

# Ethan Allen Park Site Assessment

Integrating Historical, Cultural  
And Natural Resources



## ETHAN ALLEN

Park is Site of Farm Owned  
by Hero of Ticonderoga

Putting behind him the martial  
deeds of a hero, Ethan came here  
in 1787 to till the soil as a  
peaceful farmer. On Feb. 12, 1789,  
he died here after a trip across  
the ice to South Hero. Memorial  
Tower was built on Indian Rock,  
traditional Algonquin look-out.



Prepared for the Burlington Department of Parks and Recreation  
by LANDS Program Interns, July 2008



The  
UNIVERSITY  
of VERMONT





## *- Acknowledgements -*

This report was prepared by the 2008 Land Stewardship intern team during summer 2008 for the Burlington, Vermont Department of Parks and Recreation.

We would like to thank several parties for making this report possible. First, we would like to thank the Burlington Department of Parks and Recreation (BPR) for opening Ethan Allen Park to our team. Also, thank you to Lisa Coven, BPR Land Steward, for briefing us about the park and its policies. We are also very grateful to Liz Thompson who lent us her expertise and time in identifying plant species.

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**The 2008 LANDS Crew**

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Above: View of Lake Champlain and the Adirondack Mountains from the top of Allen Memorial Tower



## ***-Overview of the Park and Purpose of this Report-***

Ethan Allen Park is a sixty-seven acre parcel situated between Ethan Allen Parkway and the Winooski River in the City of Burlington (see Map 1). It is currently owned and managed by the City of Burlington's Parks and Recreation Department. The Vermont Natural Heritage Program recently described these forested lands as 'exceptional' and 'uncommon'. It also contains great examples of rocky outcrops due to its placement along the world famous Champlain Thrust Fault. In addition to important natural communities, the park contains a rich cultural history.

This report was written by the summer 2008 LANDS Crew for the City of Burlington, Vermont Department of Parks and Recreation. In 1995, a management plan was created for Ethan Allen Park. However, this report did not include substantial baseline data about the site. This report elaborates on six facets of the park: trails and trail erosion, invasive plants, rare and endangered plants, soils and bedrock, wildlife, and cultural features. For more information, please see Appendix 2 – Project Proposal.

## ***-Overview of the LANDS Program-***

The field of conservation is rapidly evolving to meet the growing demands of society. New ideas, strategies, and players are changing how we conserve and steward land. The Land Stewardship Program (LANDS) is one of these new ideas. During the great depression, the conservation corps model was pioneered as a means to promote stewardship in the nation and provide jobs for the unemployed. That idea has since been reinvented 116 times by local and state corps across the United States. However, the general theme is the same -- young people learning *and* growing through service. LANDS is an innovative corps designed to train tomorrow's cutting-edge conservationists. The LANDS Program is a pilot partnership between the University of Vermont and the Student Conservation Association. This year marks the 2<sup>nd</sup> phase pilot year, following a successful first year.

LANDS is unique for several reasons. The program serves a wide range of land conservation partners, ranging from national to local organizations. The principal partners for LANDS are land trusts, a growing movement in the conservation field. In addition, LANDS crew interns work on projects that are more technical than traditional crew work. They draft management plans, map invasive species, measure forest carbon content, and even find time to build trails. LANDS interns are advanced undergraduates in the natural resources field and come from all over the world with a range of skills and interests. Utilizing the service-learning model, the program simultaneously assists organizations in need of service, and students in need of training. It is a unique opportunity for undergraduate students to gain experience in their field while providing valuable support to partnering organizations.

At a time when we must re-devote ourselves to conservation education and service at all levels, the LANDS Program is a valuable resource for students and conservation organizations alike.

[http://www.uvm.edu/~conserve/lands\\_website/](http://www.uvm.edu/~conserve/lands_website/)



# Map 1: Ethan Allen Park

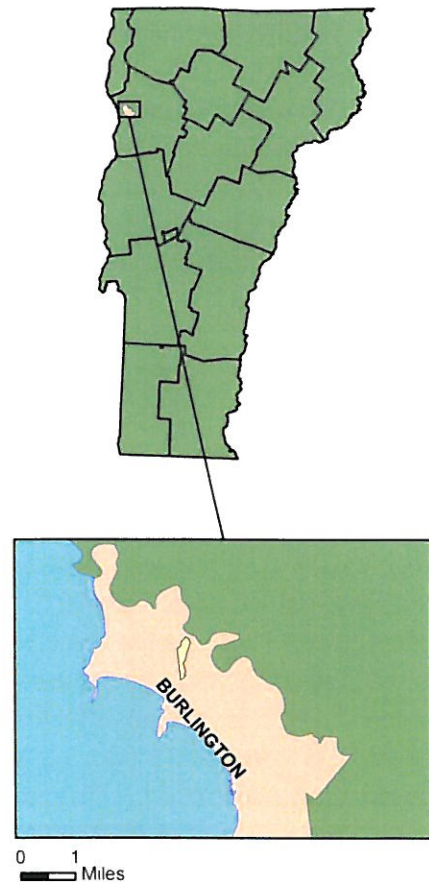
Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008



0 250 500 1,000 1,500 Feet



1:6,000



Created by UVM LANDS,  
Data Sources:  
UVM LANDS, VCGI, BPR

This map is not intended for survey purposes



## *-Cultural History -*

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### History

The present day park was first used by the Abenaki as a camp site and as a strategic lookout point. Once Europeans arrived they claimed the property and between 1774 and 1778 it changed ownership a number of times. Famed revolutionary war hero, Ethan Allen, bought it and lived there until 1789. In 1814, it was purchased by Cornelius P. Van Ness, the 11<sup>th</sup> governor of Vermont, and changed hands several times before being bought by William Van Patten the ex-mayor of Burlington. He agreed to give a portion of his land containing an area known as 'Indian Rock' to the Sons of the Revolution under the stipulation that they construct a memorial tower dedicated to Ethan Allen. The tower was constructed using native redstone and marble, and in 1905, Van Patten donated that land plus fifteen acres surrounding it under the condition that it remained open to the public. Two years later he sold the rest of his 52 acres to the City of Burlington (Burlington Parks and Recreation, 1995).

Since the tower's construction, it has been a major focal point of the park. This can be attributed to the spectacular 360° view available from the top. In 1942, the tower was renovated because of stabilization issues. The tower was closed in 1974, due to unsafe conditions. It was eventually reopened with the help of a local advocacy group known as "Save the Tower, Inc." In 1983, they rebuilt the battlement, platform and replaced the stairs inside the tower. Today, volunteers are responsible for unlocking and locking the tower on a daily basis.

Another important physical feature of Ethan Allen Park is the gazebo. It is located at "The Pinnacle" which is 304 feet above sea level, the highest point on the park. It was originally a wooden structure, but in 1937 it was rebuilt in stone in the original design. The gazebo once offered a beautiful view of the valley, but today the dense vegetation has restricted the view. Burlington Parks and Recreation has plans to thin the vegetation.

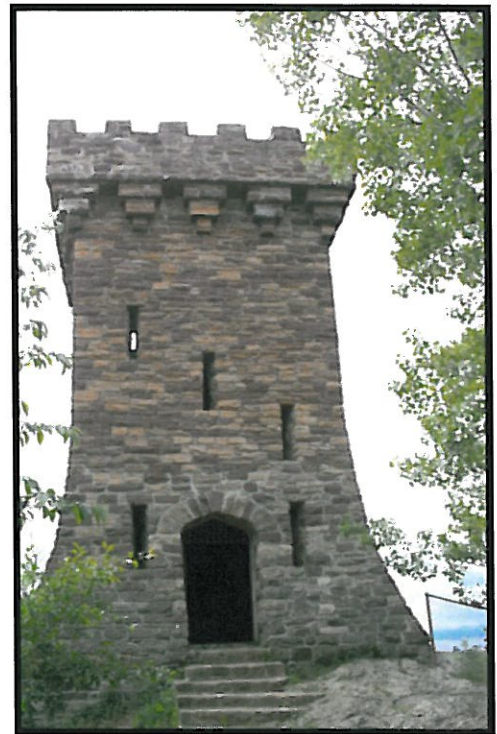
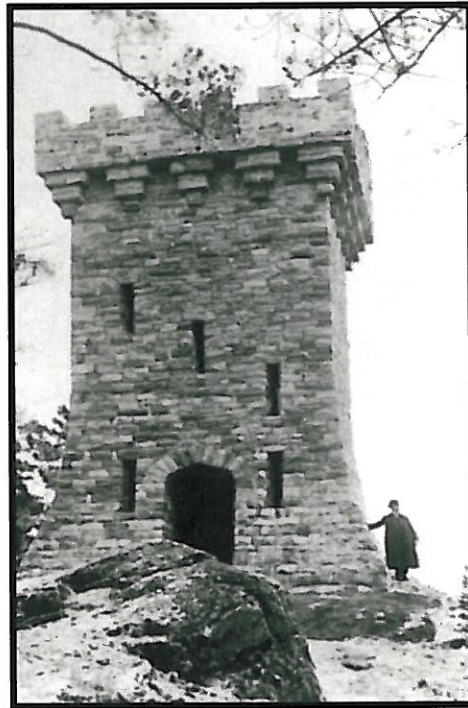
Over the next few decades the park became a popular tourist attraction and a well-established local destination. In the early 1900's the trolley extended its line to make a stop at the park entrance. A roller skating rink and a dance hall were constructed next to the park, but were later removed. Car traffic in the park was stopped in the 1980's, and a group advocating for the maintenance of the tower was formed.

This public participation inspired more community involvement in 1995 when the City of Burlington decided to create a management plan for the park. Semi-regular meetings were held in order to obtain the opinions of local people which were used when planning for the future of the park. The management plan highlights the importance to respect, protect and enliven the historical qualities of the park (1995). The park also contains a portion of Burlington's bike route known as "Cycle the City" which was completed in 2004 by Local Motion, a local non-profit. The trail is a showcase of the city's, "history, culture and natural splendor." (Lake Champlain Bikeways, 2004). The public involvement and the goals of the management plan exemplify the importance of these historical monuments to the park. The monuments, coupled with the natural beauty of the park make Ethan Allen Park a spectacular public resource.

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## Tower

**Right:** Ethan Allen Tower, 1905 after construction and in June 2008. The tower is an important historical feature, and one of the main tourist attractions of the park. As apparent from the pictures, the tower has retained its original shape and charm even after 100 years.



All historic images are from the Landscape Change website.



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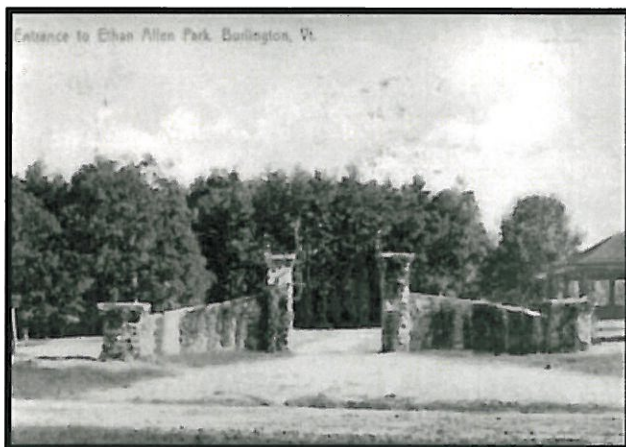
## View of Ethan Allen Park



**Above:** View of Ethan Allen Park looking north, 1937 and June 2008. The playground was constructed in the 1990's as a collaboration between the Parks and Recreation, a playground manufacturer, and the students of C.P. Smith School.

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## Park Entrance



**Above:** Entrance to Ethan Allen Park (1907-1915) and June 2008. The parking lot is a noticeable physical change to the entrance. Car traffic within the park was banned in the early 1980's, which has been beneficial to the health of this forested area.





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## Gazebo

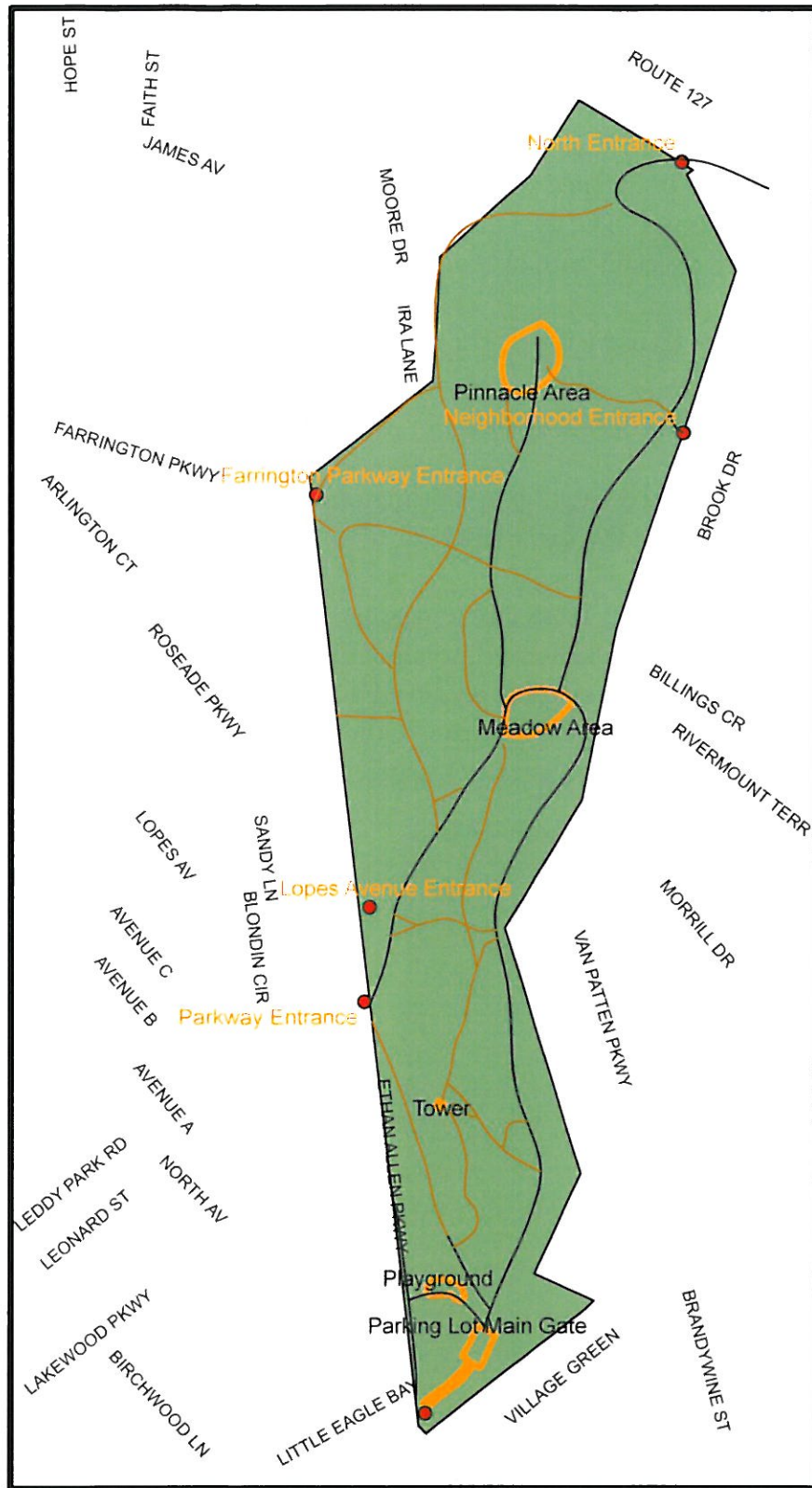
**Left:** Gazebo in the early 1900's and June 2008. This structure was originally wooden but was reconstructed to be more permanent in the early 1900's. Today the vegetation inhibits the gorgeous view that was available from the gazebo.





## Map 2: Historic & Cultural Features

Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008



### Park Features

- Paved Trail
- Maintained (Unpaved) Trail
- Ethan Allen Park Entry Points
- Historical & Cultural Features
- Ethan Allen Park Boundary
- Roads

0 250 500 1,000 1,500 Feet



1:6,000

Map Created by UVM LAND Stewardship  
Data Sources:  
UVM LAND Stewardship,  
Vermont Center of Geographic Information,  
Burlington Parks and Recreation.

This map is not intended for survey purposes

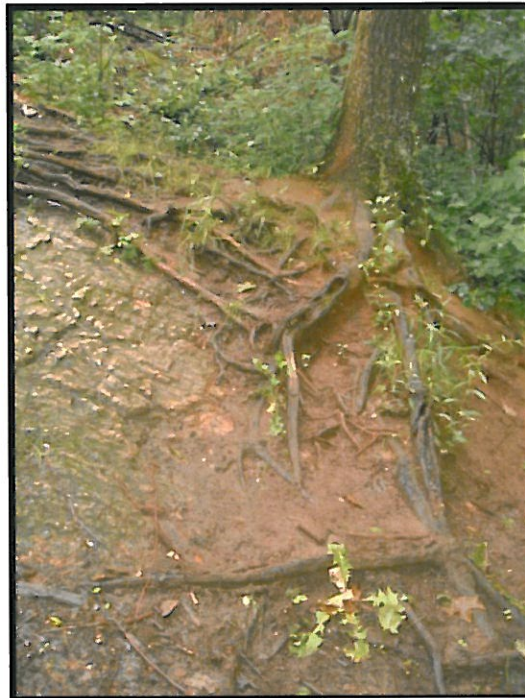
## ***-Trails and Walkways-***

### **Trail Type Description**

In order to map the trails, they were all mapped with GPS receivers. While walking, the GPS users distinguished between trail types. The GPS data was then entered into Geographic Information System (GIS) and overlaid onto other data layers.

The trails map (see Map 3) shows the park's trails by type. These types include:

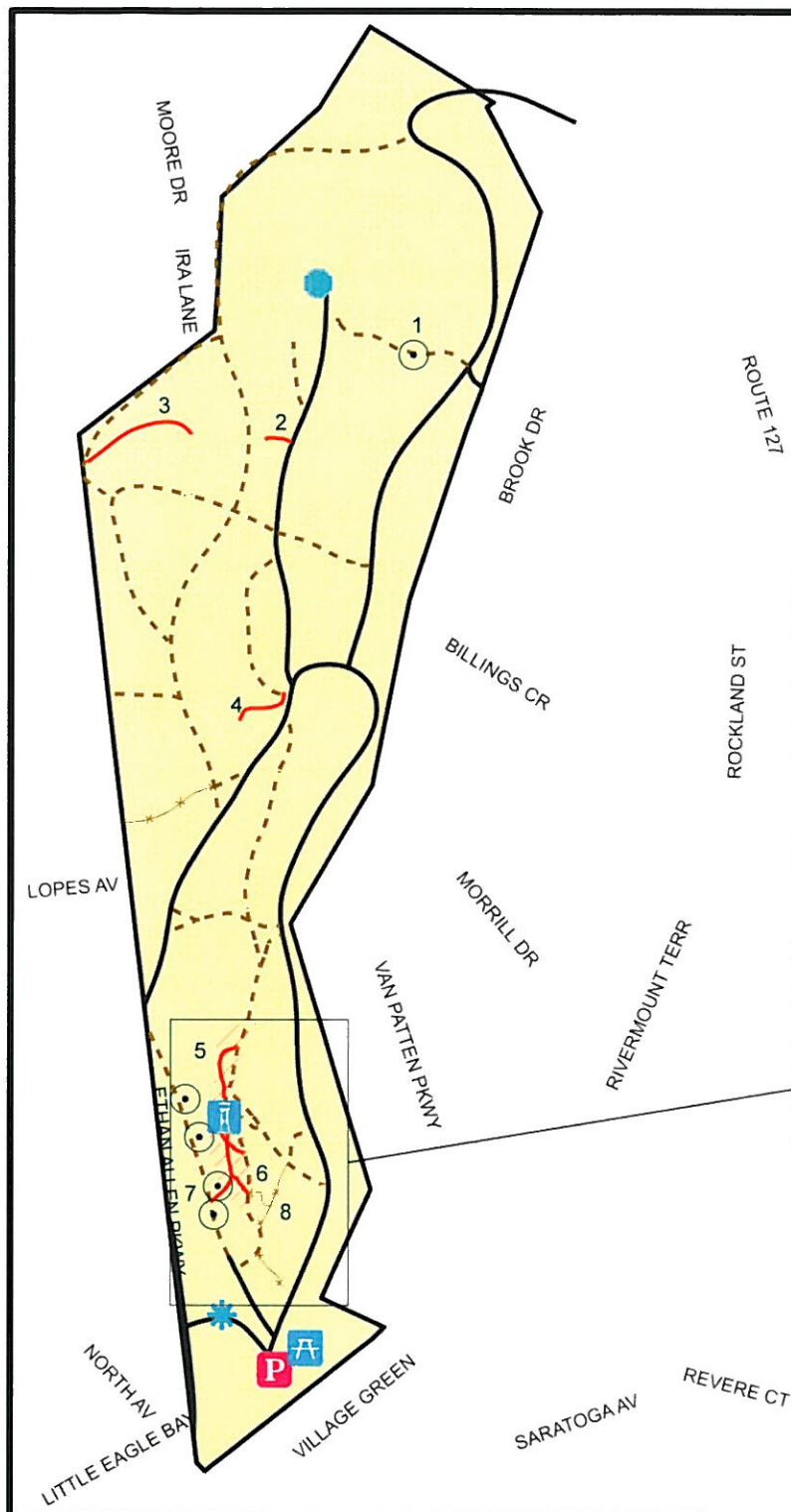
- Paved: Champlain bikeway and old access roads
- Maintained (unpaved): Authorized, kept up by Burlington Parks and Recreation (BPR), and frequented by park users
- Unpaved unmaintained (spur trails): Trails that appear to have been made by park users. Some of these trails are dangerous, promote soil loss and erosion, and may have significant deleterious impacts on sensitive vegetation - specifically rare, threatened or endangered species. Others do not have apparent negative impacts and may not warrant closure.



**Above:** An example of a dangerous trail condition: root system growing on a rocky outcrop on a trail



# Map 3: Trail Conditions and Recreational Sites



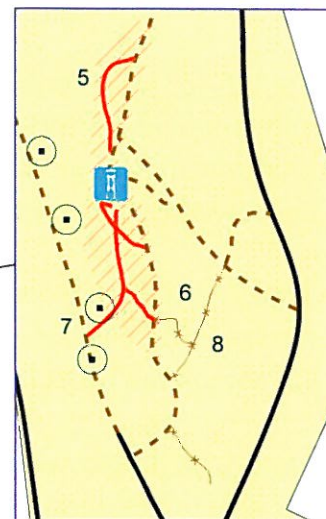
Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008

## Points of Interest

- Picnic Area
- Gazebo
- Playground
- Parking
- Tower

## Trail Features

- Paved
- Maintained (Unpaved)
- Spur Trail - Consider Closing
- Spur Trail - Recommend Closing
- High Spur Trail Area
- Erosion Sites
- Park Boundaries



0 300  
Feet

Created by UVM LANDS,  
Data Sources:  
UVM LANDS, VCGI, BPR

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## Findings and Recommendations

Spur trails that cross through areas with rare, endangered or threatened plant species, that have high erosion potential, and/or are dangerous should be closed to improve the park for future visitors.

Trail 1 (see Map 3) is a trail segment that branches into three parallel paths at a steep rocky outcropping. This trail segment should be rerouted or closed because of the erosion potential. It can also be a hazard to park visitors when it is slippery and wet.

Trails 2 through 6 are all areas where spur trails threaten rare plant species or contribute to erosion.

Trail 2 descends a steep rocky slope and ends in the middle of the woods. Human-caused erosion was observed here, and closure would be relatively easy because there is only one point of access (at the junction with the paved trail). Additionally, this trail segment may be hazardous to park visitors.

Trails 3 and 4, also end at no particular destination but impact the nearby vegetation. Trail 3 leads into a wet marshy area with tall grasses - a rare feature on the property.

Trails 5 and 6 are found in the red thatched area on the map which contains a dense network of unauthorized trails that should be closed. Trails in this thatched area are representative of multiple mini-trails on the ground. All the trails in this area should be closed because of the high density of sensitive or rare vegetation (see Map 6).

Trail 7 contains sites with significant erosion. These areas are visible to the right of the trail when walking northbound. Two points that straddle the nearby spur trail are among the worst examples of soil erosion in the park.

Trails near 8, spur trails, appear to have no significant apparent negative impact on the soils or vegetation in the region. Furthermore, they do not involve steep and dangerous slopes. These trails may not warrant closure.

The trail network may also benefit from the publication of maps. This would show users where the trails are and hopefully deter the creation of additional unauthorized trails. Additionally, the map could inform users of the length of each trail and of significant points of interest so they could better plan their visit. Finally, this map could be posted at trail heads as well as on the internet to increase awareness among future visitors.



## *-Natural Communities & Wildlife-*

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### Natural Communities

This area is a diverse region with three different community types: Mesic Oak-Hickory- Northern Hardwood Forest, Dry Oak-Hickory-Hophornbeam Forest, and Temperate Calcareous Cliff Community. The Mesic Oak-Hickory-Northern Hardwood Forest is the dominant community found in a majority of the park. It typically has mid-successional trees that include red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), basswood (*Tilia americana*) and striped maple (*Acer pensylvanicum*).

The Dry Oak-Hickory-Hophornbeam Forest dominates the upper slopes and ridge tops. This natural community is open, with sparse shrubby vegetation. Sugar maple (*Acer saccharum*), hophornbeam (*Ostrya virginiana*), white ash (*Fraxinus Americana*), and maple-leaf viburnum (*Viburnum acerfolia*) are common in this natural community.

The temperate Calcareous cliff community is characterized by low elevation cliffs on limestone or dolomite. This is located in the southern part of the park near the tower. Some plants found here include harebell (*Campanula rotundifolia*), wild columbine (*Aquilegia canadensis*), smooth cliff brake (*Paellaea glabella*), white ash (*Fraxinus americana*), and hophornbeam (*Ostrya virginiana*).

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### Wildlife

With this natural variation of community types, the forested park creates a home and breeding area for many small animals, especially bird species. They can be found in nests, snags (broken and dead trees), bird-created tree cavities, and natural tree cavities. These features provide nesting habitat for many bird species and food sources for others. Mast producing trees such as oak and bitternut were also noted within the park. These tree species help provide a source of food for the wildlife, including birds and small mammals in this small island of mesic oak-hickory-northern hardwood forest and warm calcareous cliff communities.

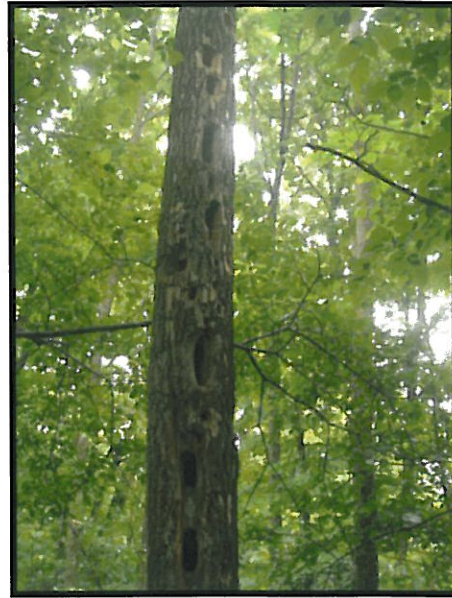
The wildlife observed by LANDS crew members consisted mainly of birds. The urban landscape limits the amount of large wildlife entering into Ethan Allen Park, although signs of white-tailed deer were present in the dense and less developed northern end of the park.

Birds seen or calls heard:

- White-Breasted Nuthatch
- American Robin
- Northern Cardinal
- Black-capped Chickadee
- Common Grackle
- Hairy Woodpecker
- Pileated Woodpecker

Other Species seen:

- Gray Squirrel
- Red Squirrel
- Chipmunk
- Eastern Garter Snake



**Left:** A snag with cavities that provide habitats for certain species

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## Focal Species

Due to the vast number of snags and tree cavities seen throughout Ethan Allen Park, the LANDS crew has highlighted two species of birds. They have been chosen for their relevance to Ethan Allen Park based on habitat requirements, interspecies relationships and importance to the natural community. Below is a more detailed description of the white-breasted nuthatch and the hairy woodpecker.



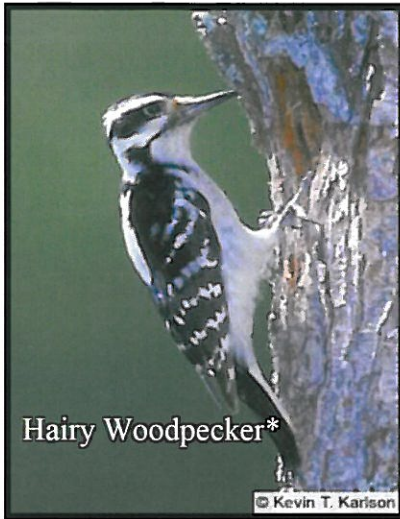
White-breasted Nuthatch\* © Michael J. Hopiak/CLO

### White-breasted Nuthatch (*Sitta carolinensis*)

The white-breasted nuthatch is present in Ethan Allen Park. The range of this bird is generally from the Rocky Mountains eastward, and widespread distribution throughout New England. Their habitats are typically composed of mature deciduous forests and mixed forests. Areas such as forest edges, parks, and open woodlands, can also provide habitat. The white-breasted nuthatch uses tree cavities created naturally or by other birds species especially woodpeckers. The nuthatch forages on the trunks of trees and moves along the tree head down. The pairs will commonly store large amounts of food in bark crevices (DeGraaf and Yamasaki, 2001).



## Hairy Woodpecker (*Picoides villosus*)



The hairy woodpecker (*Picoides villosus*) is one of the most common woodpeckers in North America and has residency throughout the New England area. Its habitat consists of extensive forests types, and is known as a generalist, as it is able to inhabit many different areas. It is a tree cavity nester and was evidenced throughout the park by a large number of cavities found. It is closely related to the downy woodpecker (*Picoides pubescens*), which is also found within the park. The downy woodpecker tends to inhabit the branches of trees while the hairy woodpecker is more likely to be found on the trunk of the tree. It also has a close working relationship with the pileated woodpecker (*Dryocopus pileatus*) by using the cavities created

by the larger woodpecker to consume insects left behind. This bird species is also beneficial to humans because they consume a large number of pests (DeGraaf and Yamasaki, 2001).

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## Recommendations

There is certainly more wildlife within Ethan Allen Park and the above listing is only a small sample of animals that were observed. Signs of larger wildlife were observed in the northern end of the park, but this does not mean that an abundant white-tailed deer population exists.

The LANDS crew recommends promoting local community engagement within the park. A birding excursion led by a local expert could be held to encourage birders; this would benefit the park by creating a list of the species. Overtime this data could be used to track the stability of bird populations using this patch of forest surrounded by fragmented landscape.

\*Images from: <http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/>

## *-Soils and Bedrock-*

### **Bedrock Geology**

Ethan Allen Park is located in the Champlain Lowlands, where the bedrock is composed of beach sandstone and shallow marine limestone (Johnson 1998). This bedrock layer is thought to be 560 to 455 million years old. Around 12,500 years ago, the area was covered by Lake Vermont, a post glacial lake much larger in surface area than present-day Lake Champlain. The presence of this giant lake as well as the two bedrock layers (Dunham Dolostone and Iberville Shale) have laid the foundation for the soils above (Map 4). The bedrock plays a significant role in determining the soil type because soil is the product of weathering of rocks at the earth's surface. These two types of bedrock occur as a result of placement of the park along the world famous Champlain thrust fault. At Lone Rock Point in Burlington there is a perfect example of this type of fault, in which the older Dolostone was thrust over the younger Iberville shale.

There are several significant rock outcrops throughout the area. An outcrop is defined as visually significant rock protruding from the ground. Most of these outcrops are dolostone, a type of sedimentary carbonate rock. When dolostone weathers it creates calcium-rich particles and creates a buffer to maintain a stable pH.

To determine whether these rocks are composed of calcium, a simple acid test was performed. When treated with HCl the rocks yield a bubbling reaction; indicating the presence of calcium. All the outcrops at Ethan Allen Park contain calcium. This is beneficial to the soils as the calcium-rich bedrock buffers the pH. As the outcrops break into smaller particles, they provide nutrients which as a result, create nutrient-rich soils that support a wide array of plants.



Above: A calcareous dolostone outcrop along one of the trails



## Map 4: Bedrock

Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008

- Trails
- × Calcareous Outcrops
- Bedrock Type**
  - Dunham Dolostone
  - Iberville Shale
  - Ethan Allen Park Boundary



Map Created by UVM LANDS  
Data Sources:  
UVM LANDS, VCGI, BPR

This map is not intended for survey purposes

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## Soil

Ethan Allen Park is home to eight different soil types (see Map 5). Each soil type differs in terms of soil composition, soil texture and its ability to hold water. These characteristics play a significant role in determining the types of vegetation that grow in the area. Soil profiles are also important because they allow us to examine areas that have a high risk of erosion which exposes the bedrock underlying them and creates problems for trails and their users.

Eleven soil samples were taken throughout the property, focusing on the most common soils: Farmington extremely rocky loam, and Adams-Windsor loamy sand (Burlington Parks and Recreation 1995). This was done to examine the texture and composition of soil, whether they were loamy, sandy or clay-like, and to provide an understanding of the variation of soil type present throughout the park.

As the other common occurring soil series in the area, the Farmington series consists of soils that are shallow to the bedrock, rocky or extremely rocky and somewhat excessively drained. They are loamy throughout their profile and as a result, are not compacted and are easy to dig up (Allen 1974).

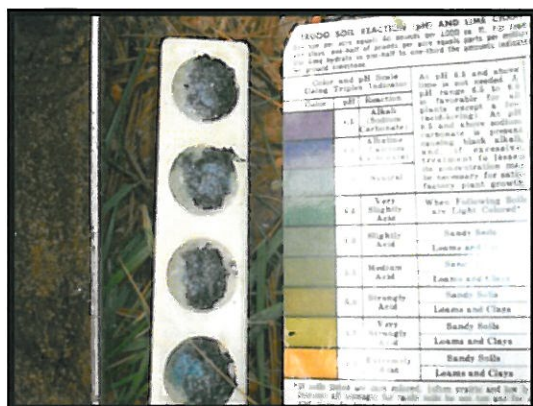


**Above:** Soil sample drawn from Soil Pit 6 (see map) classified as Adams and Windsor loamy sand. Note the mixed dark and light brown colors and the gritty texture of sand



## Soil pH

Measurements of the soil pH indicate the acidity of a soil and they can be used to understand the species composition found above it.



Soil sample drawn from Soil Pit 10 (see map) classified as Farmington Extremely rocky loam



Soil sample drawn from Soil Pit 7 (see map) is classified as Hinesburg fine sandy loam. Note light brown clay.

Most of the soils in the area are between 6.5 and 7 on the pH scale (See Table 1). This neutral pH is ideal for most plants. According to initial reports on soils in the Ethan Allen Homestead Master Plan, seedlings are particularly sensitive to pH (1995). Seedling mortality, an unexpected loss of seedlings due to environmental factors, is often caused by unfavorable soil characteristics, topographic features or plant competition. Acidic soils, for example, inhibit the growth of seedlings that prefer a neutral pH to grow well.

Many of the soils on site become more acidic the closer they are to the ground surface. The weathering of the bedrock layer often discharges calcium ions which help to neutralize the pH of deeper soils. Vegetation, such as pine needles, can be acidic and contribute to the increased acidity of the upper layers of soil.

The Farmington series is located throughout a portion of the park and consists of soils that were formed from glacial till and contain a considerable amount of limestone. These soils are shallow, rocky, extremely rocky or somewhat excessively drained and loamy throughout their profile (Allen 1974). Farmington soils have medium natural fertility and a moderately available moisture capacity. The Farmington extremely rocky loam that is found on 20 to 60 percent slopes consists of soils that are shallow to bedrock and that are too rocky and steep to be used for farming. Thus, land over this soil is mostly covered with vegetation. In areas of no vegetation, the hazard of water erosion is severe.

Results from three soil samples in the Farmington extremely rocky loam area indicated a discrepancy between the description of the soil and the actual soils present.

Samples taken closer to the park edge may have been affected by variation in vegetation atop the substrate or by soil disturbance due to nearby construction of houses and roads.

The Hinesburg series found in the north eastern part of the park consists of soils that are deep and well drained and formed in sandy deltas and beaches. In order to maintain good soil structure and to increase the water-holding capacity of the surface layer, it may be advisable to add organic matter to the Hinesburg soil (Allen 1974).

Adams and Windsor loamy sands that are found on 0 to 5 percent slopes consist of soils that are loamy sand and acidic (Table 1). Surface runoff in this type of soil is low but ground should be covered with vegetation in order to prevent soil from blowing (Allen 1974). This type of soil is most extensively used for woodland (Allen 1974).



Above: Soil sample drawn from Soil Pit 8 (see map) classified as Adams and Windsor loamy sand (0-5% slope). Note the sandy soil and gravel at bottom.

**Table 1: Soils Characteristics at Ethan Allen Park, Burlington, VT**

Soil Name	Slope	Depth	pH	Description
<i>Farmington extremely rocky loam</i>	20-60%	Shallow	-	poor sand, poor gravel, sandy loam
Soil pit 1	20-60%	Shallow	7	clay loam and sandy
Soil pit 2	20-60%	Shallow	7	sandy loam
Soil pit 3	20-60%	Shallow	7-7.5	clay and silt
Soil pit 4	20-60%	Shallow	7	sandy loam and silty
Soil pit 5	20-60%	Shallow	4.5	sandy and silty
<i>Adams and Windsor loamy sand</i>	30-60%	Deep	-	good sand, poor gravel
Soil pit 6	30-60%	Deep	5.5	mixed dark and light loam
<i>Hinesburg Fine Sandy Loam</i>	8-15%	Deep	-	poor gravel, poor sand
Soil pit 7	8-15%	Deep	6.5-7.0	light brown clay
<i>Adams and Windsor loamy sand</i>	0-5%	Deep	-	good sand, poor gravel
Soil pit 8	0-5%	Deep	7.5	variation in dark and light soil sandy soil and gravel at bottom, near road
Soil pit 9	0-5%	Deep	6.5	clay, very little slit
<i>Farmington extremely rocky loam</i>	5-20%	Shallow	-	poor gravel, poor sand
Soil pit 10	5-20%	Shallow	6.5	sandy on top, lower layers mixed
Soil pit 11	5-20%	Shallow	4.5-5.5	loamy



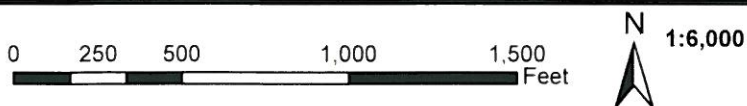
# Map 5: Soils

Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008

## Soil Type

- Soil Pit Sites
- Adams and Windsor loamy sands, 0 to 30 % slopes
- Adams and Windsor loamy sands, 30 to 60 % slopes
- Au Gres fine sandy loam
- Duane and Deerfield soils, 0 to 5 % slopes
- Duane and Deerfield soils, 5 to 12 % slopes
- Farmington extremely rocky loam, 20 to 60 % slopes
- Farmington extremely rocky loam, 5 to 20 % slopes
- Farmington-Stockbridge rocky loams, 5 to 12 %slopes
- Hartland very fine sandy loam, 2 to 6 % slopes
- Hinesburg fine sandy loam, 0 to 15 % slopes
- Munson and Raynham silt loams, 2 to 12 % slopes
- Ethan Allen Park Boundary

Map Created by UVM LANDS,  
Data Sources:  
UVM LANDS, VCGI, BPR



This map is not intended for survey purposes

## ***-Invasive Exotic Plants-***

Exotics are species that have been introduced, either from other continents or other regions and ecotypes. Invasive exotic plants are plants that threaten the health and existence of our native plants by competing for limited resources (such as light or nutrients), and usually taking over suitable growing area, creating a monoculture of plants. This reduces biodiversity, habitat for wildlife, and threatens our natural plants. Invasive species grow rapidly, reproduce in high numbers, and are tolerant of a wide variety of sites and conditions. Many invasive species are also carriers of pathogens that threaten local vegetation. Invasive species often provide no or low quality food supplies to local wildlife. They suppress natural regeneration, and it is possible for some species (e.g. buckthorn) to completely overtake a strata of the understory and prevent any regeneration in a localized area. The following invasive species were found at Ethan Allen Park and are listed from highest to lowest treatment priority.

---

### **Common Buckthorn (*Rhamnus cathartica*)**



Common Buckthorn

Buckthorn is the most common invasive exotic in the park and should be considered a top priority. This shrub commonly grows in groups but can occur singly, and there aren't many places in the park where buckthorn can't be found. The plant is native to Eurasia and was introduced in the 1880's. It is so successful due to its high tolerance of various soil and light conditions. Buckthorn is a strong competitor with early leaf out and late senescence – an average of 58 days longer than native species (Huebner, 2006) which means that it's growing season is longer, allowing it to collect more energy than its competition.

Hand pulling smaller plants can be successful, but often the plant has a large stem which needs to be mechanically cut. After cutting, covering in dark plastic for the season will help smother the plant. Chemical treatment is most effective, and should be done in the late fall applied to freshly cut stems using a 20% chemical mixture.



---

## Honeysuckle (*Lonicera spp.*)

Although there are many specific species, common honeysuckle is found in several locations across the park. Most of the honeysuckle in Ethan Allen is Japanese honeysuckle (*Lonicera japonica*), which is native to East Asia but was brought to America in the 1800's for horticultural purposes and soil stabilization.



Honeysuckle

The plant has aggressive root systems that often out-compete those of native plants. Honeysuckle can be found in woods, fields and edges. It is mildly shade tolerate but prefers full sun. In the park it is mostly found on edges or in canopy gaps where more light is allowed into the under story (Huebner, 2006). Japanese honeysuckle climbs and winds over native vegetation, shading them out (Nyboer, 2008).

Honeysuckle can be removed by hand by pulling the entire plant, including roots, and taking out of the forest to dry or placing it in the crotch of a tree where the roots cannot reach the ground to re-shoot. Chemical options include applying a 2% spray to foliage after native foliage has fallen but before the first hard frost (Colby, 1989).



Japanese Barberry

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## Japanese Barberry (*Barberis thunbergii*)

This prickly plant is found in spotted locations throughout the park. It grows about waist high, but sometimes taller, and has bright red berries. The stems are singular but grow in close bunches. Ninety percent of the



berries fall within 3 feet of each shrub but some have been mapped as far as 262 feet away (Silander, 1999). Barberry prefers a wide variety of conditions, from full sun to full shade, from dry ridges to wetlands to deep forests. Similar to buckthorn, barberry has leaf out before and after native plants. The plant was introduced in the mid 1800's from Japan.

When removing by hand, it is essential to pull up every piece of the taproot because barberry is very good at re-shooting from root bits left in the soil. Mowing large patches repeatedly over the course of a season or two will eventually kill a patch, though the seed bank can survive for years. Application of glyphosate in early spring before native plants leaf out is highly effective.

---

## Norway Maple (*Acer platanoides*)



This deciduous tree grows up to 100 feet high and is in the maple family. It can easily be mistaken for sugar maple; however the petioles of Norway maple leaves contain a milky juice and the bark is grooved similar to ash bark. Introduced from Europe in the 1700's, it has been over planted as an urban tree due to its resilience against pollution. It is also an effective replacement to the vacancies left by American elm after the Dutch elm disease outbreak. It has since escaped into roadsides, thickets and edges. In Ethan Allen Park, it is found primarily along the road near the eastern boundary. The tree is susceptible to various



leaf diseases, especially tar spot and leaf scorch. It has a shallow root system and late falling leaves. Some studies have shown that its root system is allelopathic towards the roots of competitors – meaning it releases chemicals into the soil to discourage competitive plant growth. Norway maple squeezes out native vegetation because of its thick and aggressive root systems and large, dense, shade-causing canopy.

The sale of Norway maple became prohibited in the US in 2006, and promoting its propagation will be banned in 2009. Mechanical means of removal include hand pulling small seedlings, repeated cuttings of larger trees and grinding the stumps. Chemical treatment should be dripped onto stumps in the fall.

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### Stonecrop (*Crassula helmsii*)



This is a plant that has spread over the boulder tops throughout the park. The plant favors shady spots and very shallow soils. Because of the shallow soils on top of rocks it is easy to mechanically remove by scraping off the soils – but that also removes the fragile soils, preventing the regeneration of other native species. An aquatic version of this plant is much more aggressive and can be removed by raking.

---

### Black locust (*Robinia pseudoacacia*)

This popular ornamental species originated in the southeastern US and has since escaped to road sides, wetlands and edges. Black locust is a tree species with alternate branching and pinnately compound leaves. A pair of sharp horns (1/2-3/4 inch) grow at each node. The bark of this tree is deeply furrowed and is dark reddish-brown in color. It has shallow, aggressive root system. Once introduced into an area, black locust expands readily from roots and their shade eliminates competition of native vegetation.





Black Locust

Also, large, fragrant flowers compete with native plants for pollinating bees. In managing for this species, mowing and burning are only effective in reducing the spread of young shoots. Herbicides applied to stems and stumps spread into the root system to provide more effective control. It is found in the park near the pinnacle, ringing the clearing.

## Horse Chestnut (*Aesculus hippocastanum*)

Horse chestnut is a large deciduous tree that originated in Europe. It has an opposite leaf structure which contains five leaflets (as seen in the picture). The flowers are white, large and very aesthetically pleasing. The tree also produces fruit that is in a chestnut brown capsule. This tree prefers full sun and can grow in a variety of soil types (USDA, 2008). It was originally planted because of its beautiful flowers but has spread and is now classified as an invasive exotic species in Georgia, Maine, Oregon, Pennsylvania and Wisconsin by the National Park Service (NPS, 2007). Although Vermont is not among those listed, this species could become a serious problem in Ethan Allen Park as it was seen in both seedling and sapling age classes.



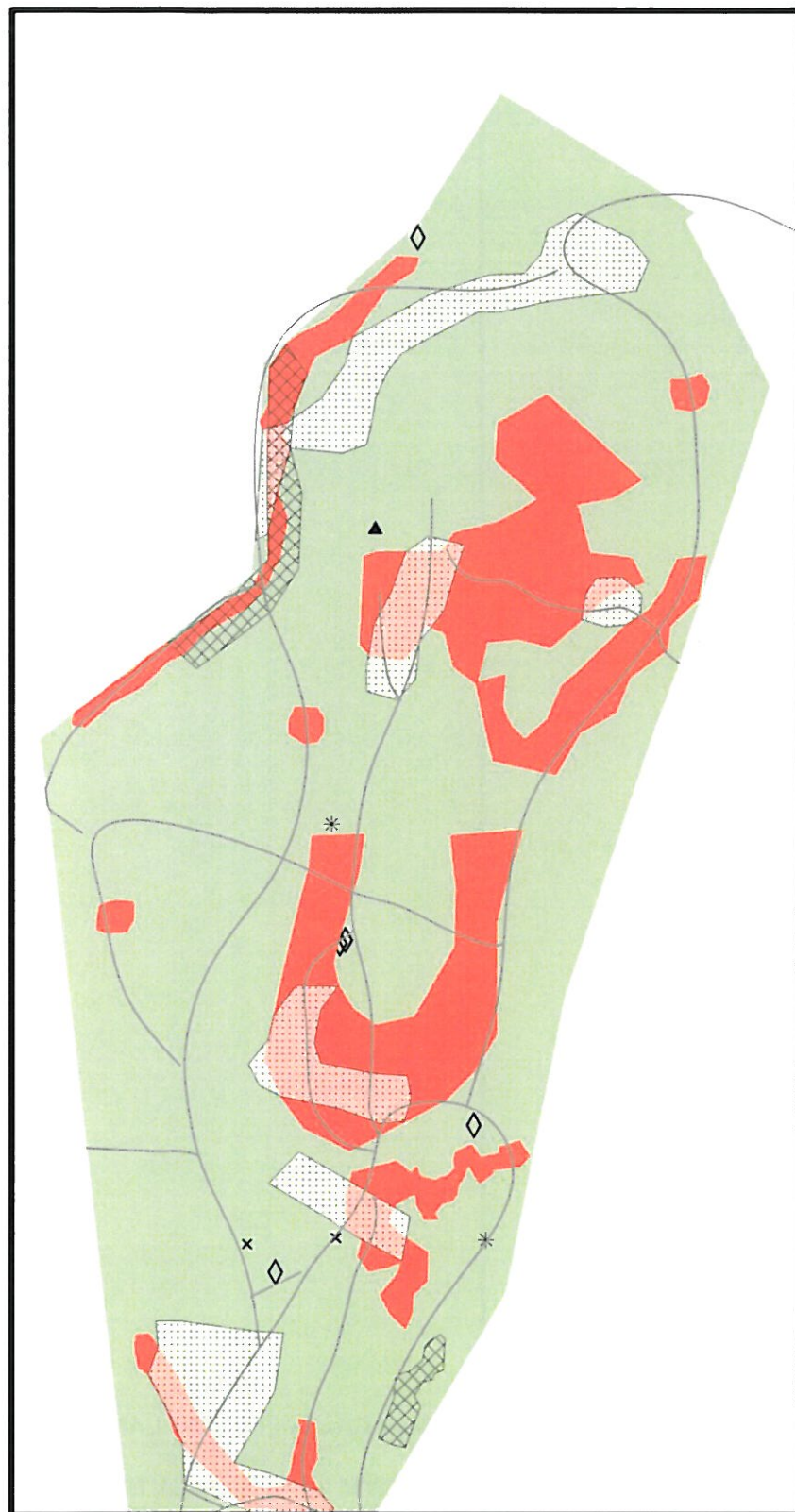
Horse Chestnut

The horse chestnut has the potential to out-compete the native species growing around it. This occurs through the large amount of litter it creates and simple competition for basic growing necessities. If the species is considered invasive in the area and removal is needed, there are a few options. The large trees can be girdled –cut shallowly around the base to the tree to cut off sap circulation but not fell the tree- in order to stop their growth and to eventually kill them. The “clip-and-drip” method can also be used by cutting the tree and applying an herbicide directly to the trunk. This method works best in the fall.



## Map 6: Invasive Species Northern Half of Park

Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008



- Buckthorn
- Honeysuckle
- Barberry
- Norway Maple
- Horse-chestnut
- Stone Crop
- Black Locust
- Trail









Map Created by UVM LANDS,  
Data Sources:  
UVM LANDS, VCGI, BPR

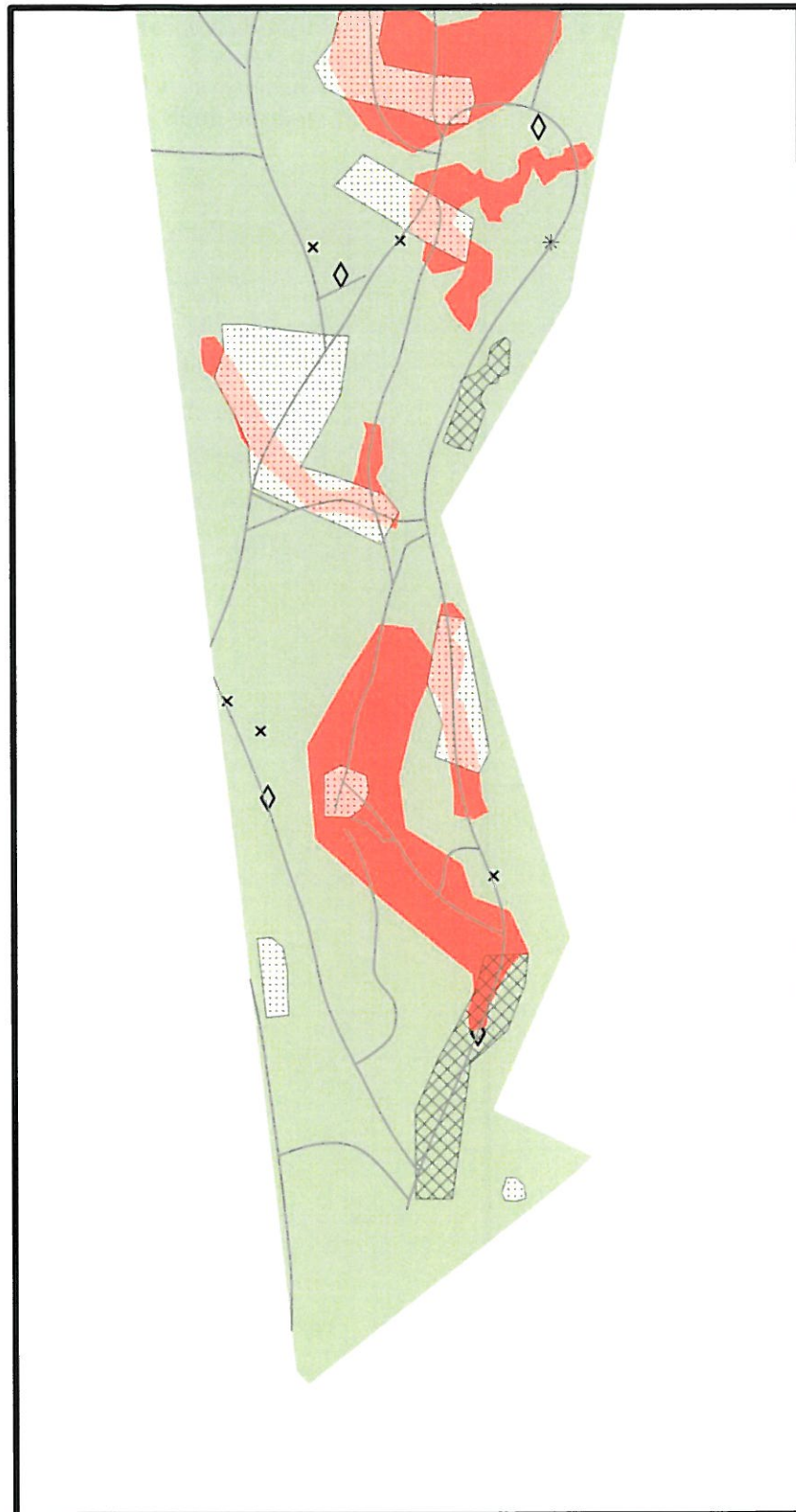


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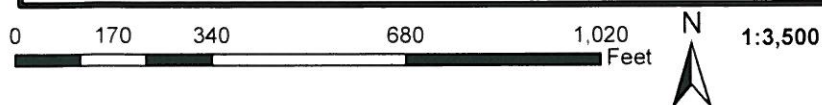
## Map 7: Invasive Species Southern Half of Park

Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008

-  Buckthorn
-  Honeysuckle
-  Barberry
-  Norway Maple
-  Horse-chestnut
-  Stone Crop
-  Black Locust
-  Trail



Map Created by UVM LANDS,  
Data Sources:  
UVM LANDS, VCGI, BPR



This map is not intended for survey purposes



## *-Rare and Endangered Plant Species-*

As described earlier, Ethan Allen Park is home to three natural communities; Mesic Oak-Hickory- Northern Hardwood Forest, Dry Oak-Hickory-Hophornbeam Forest, and Temperate Calcareous Cliff Community. Within these different natural communities variation in vegetation is expected, but some species found in Ethan Allen Park are classified as rare, endangered, or threatened. Designation as rare signifies that there are few populations of this species in the state. State and federal legislation determines which species are threatened or endangered. Threatened species are populations whose numbers are undergoing significant decline. Without protection they may become endangered species whose existence is in jeopardy.

There are a few environmental factors that pose a challenge to a species survival. First, special combinations of soils and climate can lead to unique adaptations where only some plants are able to grow. This can lead to large populations in few locations or small populations in many locations. Each of these is considered a threat of extinction if their present habitat declines and populations are not able to sustain themselves. Another example is how anthropogenic influences such as road building, agriculture, timber harvest and recreation can lead to alterations or deterioration in habitat. With increasing human pressure, specialized plant habitats are quickly disappearing.

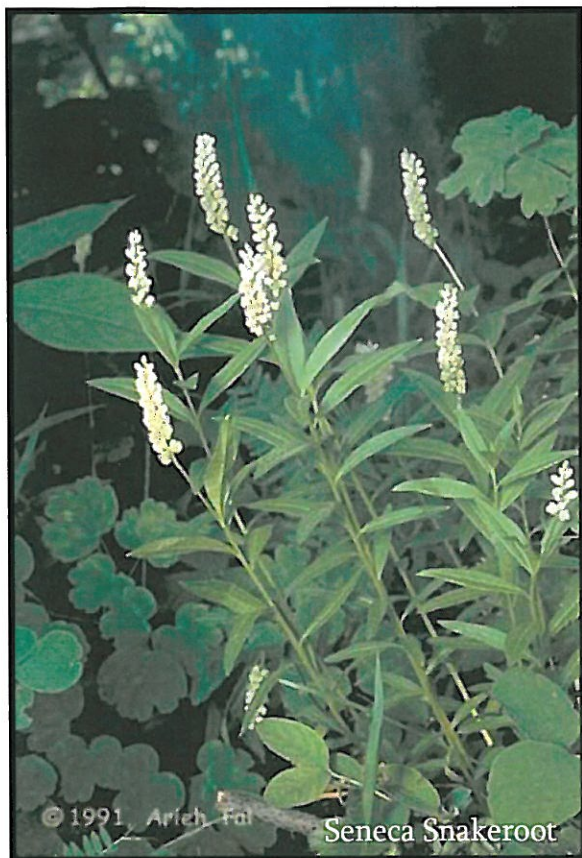
Plants are not equally rare, and in order to classify the rarity of plant species the Vermont Non-game and Natural Heritage Program follows a ranking system. The category ranking system ranges from S1 to S5 for within the state of Vermont.

State Rank	Significance
S1	Species are very rare, generally 1-5 occurrences
S2	Rare species, generally 6-20 occurrences
S3	Species are uncommon, believed to have more than 20 occurrences
S4	Species show apparent stability with over 100 occurrences in the state
S5	Demonstrates secure populations

There is also a similar scale to rate species rarity with similar criteria, but on a global scale from G1-G5. For example, a state-listed S1 species may be quite common globally and be a G5. Listed below are descriptions and status of rare, endangered, and threatened plants in Vermont that were found in Ethan Allen Park.

---

## Seneca snakeroot (*Polygala senega*)



Seneca snakeroot is a low growing, perennial herb that grows between 6 and 18 inches tall. It has white flowers, 1/8 inch long, arranged in a spike and bloom in early summer. The flowers are hermaphroditic, which means they have both male and female organs. The leaves are entire and gradually become smaller toward the base. This plant can be found in dry woods and rocky slopes. It ranges from Georgia to Canada and is listed as S2/S3 in Vermont and G4/G5 globally.

---

## Four Leaved Milkweed (*Asclepias quadrifolia*)

Four leaved milkweed is a wildflower that grows one to two feet high, with pale pink flowers in loose umbels. It has opposite and entire leaves that are broadly lance-shaped with a tapered point. It flowers from May to June. This plant is found in dry upland woods. It is listed as S3 in Vermont and G5 globally.





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## Sweet scented Joe Pye Weed (*Eupatorium purpureum*)

Sweet scented Joe Pye Weed is a tall, three to five foot native wildflower. It has whorled leaves with serrated margins. The stem is solid and purple at joints. When bruised, the stem exudes a vanilla smell. Flowers are arranged in one or more panicles of compound flowers that are in bloom in late summer/early fall. Populations tend to decline when shade from the canopy becomes too dense. This plant can be found in rich woods and some areas that are somewhat degraded. This plant is listed as S2 in Vermont and G5 globally.



Sweet Scented Joe Pye Weed

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## Low Bindweed (*Calystegia spithamea*)



Low Bindweed

Low bindweed is a wildflower, four to eighteen inches tall. It is in the morning glory family and has the characteristic large funnel shaped flowers on long stalks. Its leaves are oval shaped, one to three inches long and heart shaped at the base. This plant is S2 for Vermont and is G4/G5 globally.

---

## Poke Milkweed (*Asclepias exaltata*)



Poke milkweed is a wildflower that grows between two to six feet tall. Its leaves are in pairs and have entire margins. They are oval shaped and tapered at both ends. The flowers, arranged in loose umbels, are cream-white and tinged with lavender or green. This plant is found in rich woods. This species is listed as S3 in Vermont, G5 globally.

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## Wallrue (*Asplenium ruta-muraria*)

Wallrue is a native fern with divided leaves that are finely toothed and deeply lobed. This plant grows between 2 and 6 inches. It is found in rock crevices and ledges, mostly on limestone. Wallrue is listed as S3 in Vermont and G5 globally.





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## Cliff Brake Fern (*Pellaea glabella*)



Cliff brake fern's leaves (fronds) can grow up to two feet long, but are often much shorter. The rachis is a deep purple or brown color and densely pubescent. The pinnae are opposite. Cliff brake fern is typically found on calcareous cliffs or bluffs. This plant has a large range from Vermont to Florida and west to Nevada, but it is uncommon due to its specialized habitat. Cliff brake fern is listed as S3 in Vermont and G5 globally.

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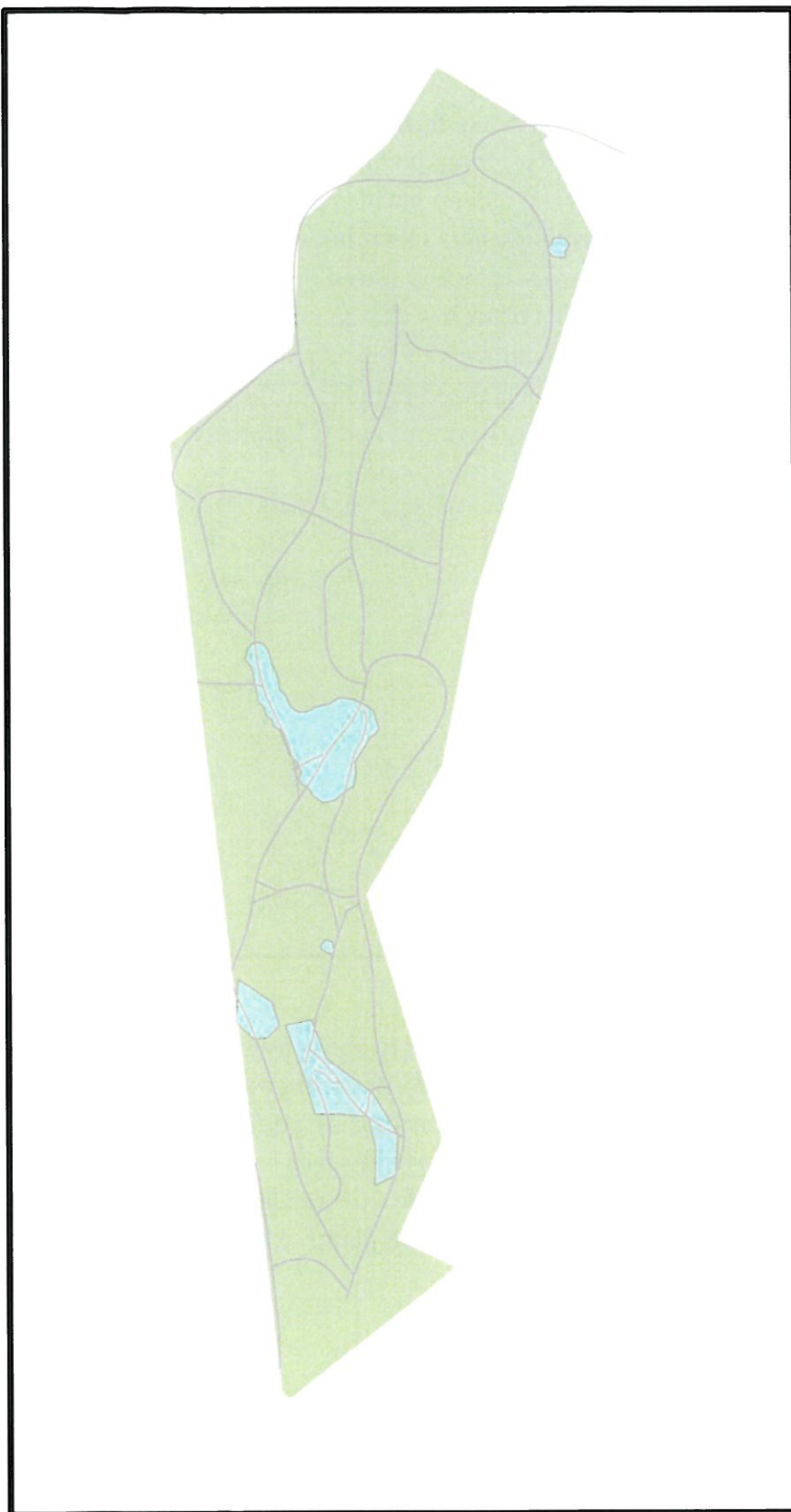
These plants, though rare, make significant contributions to the ecosystem as a whole. These species do not exist in isolation, but rather are interrelated with other organisms, such as pollinators. Through these unique interactions and the processes they perform, the consequences of the loss of these plants could affect a broad range of species. Ultimately, these rare, threatened and endangered plants improve human life. It is recommended that special care is taken to protect the identities and locations of these plants. Map 8 shows the sensitive plant sites within Ethan Allen Park.

## Map 8: Ecologically Sensitive Sites\*

Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008

— Trail  
Sensitive Sites

\*The exact locations of rare, threatened and endangered plants are not mapped here in order to protect them. However, their general locations are disclosed for management purposes.



0 250 500 1,000 1,500 Feet



Map Created by UVM LANDS,  
Data Sources:  
UVM LANDS, VCGI, BPR

This map is not intended for survey purposes



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## *-Appendix 1-*

### Rare and Endangered Plants

The following describes the presence, location, and number of rare, threatened, or endangered plants found within the park.

#### **Seneca snake root**

Approximately 1000 stems were found on the trails within 30 feet of the tower.

#### **Four leaved milkweed**

About 10 plants were found in the trails surrounding the tower.

#### **Sweet scented Joe-Pye weed**

Approximately 100 stems were found across the property including on the trail west to the tower and on the trail under the cliffs.

#### **Low bindweed**

Approximately 20 plants were found on the eastern side at base of the tower.

#### **Poke milkweed**

Three plants were found on the old access road leading toward the gazebo.

#### **Wallrue**

A small cluster of plants were found on the large rock outcrop at the base of the tower

#### **Cliff brake fern**

A few plants were found on the large rock outcrop at the base of the tower.



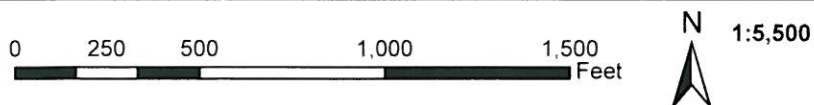
## Map 9: Rare and Threatened Plants

Ethan Allen Park  
Burlington Parks & Recreation  
Burlington, VT  
June 2008

- Sweet Joe Pye Weed
- ★ Low Bindweed
- ▲ Seneca Snakeroot
- × Poke Milkweed
- ✂ Cliff Brake Fern
- ◆ Four leafed Milk Weed
- Wall rue
- Yellow Oak
- Trail
- Park Boundaries



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Data Sources:  
UVM LANDS, VCGI, BPR



This map is not intended for survey purposes

## ***-Appendix 2-***

### **Project Proposal**



#### **Burlington Parks and Recreation Ethan Allen Park Natural Resource Inventory/Plan Goals**

The Burlington Parks and Recreation Department has identified several goals for the Natural Resource Inventory/Plan to be completed by the LANDS Program. The inventory/plan should include a description and location of all rare and endangered plant/tree species. By locating the population, recommendations can then be made on whether some of the trails need to be rerouted or closed due to sensitive conditions. The location of the plants should not be made public but will be shared with the State Natural Heritage Program and the New England Wildflower Society. It would also greatly benefit the park if the invasives were identified and mapped. Information gathered about wildlife either through existing vegetation or actual evidence will help with future management practices. Any and all recommendations about trails and overall management would be utilized by Parks and Recreation Staff with the hope of incorporating volunteers.

#### **LANDS Proposal**

LANDS interns will conduct a natural resource inventory of Ethan Allen Park for rare and endangered plant species, trails conditions, invasive plant species, significant wildlife evidence, soils, and bedrock. Management recommendations will be given, time permitting. This project is the first mapping project for the 2008 intern crew and represents service-learning; interns will be trained in resource inventory and mapping through completion of this project.

#### **Deliverables**

- Natural resource inventory report to be made public:
  - Inventory and description of trail conditions w/GIS data
  - Inventory and description of invasive plant species extent w/GIS data
  - Inventory and description of significant wildlife evidence w/GIS data



- Inventory and description of soils and bedrock w/GIS data
- Description of any rare and endangered plant species
- Management recommendations for trails and other park conditions (time permitting)
- Inventory and description of any rare and endangered plant species w/GIS data (not public)

### **Timeline**

6/17: Initial site visit 11; meet with BPRD employee Lisa Coven; GIS lab work

6/18: Natural Resource Inventory; GIS lab work

6/20: Natural Resource Inventory with guest ecologist Liz Thompson

6/23: Natural Resource Inventory; GIS lab work; report writing

6/24: GIS lab work; report writing

6/30: Send draft GIS layers to BPRD for comment

7/15: Send draft final report to BPRD for comment

7/30: LANDS Community Presentation 6-8pm, UVM Campus

7/31: Send final report to BPRD

