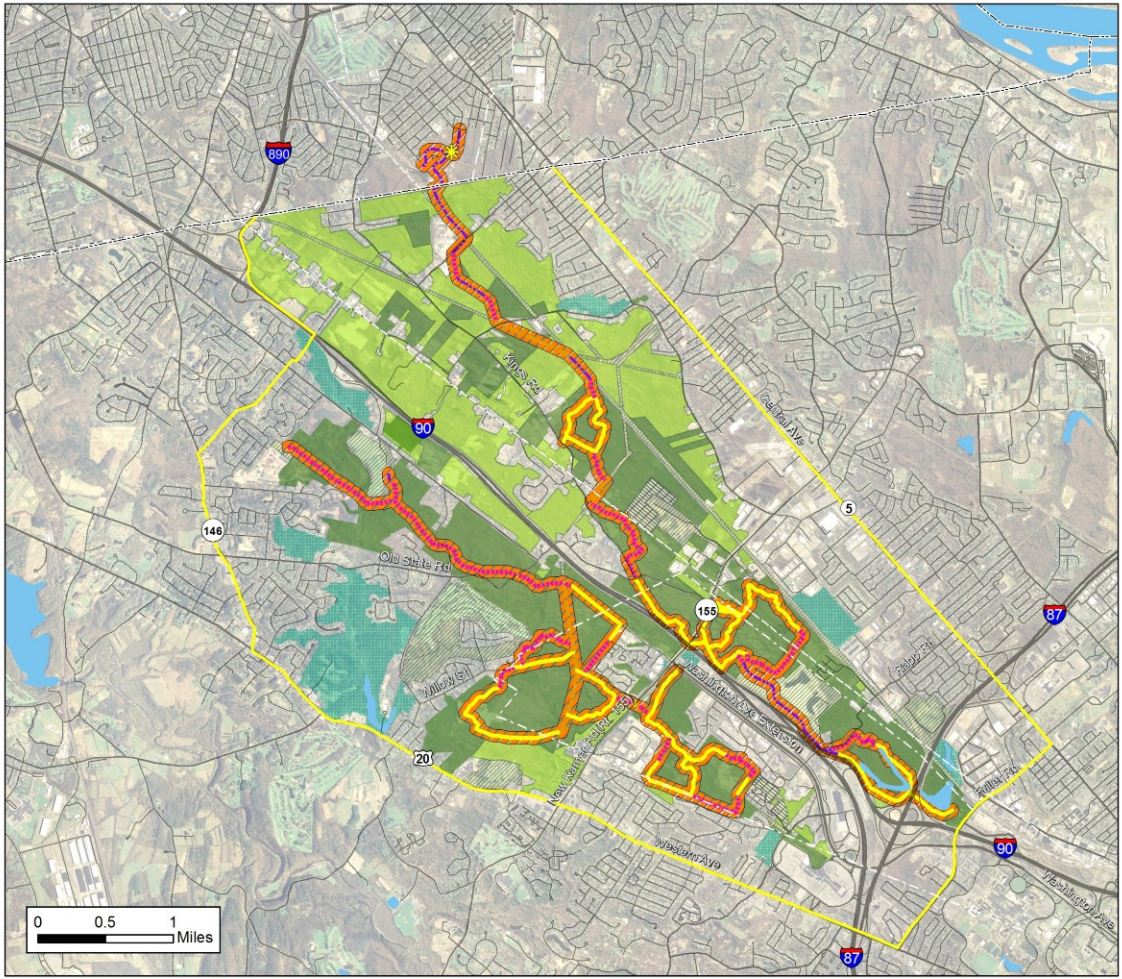
Figure 8
Conceptual Revised Trail Vision



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP existing trail
- APBP new trail
- ROW
- private
- road crossing
- APBP Proposed Trails 75M ZOI
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:

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Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

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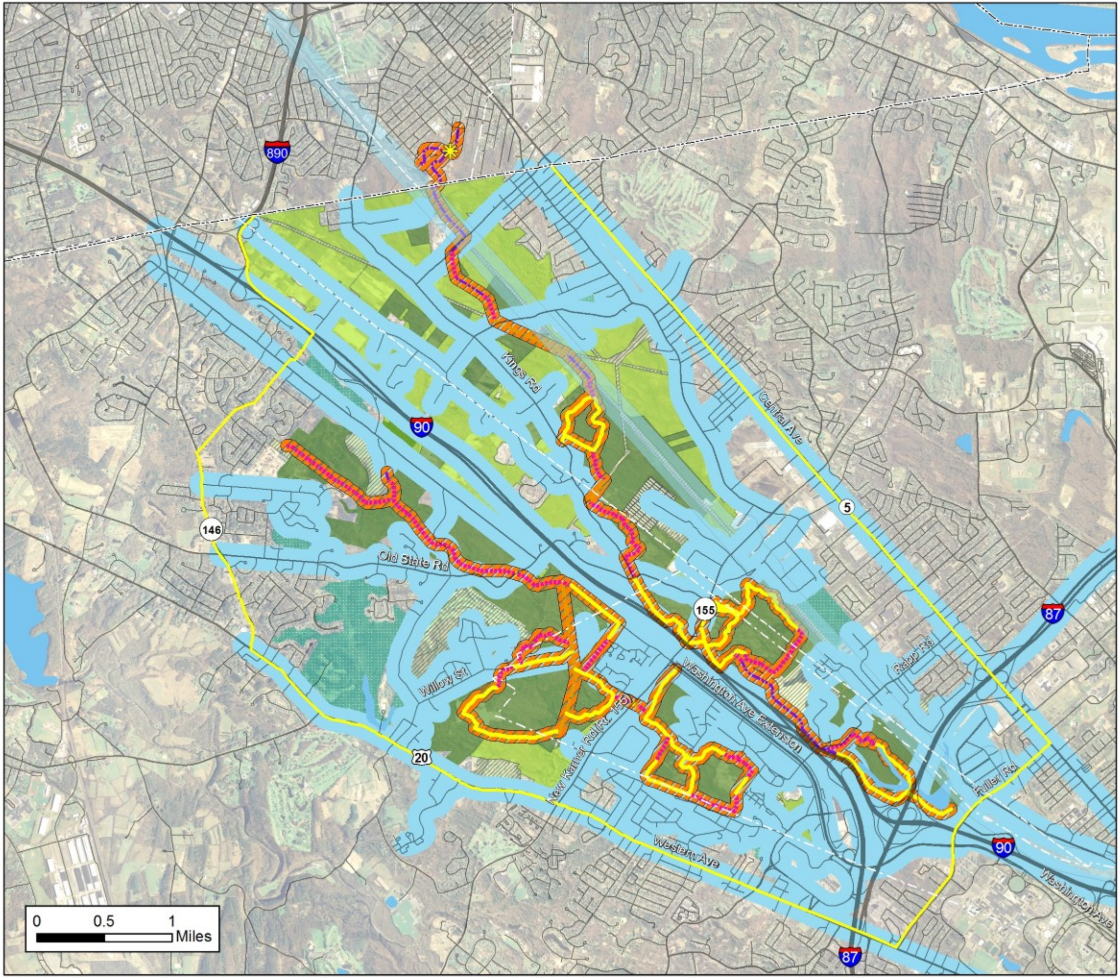
Figure 9
Conceptual Revised Trail Vision with Trail Zone of Influence

Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision



- ~~APBP existing trail~~
- APBP new trail
- ROW
- private
- road crossing
- APBP Proposed Trails 75M ZOI
- 150 M Road ZOI
- 150 M Railroad ZOI
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:

Imagery - 2007, 1 foot Natural Color Orthoimagery, New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

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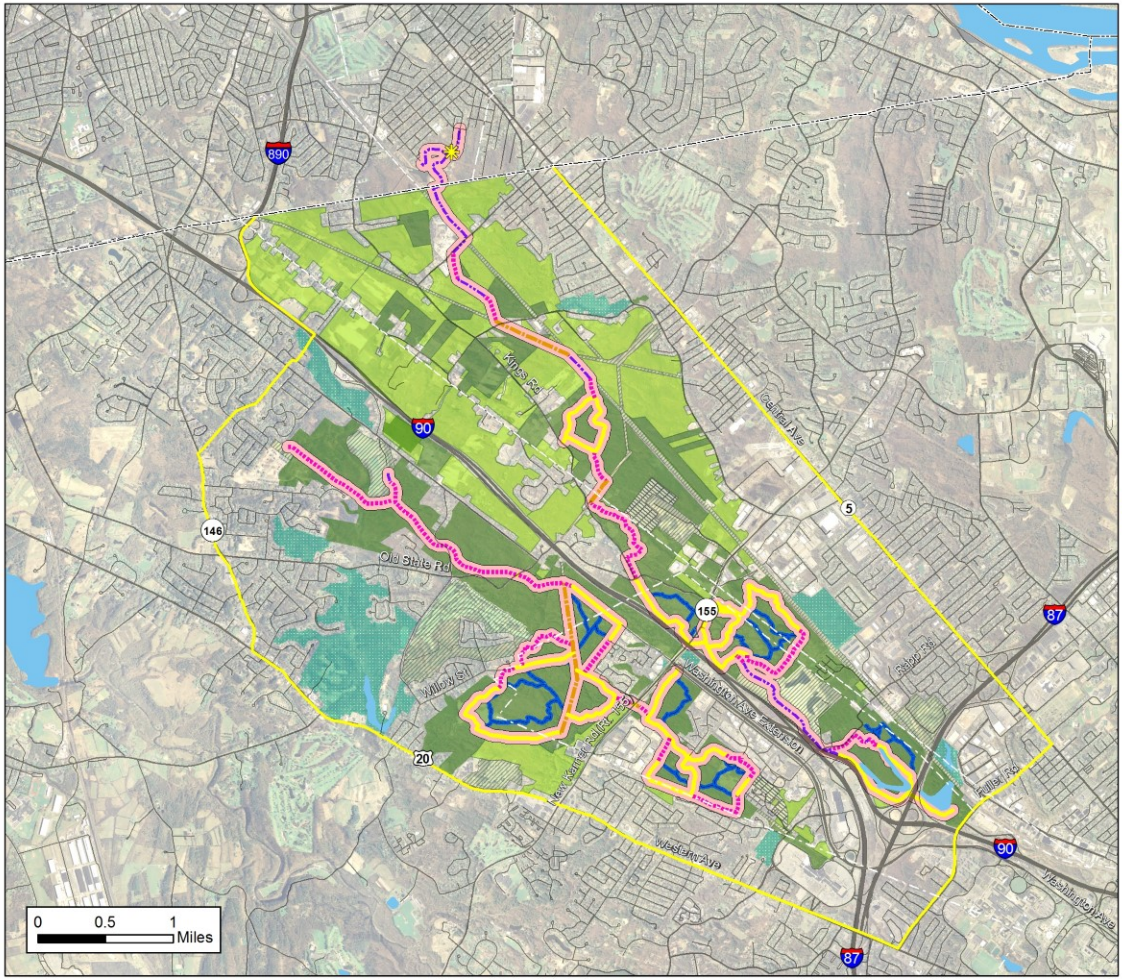
Figure 10
Conceptual Revised Trail Vision with Trail, Road and RR Zones of Influence



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP trails to close
- APBP existing trail
- APBP new trail
- ROW
- private
- road crossing
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

Sources:
Imagery - 2007, 1 foot Natural Color Orthoimagery. New York State Office of Cyber Security & Critical Infrastructure Coordination.

Vision Map - 2002, Albany Pine Bush Preserve

Protected Lands - 2009, The Nature Conservancy

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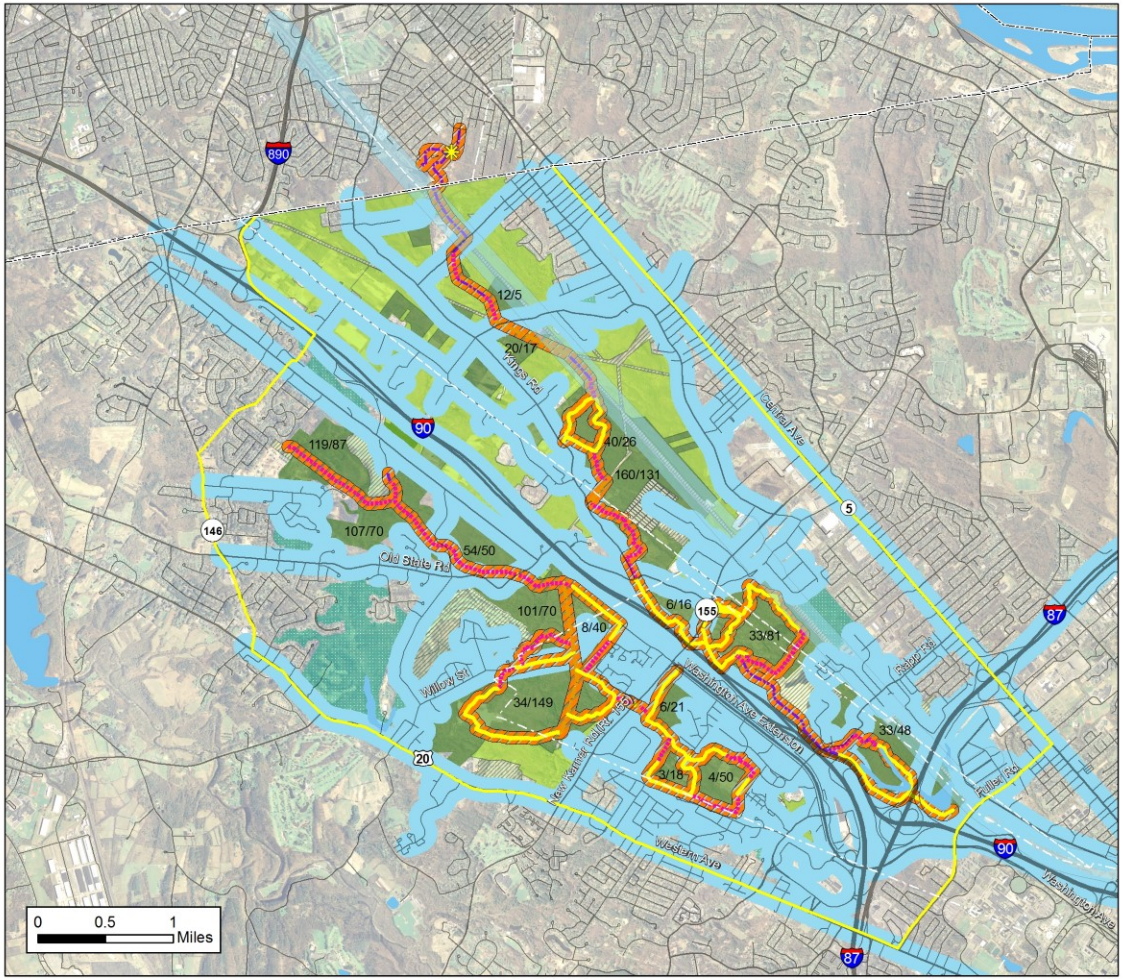
Figure 11
Conceptual Revised Trail Vision with Existing Trails Proposed for Closure



Albany Pine Bush Preserve Resource Protection and Visitor Experience Vision

- APBP existing trail
- APBP new trail
- ROW
- private
- road crossing
- APBP Proposed Trails 75M ZOI
- 150 M Road ZOI
- 150 M Railroad ZOI
- Woodlawn Preserve
- Recommended Full Protection
- Recommended Partial Protection
- Recommended Open Space
- Protection Agreement/Easement
- Protected Lands
- Albany Pine Bush Study Area

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Figure 12
Largest core area changes before and after trail system changes