

“A Beginner’s Faith in Things Unseen”



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Executive Summary

This is a community-based project focused on assisting The Friends of the John Hay National Wildlife Refuge with future planning, management of natural resources, membership and educational programs at The Fells. The former Hay Estate became the John Hay National Wildlife Refuge in 1987. The Friends of the Hay Refuge now operate the site commonly known as The Fells. This project has been a cooperative effort between both The Friends and Colby-Sawyer College's Institute for Community and Environment.

This portfolio is a reflection of our work and is divided into the following sections; course description, environmental impact assessment, natural resources inventory, environmental policy, flora, mammals, interviews and student biographies. The project included an EIA (Environmental Impact Assessment) and a survey of the current parking lot and potential expansion areas. Also included, was an examination for the possibility of new barn and its purpose. Another component is a Natural Resources Inventory using GPS, (Global Positioning System) and GIS, (Geographic Information Systems) looking at vernal pools, forest types, roads and trails, views and vistas and invasive species. Each student researched a topic concerning different policies associated with The Fells; topics included fee demonstration, invasive plant species, Senator John Sununu, management practices, noise pollution, and public access. Flora and mammal reports were created to support educational initiatives. Finally, interviews of current members were done for perspectives and opinions, to assist with planning for the future. We hope that our efforts help The Fells for many years to come.

ACKNOWLEDGMENTS

We would like to thank the Trustees of The Fells, Tim Fleury of the Merrimack County Cooperative Extension; and the Town of Newbury. We would especially like to thank the following individuals for their assistance; John Callewaert, Laura Alexander, Maggie Stier, Pierre Bedard, Thelma Hewitt, Loa Winter, Jeff Good, Thad Soulé, Roger Wells, Joe Carroll, Dave Anderson, Susan Farber, Angie Wilkes, and the interviewees.

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COURSE DESCRIPTION

The third year is the defining characteristic of the Community and Environmental Studies program. Rather than choosing from a series of 300-level course options, all students majoring in Community and Environmental Studies will take CES 301/302 for 18 total credit hours during the third year. In addition to traditional classroom and laboratory exercises, students are immersed in an in-depth, yearlong analysis of a local environmental problem or issue with detailed fieldwork and extended site visits. This structure allows students to work at length on a complex problem while developing important skills in group-oriented tasks to a degree that are not obtainable in traditional courses.

PROJECT DESCRIPTION

The course that took place during the 2002-2003 year worked with The Friends of the John Hay National Wildlife Refuge at The Fells in Newbury, New Hampshire. The Fells is one of New England's finest examples of an early 20th-century summer estate. The 164-acre estate includes Colonial Revival buildings, hiking trails, a Japanese water lily pool in the hillside of a rock garden, flowers gardens and even a secret garden hidden within an abundance of rhododendrons. The Fells is a non-profit organization and offers educational programs in history, horticulture and the environment. The organization is proud to have over 600 members, which includes 150 active volunteers and the support the on-going restoration of the historic gardens and buildings.

This is a community-based project focused on assisting. The former Hay Estate became the John Hay National Wildlife Refuge in 1987. The Friends of the Hay Refuge now operate the site commonly known as The Fells. This project has been a cooperative effort between both The Friends and Colby-Sawyer College's Institute for Community and Environment.

Natural Resource Inventory (NRI)



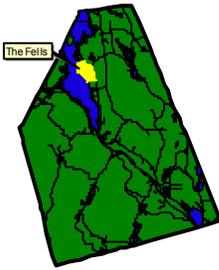
A Natural Resource Inventory (NRI) is defined by the University of New Hampshire Cooperative Extension as “the compilation and description of all important, naturally occurring resources within a given locality,” (Stone, 2001, p.1-2). Essentially it is a compilation of all the major assets of a certain region such as a state, town or even an individual property.

In the fall of 2002, the Colby-Sawyer College Community and Environmental Studies 301 class performed an in-depth study of the natural resources for the John Hay National Wildlife Refuge and developed this NRI. The John Hay National Wildlife Refuge is also known as The Hay Refuge and is owned by the U.S. Fish and Wildlife Service. It is operated by The Friends of the John Hay National Wildlife Refuge or simply just “The Fells.” The NRI performed for this site consists of a base map and five other sections, which are:

- Forest Types and Composition
- Invasive Species
- Roads and Trails
- Vernal Pools
- Views and Vistas

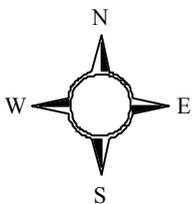
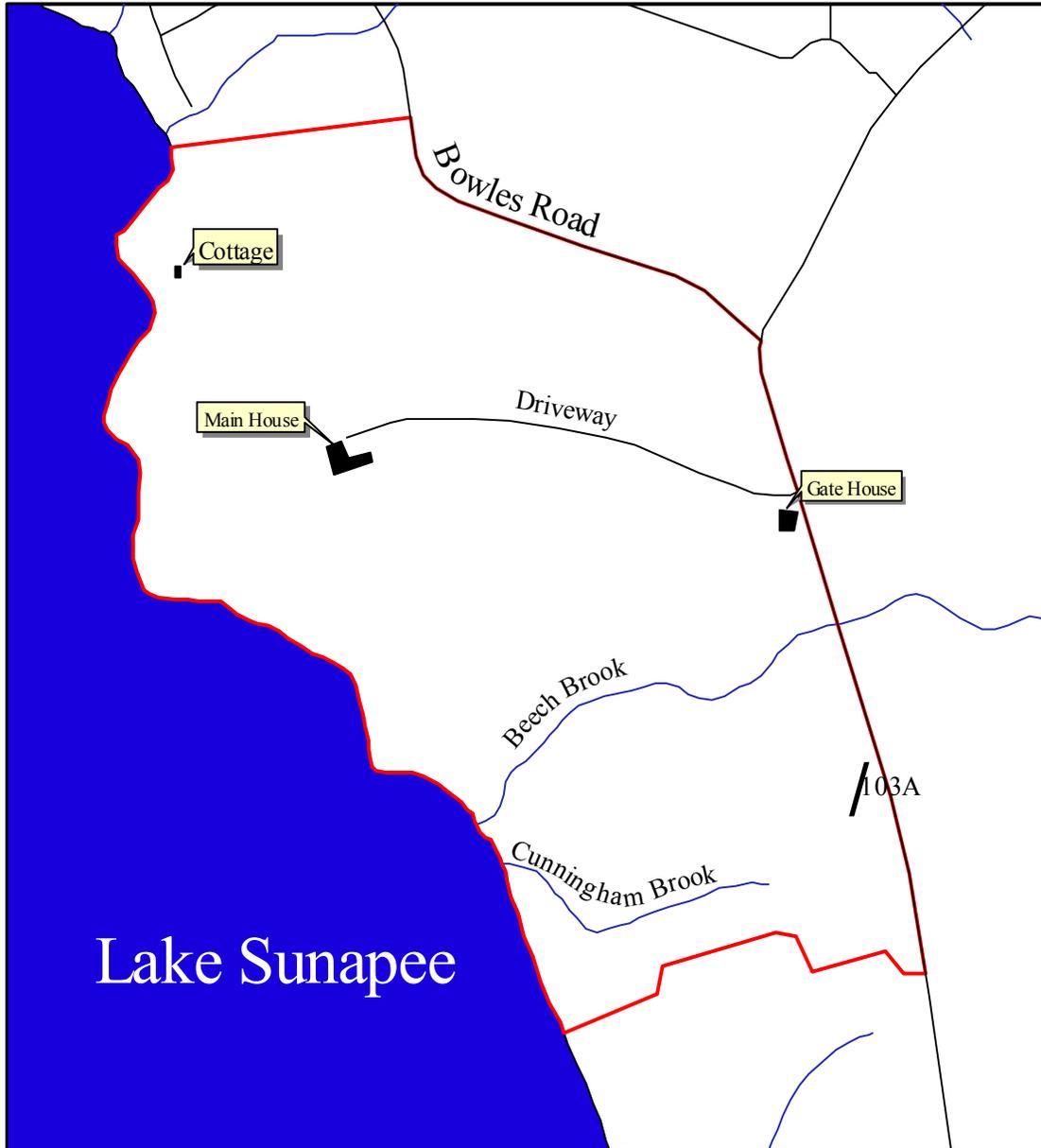
The purpose of conducting this NRI is to serve as a part of a master plan for the property for use by the Friends of the John Hay National Wildlife Refuge. The information is important in that it can be considered in making future decisions concerning the property. It is also important, when looking at this NRI, to understand that this data was collected by a group of students using and combining Global Positioning System data technology and UNH GRANIT Data layers (<http://www.granit.sr.unh.edu>). These instruments have a certain degree of error and therefore may vary slightly from what actually exists on the property. Where precise measurements are necessary, field measurements should be obtained to insure accuracy.

The Hay Refuge itself is a National Wildlife Refuge located in the northwestern section of Newbury, New Hampshire along the shores of Lake Sunapee. It is a 164 acre piece of land set on a slope overlooking Lake Sunapee and Mount Sunapee. It is composed of mostly woodland areas but also contains several large cultivated gardens. The property also contains Lake Sunapee’s largest expanse of undeveloped shoreline which is just under a mile long making up the entire western portion of the refuge. Route 103A runs along the eastern side of the property for about a half-mile. Across Route 103A is a large parcel that was also owned by the Hay Family and was donated to the Society for the Protection of New Hampshire Forests in 1960. The refuge property is relatively small compared to its neighboring property of 675 acres. However, it is still a key ecological piece of land for the region particularly given its expansive list of natural resources.



Hay Refuge

Newbury, NH



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Legend

-  Buildings
-  Streams
-  Roads
-  Hay Refuge Boundary

Forest Types

The forest of the Hay Refuge represents the common Northern Mixed Hardwood Forest found in the area. Sugar Maple *Acer saccharum*, American Beech *Fagus grandifolia*, and Yellow Birch *Betula alleghaniensis* primarily characterize the Northern Hardwood forest.

John Hay did not always own the land of the Hay Refuge. The Hay family acquired the land from buying several farms. Farming was not a worthwhile occupation in the mid to late 1700's so many farms were abandoned. The reforestation of the land began in the mid 1800's and is the current forest seen today. Sections of the Hay Refuge were used for agricultural purposes into the 1950's; these can be often delineated by stonewalls or large stands of White Pine *Pinus strobus* (Anderson, 2002).

There are several pockets of exclusive species; along the shore for example is primarily White Pine and Red Pine *Pinus resinosa*. Quaking Aspen *Populus tremuloides* can be found near the maintained vista. Eastern Hemlock *Tsuga canadensis* is found around the wildlife field. The understory of the Hay Refuge is primarily made up of Hobblebush *Viburnum alnifolium*, Striped Maple *Acer pensylvanicum*, and some Serviceberry *Amelanchier canadensis*.

There is sign of pillow and cradle topography; some of this may be due to the hurricane of 1938. Pillow and cradle topography is the formation of pits and mounds from a wind event. That occurs when a wind event is strong enough to topple trees. When these trees fall, their roots tear large portions of the earth with them, thus creating the "cradle." As time goes by the roots of the tree decays and falls to the ground, this forms the "pillow" (Wessels, 1997, p. 116).

One of the last agricultural pieces of land to be reforested can be found along 103A (colored purple) on the southern end of the property. This can now be seen as a stand of large White Pine. The average diameter breast height (DBH) is 110 centimeters. The large White Pines that were taken down by the hurricane of 1938 were salvaged for the war effort. The pines taken from the Hay Refuge were dragged onto the lake through the area that extends south of the cottage. This was originally thought to have been an unsuccessful vista.

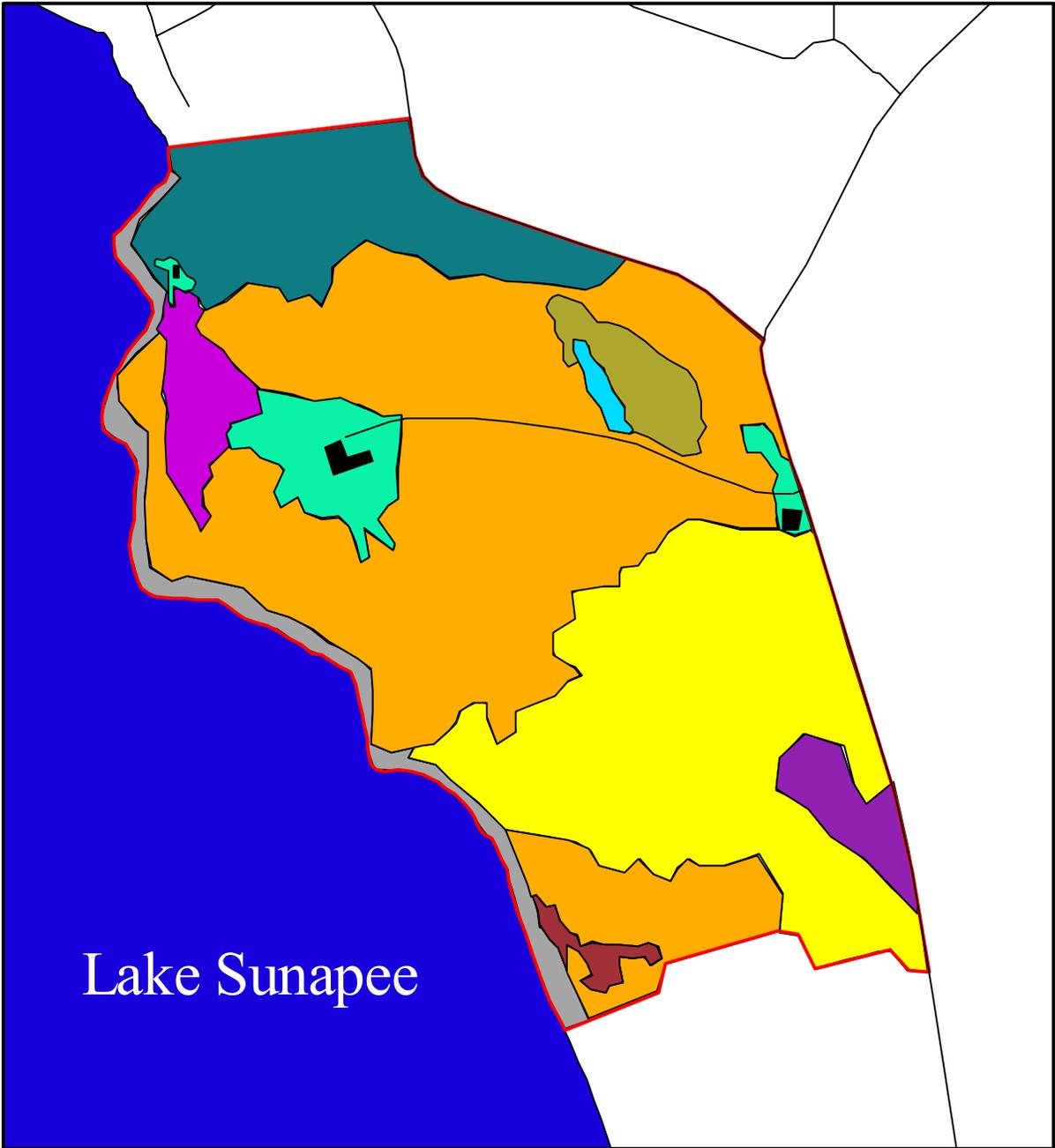
There is still one area that is not wooded; it is maintained as open for animal habitat. This is found along the driveway to the main house (aqua blue). This land was used for agricultural purposes but now is maintained for natural habitat. The wildlife field is important for creating habitat diversity. Many animals benefit from this area such as White-tailed Deer, Voles, Porcupine, and many birds are just some of the species that benefit.

There is one maintained vista not associated with the main house; it is a vista cut for a neighbor. It is found on the southern end of the property (dark red). There is Japanese Barberry *Berberis thunbergii*, Low Sweet Blueberry *Vaccinium angustifolium*, and Black Berry *Rubus allegheniensis*. The surrounding forest is Quaking Aspen *Populus tremuloides*, White Pine *Pinus strobus*, White Birch *Betula papyrifera* and Red Oak *Quercus rubra*. The edge of the shore is coniferous, having large Red Pine, White Pine, Eastern Hemlock, and Red Spruce.

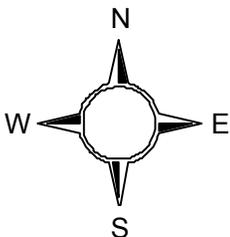
The forest of the Hay Refuge is diverse with species and history. The vistas, wildlife field, and reclaimed pastures create a forest unique to the area. The large trees and areas of visible history make the forests of The Hay Refuge a learning tool.

Forest Types

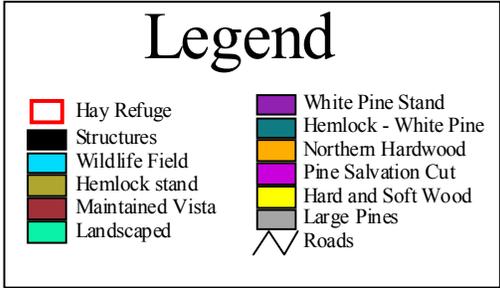
Hay Refuge



Lake Sunapee

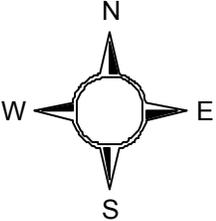
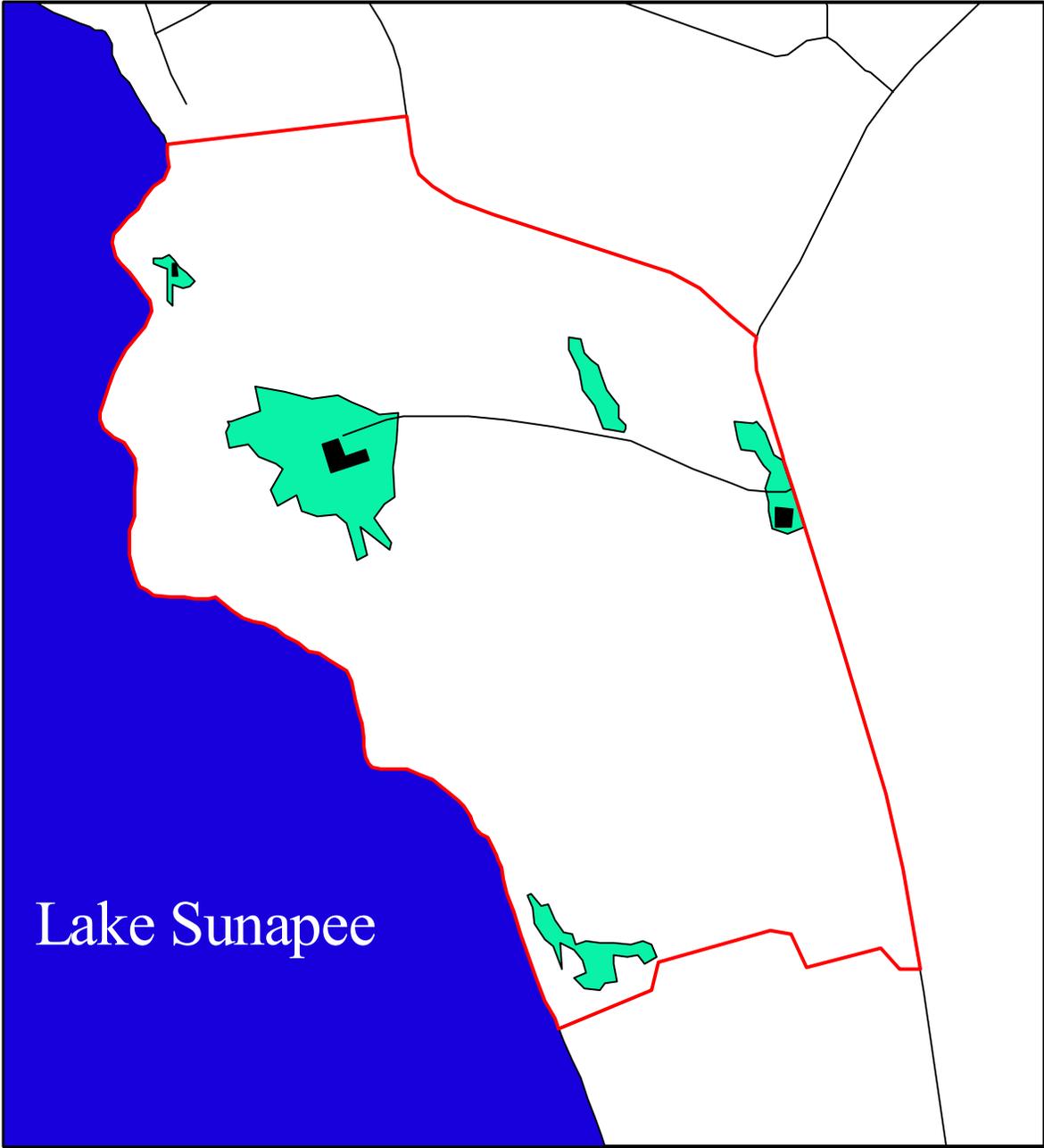


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Open Spaces

Hay Refuge



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Legend

- Structures
- Landscaped
- Hay Refuge
- Roads

Invasive Species Inventory

The state of New Hampshire faces various threats upon its ecosystem. Issues such as urban sprawl and loss of wildlife habitat are difficult to miss for the attentive eye. However, another threat that some feel is most urgent is more difficult to recognize: **invasive species**. This term may be defined within the context of flora as “those non-native species that invade and alter both natural and managed areas,” (“Invaders,” New England Wild Flower; Conservation Notes of The New England Wild Flower Society). Although this definition is broad and often debated among professionals, there does exist a strong consensus that some of these plants are harmful to natural areas of New Hampshire. More specifically, fifty species of non-native New Hampshire plants have been identified as harmful to the state’s ecological integrity.

From the information gathered with the Invasive Species Inventory, (completed by Jamie Irving during the fall of 2002 [see Invasive Species policy paper in the next section]), it is possible to say that The Hay Refuge currently has at least five invasive species identified by The New Hampshire Invasive Species Committee. This assembly, which was appointed by The New Hampshire Department of Environmental Services, (House Bill 1258, 2000), has designated fifty plant species into three levels of threat; **Prohibited, Prohibited with Restrictions, or Restricted**, (see appendix). These designations, however, are not concerned with the plant’s status as either an aquatic invasive plant or a terrestrial invasive plant, of which this study concentrates on the latter. This fact, however, should not lessen the concern for all types of invasive species, terrestrial or aquatic, plant or animal.

Of the species identified upon The Hay Refuge thus far, two are designated as Prohibited; two are designated as Prohibited with Restrictions; and one is designated as Restricted:

Prohibited

Japanese Knotweed, (*Fallopia japonica*)
European Barberry, (*Berberis vulgaris*)

Prohibited with Restrictions

Japanese Barberry, (*Berberis thunbergii*)
Burning Bush, (*Euonymus alatus*)

Restricted

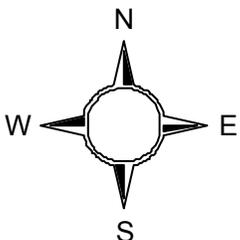
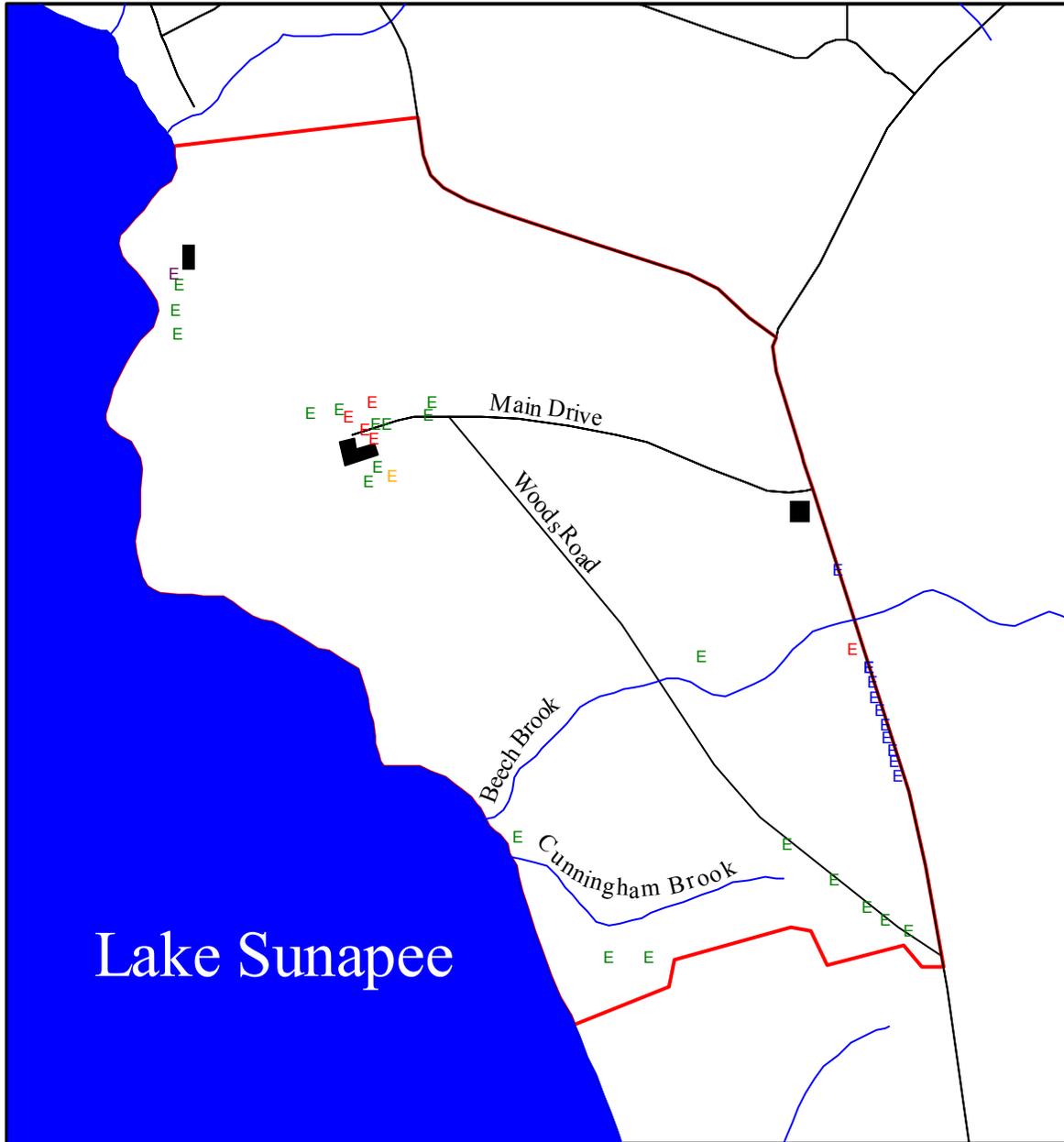
Russian Olive, (*Elaeagnus angustifolia*)

Also, it is recommended that The Hay Refuge keep watch for other likely invasive plants. Specifically, one must consider the Norway Maple, (*Acer Platanoides*), as a likely threat although it does not currently reside at The Hay Refuge; this plant is designated as Prohibited with Restrictions. Also, one must consider other invasive plant species not found on the list comprised by the New Hampshire Invasive Species Committee. The plant species found on this specific list are considered most likely invaders. However, other states and organizations concerned with this matter have noted other plant species. For example, one may consider Scotch Broom, (*Cytisus scoparius*), as a potentially harmful plant, as it does exist to a large degree on the property.

Presently, these individual plants are indexed as part of the Natural Resources Inventory completed by the Colby-Sawyer College Community and Environmental Studies class. Although these plants may pose a significant threat if left unchecked, one may see that there are few actual plants currently on the property, (this NRI data series was obtained using a random sample inventory). It is probable that these plants could be dealt with in a relatively short period of time given the proper instructions for removal. Furthermore, early action in regard to the removal of all invasive plant species would be economically beneficial as the cost of removal increase with the increase of plant population.

Invasive Species

Hay Refuge



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Legend

- E Burning Bush
- E Japanese Barberry
- E European Barberry
- E Japanese Knotweed
- E Russian Olive
- Hay Refuge Boundary
- Roads
- Streams

Trails and Roads

The Hay Refuge is home to various trails that the public can use for sightseeing and exploration. The trails vary in length and difficulty. Many visitors go to The Hay Refuge to get in touch with nature and it is important to have trails that are easy to navigate and not strenuous for the walker. The Hay Refuge has done this very well, and it shows by the number of people that continue to come back year after year, this showing that they are meeting visitor's needs.

The Driveway and Parking Lot: The parking lot is the first thing visitors see. The lot is made up of a gravel base and can accommodate about twenty cars. Other cars can be parked in the extension if needed. The extension is not a constructed lot, but is instead a field, connected to the gravel lot. A possible future plan is to expand the gravel-type parking lot into the extension area. This would benefit the Hay Refuge if done aesthetically and would be more efficient for cars.

The driveway is used as a trail. It is a five-minute walk to get to the house, as it is only one-third of a mile long. If anybody is unable to make the walk, The Fells staff allows cars to drop off visitors at the main house. The idea behind this is that the Hay Refuge is a place to think about nature and to enjoy it, not to see cars driving by, but the existing drive allows access to those people for whom the walk would prevent their visit.

The Woods Road: Near the house there is another trail called Woods Road. This is intended for use by staff vehicles, yet for the most part it is just a relaxing trail that is used by many visitors. One of the longer trails on the property, it is half a mile long in length making it a useful trail, but not a demanding walk. Some guests believe it to have great mystery because when the trail bends and curves it makes it impossible to see what is coming up next.

The Cottage Trail: This is the trail that starts at the barn site and leads all the way down to Refuge cottage. The cottage itself is only for Hay Refuge staff and not the public use. This is a short trail (one-fourth of a mile long), but helps continue to show the Fells having an exclusive set of trails that are pieced together nicely. Even though the cottage entrance way is closed off, visitors can still continue walking the path, as it will lead to the main house. It would be in the Friends best interest if the whole trail were open for the public use. This would allow guests to have another trail that goes right into Lake Sunapee, which would make the Hay refuge even more memorable.

The Forest Ecology Trail: A dominant trail that is used by many visitors, as it is the longest trail on the property (one and one-fifth mile) that starts from the back of the Hay residence and swings eventually around to join with the Woods Road. The trail reaches down to the shoreline and mixes with the Refuge's short beach and then the trail markers continue back into the trees then gradually curves upward back to the main house. Along the way visitors can easily enjoy the sights and sounds that the Hay Refuge has waiting for each new visitor. It is on this trail that people can see Lake Sunapee and Mount Sunapee. Guests can find various species of plants that only grow near the shoreline, such as Black Gum (*Nyssa sylvatica*), Buttonbush (*Cephalanthus occidentalis*), and Sweet Gale (*Myrica gale*).

Road Extensions: One of the extensions is basically a continuation of the driveway. The difference is that the road branches off in two other directions. The first direction leads right into the estate and ends at the pebble courtyard. The courtyard is

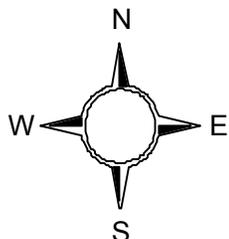
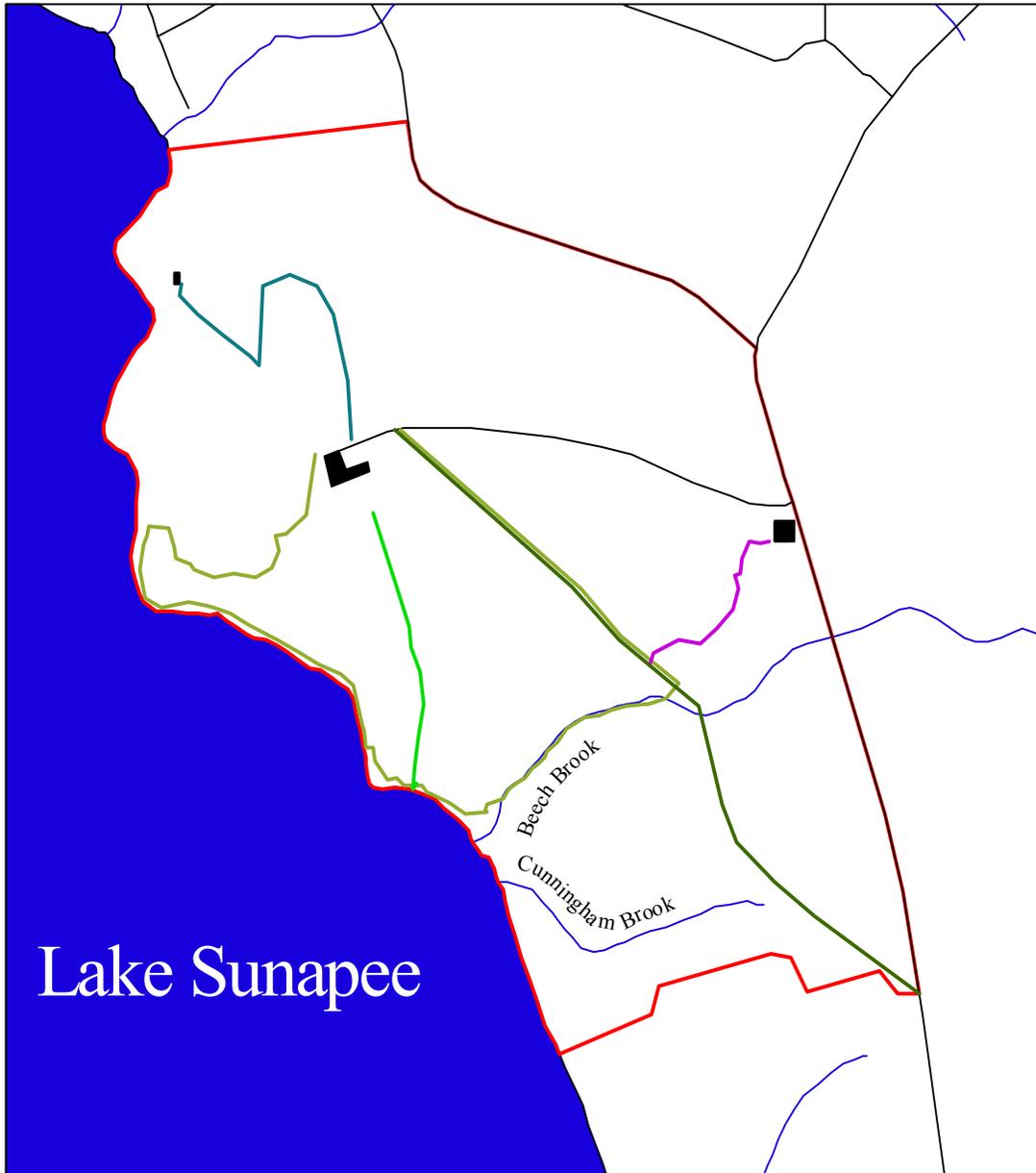
used by The Fells for large gatherings, symposiums, parking on occasion and also a place for staff and visitors to have lunch. For the time being the large meetings will have to take place here at the courtyard, until the new barn is reconstructed. The second extension curves around the main house and then continues to lead to the Gardens, one of the vistas, and also the nursery. The Bee-Line Trail is at the end of this extension too. The last extension leads quickly to the barn site.

Bee-Line Trail: The last trail is the Bee-Line Trail or Bootleg Trail. It is about one-fifth of a mile in length and runs straight from behind the Hay residence and goes all the way to the shore. It is an unmarked trail, yet many use it to get to the shoreline. The Fells staff does not want the public to use the trail, but instead to use the various other trails that are well marked. Despite the fact that it is not officially marked as a trail, the public knows of its existence and uses it regularly. But in the future the possibility might present itself to make the Bootleg Trail into a public trail because of its popularity to be used. If the Hay Refuge staff feels that the trail needs to not be used then the entrance needs to be blocked off to keep the public from finding and using the trail.

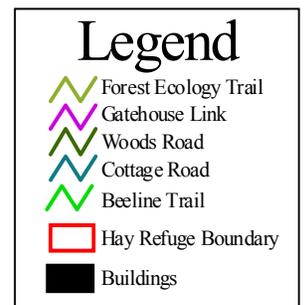
Gatehouse Link: The Gatehouse Link is a short trail that connects the Forest Ecology Trail to the gatehouse. When entering the John Hay Refuge the link can become an alternative way to see the property without first starting walking along the driveway. A problem that occurs is that many guests do not know the link starts at the side of the Gatehouse. Thus, many see the driveway and assume that it is the only way down to the rest of the Hay Refuge. Along the Gatehouse Link are some examples of large, tall Eastern Hemlocks. Clarence Hay decided to keep because he thought that they were a necessary component of the forest.

Trails and Roads

Hay Refuge



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Vernal Pools

A vernal pool is a small temporary body of water that occurs in a forest depression in the topographic land layer. Pools are usually identified by the biota that inhabits the area during inundation. Wetland flora species can also be associated with vernal pools. Vernal pools tend to be located under tree canopies that limit available light. The shade formed by the surrounding trees creates a cooler atmosphere and therefore causes a lower evaporation rate. The water that resides in the basin usually does not exceed a depth of four feet during the time of water retention. This “flooding period” affects its soil composition. The soil can be defined as a rich organic compound since it is very rich and silty. Identifying vernal pools in the dry season can be difficult, however detecting areas with dips in elevation, and brown water and silt-stained leaf litter are key indicators (Thompson & Sorenson, p. 307-8, 2000). Vernal pools are limited due to their location and their lack of inlet and outlet connectors to larger water bodies such as rivers and streams. The invertebrate species that is associated with this habitat like frogs and salamanders have a higher survival rate due to the restricted access to the enclosed area.

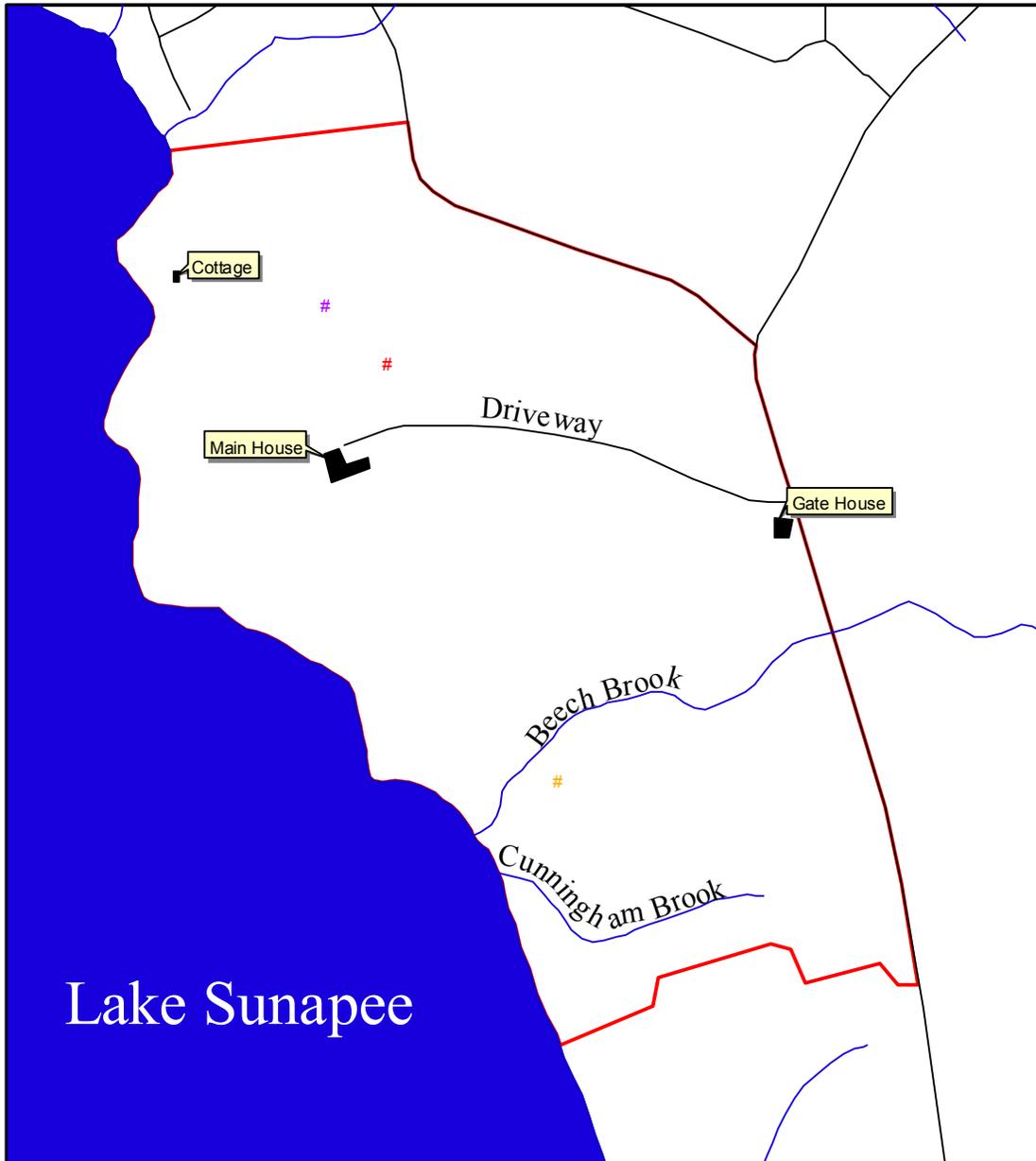
There are three vernal pools located on the Hay Refuge site. One pool is found adjacent to the collapsed barn and is directly at the end of the power-line right of way, which connects to Bowles Road. The second is located behind the secret garden and is sited by a nearby trail. Lastly, the third pool is found on the lower part of the estate near the lake bordering the Forest Ecology Trail.

Wetlands and vernal pools are very important for amphibian procreation activities because vernal pools are excellent habitats for mating. However, “vernal pools and the animal species that depend on them are threatened by activities...[such as] alteration(s) of surrounding forests,” (Thompson & Sorenson, p.308, 2000). Activities such as construction, timber logging, agriculture, land disposal, highway maintenance, underground storage tanks and storm water run-off contribute to non-point source pollution that can effect the quality of standing water bodies. Currently, The Hay Refuge only needs to be concerned with highway maintenance from Route 103A. However, if another access road is built near the preexisting power line easement that would interfere with the dynamics of vernal pools in that area and reduce the amount of wetlands even further.

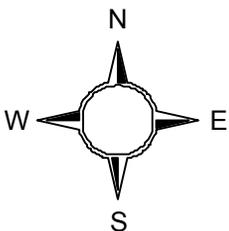
Part of the Fells’ mission is to educate the public, not only in the history of the Hay family but also in other dimensions such as horticulture, gardening, and forest composition. Wetlands and aquatic life are excellent resources for environmental studies and education. It is important to keep this valuable resource in mind in the master planning process.

Vernal Pools

Hay Refuge



Lake Sunapee



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Legend

- Vernal Pools
- # Barn
- # Secret Garden
- # Foot Trail
- ∧ Roads
- Hay Refuge Boundary
- Buildings

Views and Vistas

Several views and vistas were studied at The Fells. Below are several images of the major views and vistas and a map of the location map for the images.



South vista from the main house



Lake Sunapee at the bottom of the south vista



Main house from halfway down the south vista



Rock garden from the top of the south vista



Rock garden and main house



Secret garden



Secret garden



Secret garden



Secret garden



Mt. Sunapee from the porch of the main house



Main house



Lake Sunapee from the Forest Ecology Trail



North vista



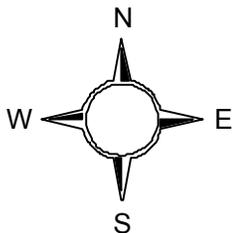
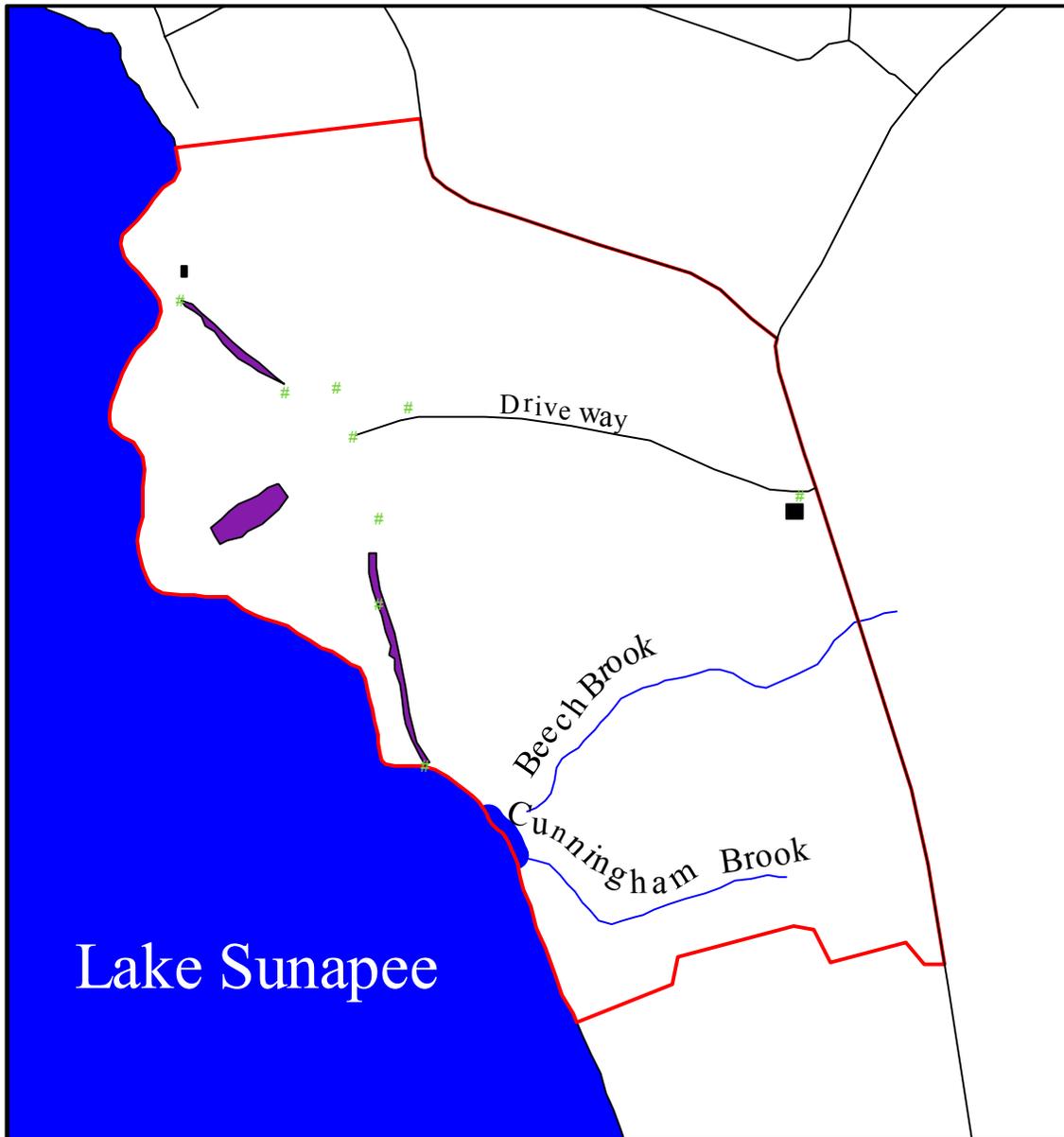
Driveway



Gatehouse

Views and Vistas

Hay Refuge



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ENVIRONMENTAL IMPACT ASSESSMENT

Working with the primary elements of environmental and social impact assessment under the National Environmental Policy Act, students conducted modified environmental and social impact analyses for two projects at The Fells. These projects provided the students with the opportunity to illustrate the importance of impact analyses for good environmental planning and policy with particular emphasis on prediction so that negative impacts can be anticipated and avoided. One group analyzed parking concerns at the Gatehouse and another group examined options for rebuilding the barn. We worked in conjunction with Pierre Bedard a local surveyor to produce a survey map of the parking lot. Our primary reference sources for this work were Ravi Jain's *Environmental Assessment* (2002) and the Environmental Assessment Forms of the New York State Department of Environmental Conservation (2002).

Hay Refuge Parking Lot

The Hay refuge is a 164 acre National Wildlife Refuge located in Newbury N.H. on Rt. 103A. Its grounds are open year round from dawn until dusk. House tours are provided on weekends and holidays from Memorial Day through Columbus Day. Throughout most of the year parking is not an issue. However during several large events such as the annual plant sale, Christmas at The Fells and several other special events, parking becomes a very large and dangerous issue. During these special events cars fill the 44 current spaces and extend onto Rt. 103A as well as Bowles Road. This presents a major safety issue due to the number of pedestrians in the line of traffic.

The entrance to the Hay Refuge parking lot is also a major problem. It is extremely small and will not allow two cars to pass through at the same time. This creates a bottleneck for cars trying to get in and out. Cars trying to get out get backed up into the lot and block the entrances to empty parking spaces. Cars trying to get in often get stuck right in the middle of traffic on 103A waiting for other cars to exit. This is particularly dangerous because this creates the potential for accidents due to unexpected stops in the middle of the road.

Present Site Description:

The parking area of the Hay Refuge consists of two sections and one entrance. The entrance itself is fairly narrow because it contains two large stonewalls on either side. It is impossible for two cars to go pass through at the same time. The primary parking lot consists of twenty spaces and a coarse gravel surface that helps to assist in water runoff. A French Drain System that gradually slopes off to the lot's southwest corner enhances this drainage. The Secondary parking section is on the same slope as the primary however the surface is grass and has not been altered to increase drainage. This presents a major problem in the spring during "mud season" when the thaw of the ground causes it to become extremely muddy and thus unable to be used by cars.

On the western edge of the grass lot there is a large section of bedrock, which rises up above the level of the lot itself. This occurs again on the eastern edge of the gravel lot as well as near the entrance of the driveway. However, these are fairly small in comparison to that of the one next to the grass lot but they do take up enough space to eliminate several spaces.

The eastern side of the gravel lot contains one large American Basswood (*Tilia americana*), which should be paid attention to during any renovations of the parking lot. Special care should be paid attention to this tree because of not only the aesthetics of having the tree there but also because it is an excellent example of a large and very old American Basswood with a long history at the Hay Refuge. This eastern side of both lots also contains several large maples as well as some smaller species of trees and a stonewall. On the other side of this stonewall is 103A and its fairly large drainage ditch. This ditch has caused erosion of the existing main entrance as it flows downhill from the corner of Bowles Road.

The Western edge of both of these lots contains a rise in elevation due to the emerging bedrock. There are also several large coniferous and deciduous trees that seem to have grown in the thin soil on top of this bedrock near the gravel lot. The bedrock near the grass lot is covered mainly by grass and one or two small deciduous trees. However at the

northern most edge of this grass lot the bedrock subsides and is fairly level with the rest of the lot. Along the northern edge of the grass lot is a stand of several large white pines as well as numerous other smaller deciduous and coniferous trees. The southern edge is where the entrance is located as well as the Gatehouse.

Project Proposal:

In order to eliminate or at least reduce the dangers and inconveniences of the existing parking lot can be helped by several minor adjustments and alterations. The first alteration would be to convert the grass lot into a drainable gravel lot much like the one that already exists. This would allow for increased parking during the spring and fall when the ground tends to become muddy and unusable by cars. The second alteration would be to remove the two small areas of ledge that exist in the current gravel lot. This may require some drilling and blasting but would allow for several extra spaces to be added.

The third alteration would be to extend the new gravel lot out to the northwest where the ledge is not a problem. This section would need to be filled in slightly with fill in order to level it out slightly. However, it will not extend any farther north than the existing lot.

The last addition to the parking lot would be one that contains several different pieces. In order to help solve the problem of traffic flow in and out of the lot, a second entrance should be added from Rt. 103 A. This entrance should be at least 400 feet south of the entrance to Bowles Road. This puts it right around the 40 MPH sign on 103A and at the Northern edge of the existing grass lot, or new gravel lot. It would act as the entrance because it allows the exit to have an increased amount of visibility for exits from the property onto 103A.

In order to put in this entrance however, the drainage issue must be addressed. In order to solve this and prevent further erosion of the existing exit/entrance, a catch basin can be added just north of the new entrance to collect the runoff from 103A. The water from this basin will then run through a pipe that stays underground and runs underneath the northern edge of the parking lot, just south of the large white pines. It will then daylight when it reaches the previously cleared, grassy area to the west of the white pine stand. The pitch of this grassy area should be leveled out slightly to slow down the movement of the water allowing particulate matter to settle out of it before it dissipates into the woods.

Potential Direct Impacts:

The expansion of the existing parking lot will have several potential direct impacts on the surrounding environment. One of the largest of these direct impacts is the possibility of erosion from the diverted street runoff. Despite the fact that prevention measures have been taken, there is still the possibility that erosion may occur particularly during large rainstorms. If this erosion does occur it will run down hill into the woods that could then have a chain effect causing erosion farther and farther downhill. Along with the possibility of erosion due to drainage, there is also the likelihood of increased pollution. This may come from either the diverted street water or just pollution created by it being a large parking lot.

Another potential direct impact of this plan would be the loss of trees and the habitats that they provide. The loss of trees would occur as a result of having to create the second entrance. In the creation of this second entrance several trees would need to be

removed and other trees may be damaged. With the removal of these trees there is also an increased possibility that there will be an increase in erosion. These trees also provide a wide variety of habitats for animals such as squirrels and birds that will then lose their shelter. Despite the fact that some trees will be harmed in this project, the impact on the overall area will be fairly minimal.

Aesthetics is another potential impact of concern. The removal of trees as well as the expansion of the gravel lot may not be as aesthetically pleasing as the existing lot. This impact on aesthetics may exist from the point of view of the Hay Refuge as well as from route 103A.

Indirect Impacts:

During and after the construction of the new parking lot several secondary impacts may result as well. The first of these secondary impacts is noise pollution. This noise pollution may result from construction equipment and possible blasting during its development as well as an increase in traffic noise from the refuges potentially larger attendance. Parking lots in general tend to create a moderate amount of noise due to engine sounds as well as door slams. These may result in a decrease in wildlife habitation of the area.

Another secondary impact resulting from this project would be a more social impact. The removal of trees and addition of a second entrance would decrease the aesthetics of the property from the viewpoint of the road. This could cause a negative view of the Hay Refuge in the eyes of the public. This may result in a decrease in attendance to the refuge itself. This could defeat the purpose of creating the expanded parking lot because less people will attend.

Alternatives:

The first and most obvious alternative is to do nothing at all with the existing lot. This will really only create parking problems a couple of times a year but will not have any of the negative environmental impacts of the proposed plan. Even with the improvements to the lot that have been proposed, the parking problems during these several large events will still exist. So in some ways parking lot expansion will really not solve any of the major parking problems at the Hay Refuge.

Another alternative is to leave the parking lot the way it is now and create a satellite lot somewhere else nearby with shuttle service to and from the Hay Refuge. The town of Newbury is the most likely spot for these satellite parking lots particularly the Mount Sunapee State Park parking lots. This will prevent the negative impacts on the environment at the Hay Refuge by not creating another parking lot and using existing ones.

A third alternative is to expand the existing gravel lot to include the grass one but not adding the second entrance. This will prevent the added environmental impacts as well as eliminate parking problems during mud season. However this will not solve the problems of the existing entrance being too small for two cars to pass through at the same time. However in order to solve this problem an alternative would be to widen the current entrance to allow two cars through at the same time.

The last possible alternative would be to create a new entrance on the southern side of the gatehouse. The road would need to run around the backside of the gatehouse and come out farther south from the existing entrance onto 103A. This would solve problems

of safety resulting from entrance and exit so close to Bowles Road. However it would not solve problems of traffic flow through the existing or expanded parking lot.

Recommendations:

Following the main proposal of this EIS would best solve the parking problems at the Hay Refuge. It increases the parking capacity of the refuge as well as solves traffic flow problems through the lot. This will help during the summer and fall months when attendance is high and parking becomes somewhat of an issue. However during large events this expanded lot will still not be adequate and as a result the original safety issues will still exist. In order to solve these safety issues of having pedestrians and cars in the road on 103A an alternative may be to provide shuttle service from a satellite parking lot somewhere else nearby such as the Newbury town hall or Mount Sunapee State Park. This plan seems to have the least minimal impact while still providing solutions to all of the parking problems at the Hay Refuge.

Barn Reconstruction

In the winter of 2000/2001 the barn at the barn near the main house collapsed due to heavy snowfall. Because this barn was an original structure at The Fells, the Friends feel as though it should be rebuilt for the sake of historical accuracy and overall estate integrity. However, the reconstruction will have certain influences upon the land. The purpose of this environmental impact statement is to assess these possible influences and to help decide in which manner the newly built barn will best assist the goals of The Hay Refuge.

Project Overview:

There are many different solutions to building the barn, along with different alternatives for the site. One main focus for the site is to understand what erecting the barn would entail and the complications that may occur in the surrounding areas. This includes waste pollution to the vernal pool and surrounding land, noise pollution, and the effects on pre-existing plant and animal life.

The new barn will be designed in resemblance to its former construction and will be built within the historical footprint. Over time the previous foundation has deteriorated, leaving the corners of the structure in crumbles. Consequently, the structure will need to be restored using similar materials.

It has not been determined what the barn will eventually be used for; however, there are no plans for the barn to have a bathroom. Although, the blueprints show plans for piping for a bathroom to be built at a later date should it become necessary to have one on the site.

During the construction process possible runoff may occur at the barn site. This poses potential harm to the vernal pool. The company constructing the site may be asked to use different tools and remove construction waste. Thus they may have to use different methods of disposal than they would on other sites. For instance, the hired company might be asked to use different painting materials that would be less harmful to the environment. This could cause a problem when selecting a construction company to construct the barn, as that many companies may not have the same environmental goals in mind as other people working on the project.

A controversial issue that arises is whether or not The Fells should use the location of the barn for handicap parking or if the construction shouldn't take place at the original footprint. Having people drive down to the barn for parking would be both positive and negative for the site. The positive aspects are the close proximity to the main house for the handicap and those who are not able to make the long walk down the driveway. The negative aspects are the noise pollution to the guests visiting the secret garden. We also fear that having parking down on the barn site may lead to all visitors using the parking area, thus creating more noise for visitors of the secret garden. These issues and other have repeatedly come up and will have to be further discussed to reach a conclusion. Another issue is the runoff into the vernal pool on the occasion there was a leak of car fluids on the property.

The barn was lost in the winter of 2001 due to winter weather conditions and issues with snow. Prior to the collapse it was used by the grounds-keepers to house tools and tractors used on the site. Behind the foundation of the site is one of only a

few vernal pools on the property. When looking at the site these aspects need to be addressed to correct previous problems with the property.

The area around the barn site has been overwhelmed with coniferous trees due to a lack of maintenance. The surrounding trees have been maintained in previous years, yet the area has not been maintained since the collapse of the barn. The overwhelming amount of work that would need to be done to that area has caused the grounds-keepers to neglect this part of the property. This means that there will be some removal of overhanging branches, limbs that have fallen, and general brush removal.

Scoping Overview:

There is a multitude of issues concerning The Fells property since there are numerous stakeholders that contribute to the maintenance of the Refuge. For instance, organizations such as The Friends, The Fish and Wildlife Service, The Garden Conservancy, the Society for the Protection of NH Forests, The town of Newbury, State Historic Preservation Officers and the Hay family are just a few of the many stakeholders involved in the project concerning the 165 acres of land. The issue at present is rebuilding the barn structure that collapsed due to heavy snowfall in the winter of 2001/2002. Previous topics the Friends committee considered included the obtaining of the funds to finance this particular project. However, this is no longer an issue because the money has already been appropriated through a bill. Another concern is what the function of the building will be. The possibilities for how the new structure's capacity is used for are numerous. For example, the proposed action is to have the outer structure replicate the original barn and use the inner space as a classroom or an area for which larger groups can assemble. Another possibility is to keep the area inside as a storage unit where the various tools can be kept, as it was the barn's purpose in previous years.

NY State Checklist:

There are four main issues that were due for analysis from the New York State Environmental Impact Assessment checklists (New York State, 2002), which included potential influences on the landscape such as on land, water, transportation, plants and wildlife. These possible direct/indirect, cumulative, social and environmental impacts play a crucial role when developing an environmental assessment report.

Direct impacts on the land are inevitable when dealing with the reconstruction of any former building site. The barn location is off to the right hand side a few yards before the main estate. The barn's original footprint is still intact and the disturbance to the land would be limited if the barn was rebuilt on this former blueprint. The impacts to the land surrounding the area causes an issue of concern due to the valuable natural resource of a vernal pool located directly behind the barn. Potentially the process of rebuilding the barn can cause direct impacts on its current location. These include wetland disturbance, aesthetics during the construction period, and once the building is erected, the new attraction will provide space for more public functions and will result in more wear and tare on the land. The social and environmental impacts include a better opportunity to use space for educational purposes and more people will eventually be congregating at the site and in turn create more memberships equaling more money. Historically, this barn was in existence during the tenure of the Hay

Family, if the site was relocated to another location it would not be historically accurate and that idea would not coincide with part of The Fells mission.

Another important issue to consider is the impacts of transportation to and from the site and along the major roads that surround the Hay Refuge. Route 103A and Bowles Road are the adjoining roadways that provide public access to the site. The possibilities that are being considered to add additional parking and entrances will increase the traffic on Bowles Road and create possible blind driveways on the dangerous stretch located on 103A. This will affect the impacts on the barn because it could be a site for additional parking and if an access road were built on the power line right of way it would completely destroy the existing vernal pool adjacent to the barn's footprint. Furthermore, erosion to the land from the highway runoff would be evident especially if the state issues access for a new entrance located on Route 103A. Moreover, if the state redirected its excessive rainfall and snow runoff through the Hay Refuge it would benefit the issue of abrasion by the current entrance however, thus could subject other parts of the property to erosion.

The Hay Refuge is currently associated with The Fish and Wildlife Service and therefore wildlife management is an important aspect of the Refuge. Due to the barn's location it will have a direct impact on the vernal pool habitat, which was previously mentioned above. Due to the construction and the aftermath of the rebuilding process there will be adverse effects on the vernal pool. For example, many of these effects will be caused from the road run off, possible sewer or septic systems and the plumbing installations, which will be needed if the barn is going to be established for educational purposes. This will decrease the intrinsic value of the natural resource that is already limited on the Hay Refuge.

Finally, the impacts that will occur to the water sources in the area such as the larger water bodies such as Lake Sunapee, Cunningham Brook and Beech Brook will be indirectly effect by the barn's construction. As stated previously, the runoff from the rode will cause erosion and change the pH of the water from the maintenance of the highway (mainly due to salt and sand). Also, one might consider the preexisting drainage pattern of the property. Rebuilding the barn could significantly affect the drainage pattern. Furthermore, due to special events a parking lot near the barn or the estate might be needed and this could cause disturbance to the water and have weathering effect on the appearance of the property.

Alternatives:

Subsequent to the collapse of the barn the Friends realized the obvious need for its reconstruction in order to maintain the historical character of The Fells, (the barn/garage has been a piece of the Hay landscape since approximately 1915). Shortly after the collapse, an appropriations bill was given to the Fells in order for the barn's reconstruction. The terms of this bill indicate, however, that the monies shall be utilized in the pursuit of the barn's reconstruction as a closely resembling structure. Also, the Friends have decided that for times sake the barn will be constructed in its original footprint, as doing otherwise would necessitate a lengthy application/review process. Given the above situation, reconstruction is imminent. However, in considering all possible alternatives the Friends must consider the option of "non action." Although this would most likely result in the cancellation of the allocated

funds it does remain a possibility. Furthermore, the cancellation of this project would most benefit the local habitat, as there would be no noise or physical disturbances.

A second alternative is the construction of the barn in a different location from its current footprint. Although this option would not be considered until future funds permitted, it would provide distinct advantages such as improvement of available vistas, an increased distance from vernal pools and increased distance from the Secret Garden. To elaborate, there exists a suitable location approximately fifty yards east of the existing footprint. This location, situated between two large maple trees provides an excellent view of the Sunapee/Kearsarge Mountains, important for the visitor and student aesthetical experience. Also, this location would provide a sufficient buffer zone to the vernal pools near the existing foundation. This buffer would save much disruption to the vernal pool spring inhabitants.

A third alternative includes the buildings structure, interior/exterior, and its usage either it be educational, functional, or simply provisional space for special events. Many possibilities exist within this discussion. For example, because of the barn's close proximity to wetlands and vernal pools it may provide a valuable classroom and educational facility. Continuing with this theme, many ecology based recreational/educational areas are exploring the benefits of "wetland walk." This boardwalk could serve as an integrative and interactive facility that would provide hands on experience for many visitors to learn the importance of such micro ecologies. Furthermore, the construction of such a walkway would help minimize the negative effects of constant foot travel over delicately soiled grounds.

A fourth alternative concerns the facilities available in the newly constructed barn. If the barn is realized in an educational capacity will it be provided with bathrooms for the public and professional personnel? Although current plans do not include bathroom facilities, the Friends may consider such improvements if the building is going to be a public structure.

Recommendations:

Because the Friends have already been allocated the necessary funding to rebuild the barn it would be nonsensical to not use it. Therefore, it is our recommendation that the barn be rebuilt. Furthermore, because the barn's location is already approved because of a pertaining "grandfather clause" it should be built in its preexisting footprint, this will eliminate needless complications of new applications and review processes.

Keeping in sync with the Hay Refuge as a public education center incorporating history, horticulture and ecology, the barn should, in time, be converted into an educational facility. This facility will greatly improve the possibilities for future programs visitors. Also, the building shall be equipped with a lecture room, providing a much needed space for discussions and future symposiums.

ENVIRONMENTAL POLICY

In the fall, the class studied a broad range of environmental policy issues at the local, state and national levels (Vig and Kraft, 1999). Following this general study, each student identified a research topic relevant to The Fells. The topics which were researched and analyzed include current invasive species legislation, resource management approaches for National Wildlife Refuges, noise pollution and control strategies, fee demonstration projects on public lands, water access, and the environmental stance of the most recently elected senator of New Hampshire – John E. Sununu.

Invasive Species

Jamie Irving

On February 3, 1999, President Bill Clinton signed Executive Order 13112 for the establishment of the National Invasive Species Council*. This Council was prescribed to many duties concerning the facilitation of education, funding and management of invasive species on a national scale. The definition of invasive species, as provided by Executive Order 13112, shall be maintained for this Fells specific proposal: **“Invasive species” means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health,** (EO 13112, H.R. 1462).

The State of New Hampshire began similar legislation in April of 2000 with New Hampshire House Bill 1258. This bill established the need and funding for the formation of the New Hampshire Invasive Species Committee, which identified for itself the same mission as the National Invasive Species Council. Indeed, both groups utilize the same definitions, including that of **“invasive species.”** However, the list of plant and insect species proposed by the New Hampshire Invasive Species Committee is still under review, (a final decision on the list is expected in 2003).

Invasive species is a term new to most who are unfamiliar with natural resource management. Aside from newsworthy topics such as aquatic invasive Milfoil or the invasive rock bass, little is heard of invasive species. However, this subject is far more serious than the media may lead one to believe. This report is intended to provide basic insight concerning legislation and policy from resources outside of the Fells. From this information there may be greater understanding of how the Fells should approach the issue of invasive species management on a local scale.

Invasive Species at the Fells:

As a result of a random sample survey completed in the fall of 2002, it was determined that The Fells does have certain plants species considered by the state and federal governments as “likely to cause economic or environmental harm,” (see NRI section). Specifically, four species were found at the Fells that are identified by the New Hampshire Invasive Species Committee, these species are:

- **European Barberry, (*Berberis vulgaris*)**
- **Japanese Knotweed, (*Polygonum cuspidatum*)**
- **Burning Bush, (*Euonymus alatus*)**
- **Japanese Barberry, (*Berberis thunbergii*)**

However, this list is represents only those species that have been identified by the New Hampshire Invasive Species Committee. There are other invasive species identified by the National Invasive Species Council that exist at the Fells as well, these include, (but are not limited to):

- **Russian Olive (*Elaeagnus angustifolia*)**
- **Scotch Broom (*Cytisus scoparius*)***

* This Executive Order was later formalized into H.R. 1462

* Both the Scotch Broom and the Russian Olive are on the property. However, because of their unclear status as New Hampshire invasive plants they have been kept off of the Invasive Species Map.

Needs and Benefits of Management:

The Fells, represented by The Friends of the Fells, should be concerned with the existence of these species for two main reasons. First, because the Fells is a place focused on the preservation of local history, ecology and horticulture, The Friends should consider what the Fells stands to lose if no action is taken in regards to invasive species. Particularly, the forested landscape of the Fells is susceptible to compromise because it is not managed with such veracity as the gardens or homestead. Left unmanaged, the forest areas at the Fells may, in time, become overgrown with invasive species that consume a much-needed amount of resources and available space. This will eventually cause an unsuitable environment for the native plant species in the forest, thus rendering it less diverse in species composition and diversity. Over time this homogenizing of plant species may cause local extinctions and cause serious deterioration to overall health, (Mehrhoff, 1998, p. 8).

The second reason for concern of invasive species by The Friends relates to the Fells being an educational facility. The Fells itself abounds with examples of historical land usage, current horticultural and ecological practices and various natural resources, such as vernal pools and almost a mile of Lake Sunapee shoreline. An opportunity now exists to illustrate The Friends' knowledge and understanding of resource management by setting a positive precedent for local and state invasive species management issues.

Invasive Species Legislation:

As stated above, the most recent New Hampshire legislation concerning invasive species was House Bill 1258. This bill was introduced in early April of 2000, at which point both the New Hampshire House of Representatives and the New Hampshire Senate approved the bill and subsequently adopted it on April 27, 2000. The bill called for the establishment of the Invasive Species Committee that was responsible for the assembly of a list of threatening plant and insect species. This list was to be completed and submitted for review in one calendar year from the date the bill was passed, April 27, 2001, (House Bill 1258, 2000). However, the Committee realized early on that the project would require more time to complete. In July of 2002 the Committee finally proposed a list containing fifty invasive plant species and sixteen invasive insect species. These species were assembled into three different groups based on their specific level of threat, (currently, at the Fells, concern lies mostly with terrestrial invasive plant species, although the list contains both aquatic and terrestrial plant species). The first grouping is the **Prohibited Plant List**, which acts to prohibit the "collection, possession, importation, transportation, sale, propagation, transplantation and cultivation of plants known to pose an immediate threat to the health of native species, to the environment, to commercial agriculture, to forest crop production or to human health," (The New Hampshire Invasive Species Committee, 2002).

The second grouping is the **Prohibited Plant List with Restrictions**, which acts to "designate such plants that pose a potential threat to environmental or economic health but for which such potential may be reduced or eliminated by cultural or biological practices, (The New Hampshire Invasive Species Committee, 2002)."

Finally, the third grouping is the **Restricted Plant List**, which “acts merely as a ‘watch list’ for which there are no provisions at this time,” (The New Hampshire Invasive Species Committee, 2002).

Of these three groups, The Fells has species found on the Prohibited Plant List and the Prohibited Plant List with Restrictions. First, both European Barberry, (*Berberis vulgaris*), and Japanese Knotweed, (*Polygonum cuspidatum*), are on the Prohibited Plant List. Second, both Burning Bush, (*Euonymus alatus*), Japanese Barberry, (*Berberis thunbergii*), are on the Prohibited Plant List with Restrictions list. It is currently unclear whether the New Hampshire Invasive Species Committee’s list will suffice for the Fells. Because the Refuge is still owned by the United States Fish and Wildlife Services, (which constitutes part of the National Invasive Species Committee), it is subject to federal level legislation. However, it is quite clear that there are some species of plants that, no matter how invasive, will not be able to tolerate the harsh New Hampshire winters, especially in the northern regions. For this reason alone, one may assume that a state level initiative may prove more effective in assessing which species pose the greatest threats, (this is not to say that the Fells should ignore the presence of species listed by the National Invasive Species Council, species such as Scotch Broom).

Furthermore, certain logistics of the invasive species legislation still remains unclear. For example, it has not yet been established as to what stance the state will take on enforcement issues. With over half a million households in New Hampshire, (United States Census, 2000), inspection may prove too difficult. Also, questions may arise surrounding ex post facto laws and certain “grandfather clauses.” Especially concerning are locations such as the Fells where “Prohibited” plants have long since been a part of the historical and horticultural value of the site. These questions shall be answered in time with public hearings and press releases, according to Lionel Chute of The Natural Heritage Bureau.

Other Invasive Species Management Plans:

The problem of invasive species is not a new one. The signing of the Lacey Act in 1900, during the McKinley administration, was geared mainly towards the endangerment of animal species due to over hunting. However, the Act also provided regulatory language prohibiting the introduction of injurious species into the United States. As a result of this long history combating invasive species there has been a solid foundation for management plans. However, because invasive species are varied in form, (plant, animal, fungi), management plans are often quite diverse in their procedures.

In March of 1999, The Connecticut River Watershed/Long Island Sound published an Invasive Plant Control Initiative. Their strategic plan represented a large group of constituents along the Connecticut River*. Their goal, as stated in the document, is to coordinate an effort for the entire Connecticut River Watershed. The document focuses primarily on the Silvio O. Conte National Wildlife Refuge,

* The formal name being the Invasive Plant Control Initiative Steering Committee, representing: U.S. Fish and Wildlife Service, Silvio O. Conte National Fish and Wildlife Refuge; New England Wild Flower Society; Massachusetts Native Plant Advisory Committee; Vermont Agency of Natural Resources, Water Quality Division; Connecticut Department of Environmental Protection and the New Hampshire Department of Environmental Services

(SOCNWR), based in Turner Falls, Massachusetts. The SOCNWR is immense in comparison to the Fells. However, their basic invasive species initiative format may work for the Fells as it involves positive networking strategy. For example, their document strongly suggests the benefits of working with already established invasive species management resources. As there are many agencies and organizations taking action against invasive species there seems to be a lot of redundancy. Specifically, SOCNWR stresses the need for a standardized management process for invasive species management that would cater universally to all those applicable. Thus far, the SOCNWR has collaborated with the various contributors to derive a universal understanding about the problem. They have established a basic list of definitions, specific invasive species targeted for management, plant physiology and reproduction trends, and available information on plant histories and control methods previously utilized by other agencies, (there are a few common plant species between SOCNWR and The Fells). This information was disseminated to all affected organizations. The Steering Committee was able to procure a grant to begin collaborating on a plan from the Fish and Wildlife Fund and was also allocated funding from The Silvio O. Conte National Fish and Wildlife Refuge Act, (Public Law 102, H.R. 794).

The Fells has an opportunity to become a proactive leader in the Sunapee Region with regards to invasive species management. Again, as an educational facility the Fells is in an optimal position to make a difference on a local scale, and such an initiative would prove economically beneficial and in accordance with their mission statement. This policy proposal suggests that the Friends should take action against the growing threat of invasive species, before it becomes necessitated to save the Fells' ecological integrity or required by law.

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Resource Management at The Fells

Bill Doenges

The topic of natural resource management and extraction on government owned and operated lands is one in which there are many variables. The focus of this paper will be on Department of Fish and Wildlife lands, mainly The John Hay National Wildlife Refuge. “The National Wildlife Refuge System Improvement Act of 1997 identifies six wildlife-dependent recreational uses (hunting, fishing, wildlife observation, photography, and environmental education and interpretation). The Draft Appropriate Refuge Uses Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997 proposes a policy for other uses (Draft Appropriate refuge Uses Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997). The John Hay National Wildlife Refuge is not the largest of the refuges in the country. What is the benefit of resource management and extraction on federal lands? How should the refuge be used and who should be able use it? These are some of the questions raised and discussed in this paper.

The Mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (<http://refuges.fws.gov/>). In addition, the appropriateness of a particular use is based on the unique characteristics of a refuge. There currently is policy (Draft Appropriate Refuge Uses Policy pursuant to the National Wildlife Refuge System Improvement Act of 1997) out which refuges follow to make decisions about which uses could be beneficial and which could be potentially harmful.

The National Wildlife Refuge System Improvement Act (NWRISA) of 1997 identifies six recreational uses for refuges, hunting, fishing, wildlife observation, photography and environmental education and interpretation. There are also stewardship responsibilities in which help ensure that the six recreational activities have priority over other public activities. If these other public activities are to be allowed there is a process to be followed. The Refuge Recreation Act (RRA) of 1962 states that the use must insure that the conservation objectives will still be met, regulation of the use is also allowed, if deemed appropriate. An appropriate use of refuge is a proposed or existing use that meets at least one of the following three conditions: The first is: the use is a priority public use or necessary for the safe, practical and effective conduct of a priority public use on the refuge. The second is: that the use contributes to fulfilling the system mission, or the refuge purposes, goals or objectives as described in a refuge management plan approved after October 9, 1997 was passed; or the third that: the use has been determined to be appropriate in documented analysis by the Refuge Manager, with the Refuge Supervisors concurrence. This documented analysis has to follow 11 factors.

- Does the use comply with applicable laws and regulations?
- Is the use consistent with applicable Executive Orders and Department and Service policies?
- Is the use consistent with refuge goals and objectives in an approved refuge management plan?
- Has earlier documented analysis not denied the use?

- Is the use consistent with public safety?
- Is the use manageable within available budget and staff?
- Is the use consistent with other resource or management objectives?
- Will the use be easy to control in the future?
- Is the refuge the only place where this activity can reasonably occur?
- Does the use contribute to the public's understanding and appreciation of the refuges wildlife or cultural resources, or is the use beneficial to the refuges wildlife or cultural resources?
- Can the use be accommodated without impairing existing wildlife-dependant recreation in the future?

Other uses will be evaluated using a screening process created by this policy. Under this screening process, uses will be critiqued on their relationship to the systems conservation mission, individual refuge purposes, and the six priority public uses. This appropriate use test and screening test will be used refuge managers to decide which uses are appropriate on national wildlife refuges. Refuge uses are carefully monitored to see impacts on natural resources. Preventing uses that are deemed harmful will allow refuges to follow their conservation missions and purposes (NWRSA).

There are some concerns with what is allowed for recreational activities on refuges. The most controversial one is hunting and to a lesser extent fishing. There are pro hunters, which have two main arguments: The first argument is the purchase of migratory duck stamps by hunters has paid for a substantial portion of refuge land, mainly in areas suitable for water fowl habitat. In the fiscal year of 1994 stamps purchased by hunters and certain visitors totaled \$21,200,000. The second argument is that the animal population is the unit of conservation, and removal of individual animals for human use is not harmful, and may be beneficial as long as the population growth rate is maintained. The anti-hunting argument is that no place can be a refuge where there is regular killing of the residents. The other argument is that fewer people hunt now so that it hinders the enjoyment of the refuge by the majority, (non hunters). The Fish and Wildlife Service has taken criticism for allowing grazing, mining, and other activities which refuges were not designed (<http://www.ncseonline.org/nle/crsreports.natural/nrgen-3.cfm#nwr%20management>). Grazing, mining and oil drilling can desecrate the land and make it unsuitable for non-domestic wildlife. It can cause erosion, and polluted areas that takes years to heal, and leave wildlife without land.

The Arctic National Wildlife Refuge (ANWR) in Alaska is one of the better-known refuges. There is a heated debate whether to drill for oil there. The ANWR is a 19 million acre refuge. Of the 19 million acres 1.5 million is coastal plain and was set-aside and named section 1002 for study of its environmental value and petroleum potential. In 1987 Secretary of the Interior Donald Hodel under President Ronald Regan recommended that section 1002 be open for oil and gas leasing, even though the environmental impact statement said other wise. The statement prepared by the Fish and Wildlife Service found that “expected displacement and reduction of wildlife populations and natural processes would cause major reduction in the value of the area as a pristine, natural scientific laboratory. Wilderness values within the 1002 area, the report concluded, ‘would be eliminated’” (Mitchell, 2001). The ANWR has many issues with the idea of drilling. One of the major ones is that caribou cows like to bear their young

on the open plains where predation is minimal and grazing is easy. Drilling for oil would hinder this and would drive the caribou to the foothills where predation is much higher and grazing more difficult. The difference in the areas is argued by scientists, they say that the Plains is important calving grounds for a herd 5 times as large as the Prudhoe Bay herd, (Mitchell, 2001). Proponents against drilling argue that it is not worth the environmental risk for the economic gain. The United States would still depend heavily on foreign oil. Residents of Alaska have much to gain from drilling considering half of the royalties stay in the state. Republican Senators Frank Murkowski and Ted Stevens of Alaska are disappointed that congress rejected the oil drilling. They felt without drilling at the refuge, “there was not one single thing on the energy bill that increased oil production” and Stevens blamed “radical environmental organizations” for shutting off the needed energy source, (U.S. rejects drilling in Arctic).

The Sutter National Wildlife Refuge outside of Sacramento California has problems with economic demand. The power crisis that has plagued California in recent years has started to affect refuges. The plan from Western Power Administration is to run power lines south of the refuge. These new lines would need towers as well, what if these towers were to be placed on the refuge, what sort of impact would that have on the wildlife. The people living near the area do not want the power lines and towers to be put in because of devaluing their property, (Kruger 2002).

The John Hay National Wildlife Refuge is a on a completely different scale compared to the ANWR. The JHNWR does not have to worry about oil drilling, mining, or any large-scale extractions. It could possibly consider timber harvesting in the future, of course it would have to start to maintain and potentially manage the refuge, this might not be in line with the guidelines of the refuge system. The JHNWR has to look at what is has to offer recreationally to the public, that is where it is strongest. There are beautiful gardens and vistas over looking Lake Sunapee, and a historic estate. The six primary uses outlined by the NWRSA 1997, are mostly easy to uphold. The strongest ones for the refuge would be photography, environmental education and interpretations. This is already part of their mission statement. The gardens provide botanical education experiences for people of all ages and are beautiful to photograph. The estate of John Hay provides cultural and literary education, and ecology trail is an education opportunity for young children to learn about nature and watersheds. JHNWR is a great educational opportunity for people of all ages and that should be the focus of the refuge. Hunting, fishing and wildlife observation are more difficult for the refuge to uphold, simply because of its size. Being only 164 acres, hunting is nearly impossible; the refuge would have to be closed to the regular visitor and the number of sportsmen would have to be limited. There is not a large amount of wildlife to be hunted on the property to begin with. Hunting would quickly dissipate the population of animals that live there. It would not be in the best interest of the refuge to allow hunting simply for the reason it would not follow the conservation strategy. The location of the JHNWR allows for possible boat access to the property, there would have to be strict regulations on which boats would be allowed access to the refuge. Powerboats would be strictly forbidden. This of course is difficult to enforce because of the control of Lake Sunapee. Hand paddled boats such as kayaks and canoes would be allowed because of their minimal noise and disturbance to the area. The JHNWR has many things to offer the public, keeping the conservation plan in mind will help keep them on the right track.

The National Wildlife Refuge System is a system with many variables and opportunities for individual refuges to grow and further the love of wildlife and conservation. The JHNWR is one of these refuges. Following the NWRSA (final version due out spring 2003) and its six public priority uses is a way to start to monitor what the refuge is capable of and what it isn't. Creating their own policy would be wise for the future, allowing the public and themselves to know where the refuge stands on issues, current and potential future ones.

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“A lake is the landscape’s most beautiful and expressive feature. It is earth’s eye, looking into which the beholder measures the depth of his own nature.”

-Henry David Thoreau

In the world today, technology is getting faster and at the same time humans are crossing into the natural world, and thus things are changing quickly. A new kind of pollution has entered into the political realm and also in the public’s opinion; this is noise pollution. Our society is realizing that noises created by humans are causing problems for both humans and animals. Scientists are using sounds that harm animals, even though they are trying to study them (J.G., 1993). In this paper I will produce a general overview of noise pollution, the policy on noise pollution, show strategies for addressing noise pollution, and offer recommendations for The Friends to consider.

In the early seventies, the Clean Air Act of 1970, the Noise Control Act of 1972, and the Quiet Communities Act of 1978 forced the EPA to develop an Office of Noise Abatement and Control (NPC, 2002). With this office in place the United States now had an organization that would regulate and maintain anything in relationship to noise pollution. This included tasks of creating standards for noise, education of what noise pollution is, helping with making low emission products, and continuing research on noise (NPC, 2002).

Even though this office was developed it was not maintained because of funding issues. So noise pollution took a backseat while other important issues became the funded problems. Recently the Quiet Communities Act of 1997 was proposed in the House of Representatives. The main goal that this act involves is to reinstate the Office of Noise Abatement and Control (NPC, 2002).

At this time in New Hampshire there are no polices and or laws that regulate noise pollution in the granite state. But that does not mean that the process of making noise laws for New Hampshire is not in production. The state is growing in numbers concerning population and because of this New Hampshire’s towns and cities are changing too. More noise is being created by various machines and because of this New Hampshire is starting to get noise pollution that a city would get in another state.

The town of Newbury wants to make sure that their community is fair to its citizens, but at the same time wants to create laws that make Newbury a place to visit. The Hay Refuge is in Newbury so it too tries to follow the Newbury guidelines. That is why in the town ordinance they have a section that states that the noise level should not exceed 80 decibels on a citizen’s property. To give the reader an idea of the decibels of equipment a tractor is 80 decibels and a pile driver is 95 decibels. This creates an environment that the Newbury residents can likely be proud of and can function without disturbance (Town of Newbury, 2002).

The obvious danger to the environment is that the wildlife suffers (J.G., 1993). If loud noise is created in a national park or refuge that area will decline aesthetically. Many people go to these parks to get away from the loud noises in their daily lives. This is because noise pollution is very invasive, spreading like wildfire all over the United States. These places are designated spots to enjoy nature and to sit, walk, or run while thinking without the nuisance of a loud.

People have to be aware of the dangers of loud noises. Because of loud noises many Americans are getting hurt because of the deafening noise. Some major problems that are associated with prolonged noise abuse are: hearing loss, sleep loss, and a loss of productivity in the workplace. So laws proposed for noise pollution in the near future would benefit the environment and human health. Most equipment has been invented to be quieter. An example of this is that a concrete mixer, which was 85 decibels, has been modified to now be 75 (Jain, 2002).

Noise can cause an array of problems in relation to human aspect. The main attributes are physiological, psychological, communication, performance, and social behavior effects.

“Most people don’t want to come to the wilderness to be to be assaulted by the same sights and sounds they left behind”
-Barb Maynes (Wood, 1998)

Noise can harm human physiology by three main ways. They are internal bodily systems, hearing threshold, and sleep pattern. Each of these is harmful to humans and should be constantly recognized when using loud machinery (Jain, 2002).

Many parts of the body can be effected indirectly when noise is louder then human decibels can take. If the decibels reach 85 then humans can be harmed. The heart and the stomach can be affected and can cause harm eventfully to the individual. High volumes of noise levels can create bodily functions to reduce. Such things as coordinated movements and respond time can lead to human inaccuracies (Jain, 2002).

The hearing threshold is the level that an individual can hear a noise both the lowest and the highest noise. This is important to understand because if a noise excised the normal capacity of a human then the risk of hearing loss becomes into effect. This is all determined by the decibels of the noise and the length at which the ears were exposed to the pitch. In researching noise complaints one most put the loudness of the noise, the length, and the frequency content (Jain, 2002).

The Noise Pollution Clearinghouse is a non-profit organization that promotes awareness of noise pollution, generate resources, and tries to change laws to better noise pollution control. A new idea that the Noise Pollution Clearinghouse has suggested is the Quiet Lakes Project. Throughout the United States people have tended to not realize the importance of a quiet lake (NPC, 2002). They have retracted back to their lakeside homes and let the noisy and disturbing boats drive on in. But through education and citizen involvement things could change in many of the lakes around the nation. The three goals that the project wants to accomplish are too reduce the majority of noise levels on the lake, to enforce quiet times or days, and to reduce the loudest problems on the lake: jet skis and powerboats (NPC, 2002).

“Cited studies showing that personal watercraft noise levels reach 115 decibels, more than the 105 decibels of a jackhammer.”
-Kevin Collins, of the National Parks and Conservation Association. (Kilian, 2000)

NPC have come up with a realistic plan to address noise pollution. They have determined that they can do these goals in a time frame of about 3 years. The first part, which begins in 2003, will include key parts to get things started for the program such as:

- Make the public aware of the noise boats create and solutions to them
- Show the public that they can challenge and change old rules
- Show what are the laws right now
- Get citizens to make sure the law enforcement is doing a good job
- Get the public to want quiet lakes

In the second year the project will incorporate these resources and educate the public. The last year is estimated to be the year that with the public's support will take the lake noise issue to the political arena (NPC, 2002).

It is very important that The Hay Refuge is kept quiet so that its many visitors can get the most out of The Fells. The more noise on the Hay Refuge property has, the worse it is to have guests and enjoy their stay at The Fells. The good thing about The Fells is that the property is away from any running noisy objects like cars and trucks and the goal of the refuge tries to accomplish is a place to promote the quiet contemplation of nature (Stier, 2002).

One of the few exceptions is the shoreline of the Hay Refuge, which has the Forest Ecology trail running along side Lake Sunapee. Here visitors to The Fells have to deal with the sound of noisy private boats. Lake Sunapee is home to many tourists and shoreline homes that own many powerboats. These boats create a disturbance in the peace and quiet of the Fells.

Today there is a push to try and change the types of engines used in small boats to reduce air and noise pollution boat. Now companies are trying to remodel the engines making them cleaner when used. With the help of the National Marine Manufacturers Association (NMMA) The Marine Retailers Association of America (MRAA), and the U.S.EPA steps have been pushing towards monitoring boats so that the boats or a certain environmental standard when made (U.S. EPA, 2002).

This would benefit The Fells because a cleaner boat tends to be a quieter boat. This would ensure that the visitor at the Hay Refuge enjoy the Fells and do not be distracted by simple things like a noisy private boat. Even though there is a movement to make boats cleaner, the noise of a boat is not mandatory to change. This shows that there is progress towards the environmental help, but needs fine-tuning to be truly effective to all aspects of the environmental point. With cleaner boats the engines will help with the air quality and secondarily reduce noise pollution in an area around a lake (U.S. EPA, 2002). This however is quickly changing so that when the boat engines are being made, air, water, and noise pollution are addressed (U.S. EPA, 2002).

If a noise is causing problems in an area there are three steps that can be taken to solve the situation. The first being that technology can create better machinery that is more productive and quieter. Some examples of this are the differences in regulations on different kinds of equipment. An example being a truck in 1972 averaged levels of 91 decibels when in use. But three years later the average for dozers was 75 decibels. If technology is not working an option is to have people wear earplugs or build mufflers that block out most of the work noise. This creates the business to still be done, while

minimizing the complaints. The last idea is to force the stop of the construction (Jain, 2002). This applies to the Fells because they could help with the EPA to change noisy engines of boats to clean quieter boats, making the stay at the Fells more enjoyable.

I recommend that The Fells try to minimize construction noise if they do increase parking. The mufflers might be a good concept to use to decrease disturbing noise pollution. This will also keep neighbor of the Hay Refuge still friendly with the Fells. As far as the shoreline property issue goes, I think that they should hold workshops to educate the Lake Sunapee area residents of the dangers and ugliness of noise pollution caused by boats on the lake. The Hay refuge needs to have a firm understanding of the types of noise pollution and then construct the best way with the minimal noise pollution. By during this the animals, construction, and the members can coexist.

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Fee Demonstration

Lindsay Micarelli

Fee demonstration is relatively a new and controversial issue that has been brought to the forefront in the past couple of years. The Fee Demonstration Program was developed in the fiscal year of 1996 and will be in place until the year 2004. The legislation provides the opportunity for the refuges that comply with these appropriation acts to use the fees that are collected onsite for renovations or improvements for the protection of natural resources. Examples for what the allocated funds could be used for are maintenance and backlogged repair, interpretation, signage, habitat or facility enhancement, resource preservation, operations and law enforcement related to public use (National Wildlife Refuge System- 1998 CFO Report, 513). In theory, the idea for the collection of fees on federally owned property has many advantages for keeping up with the monetary demands of designated conservation land. However, many could argue that the accumulation of funds from the public provides disadvantages that target lower income families.

What is the purpose of fee demonstration and why has it come to pass? Well, the need for such a program was documented in a report brought before Congress in 1998. In that paper it noted the following four main issues of why this act had to be implemented. First, the federal land agencies had acquired a multibillion-dollar surplus in terms of infrastructure and developmental needs. Secondly, the services that are provided at these wildlife refuges have been on a constant decline resulting in the termination of services rendered and the reduction of their hours of operation. Thirdly, the natural resources that are found on these sites are slowly deteriorating and natural resource inventories (NRI's) are currently nonexistent. Lastly, even though the funds for national parks systems (NPS) and the federal wildlife refuges (FWR) have increased annually, the funds are still not sufficient for the current ecological demands of the land (More, 56). Therefore, the fee demonstration is a step in the right direction for the survival of state-wide refuges but there needs to be more advancements made in order to mandate the land and collected funds better.

Attitudes towards the importance of outdoor recreation and environmental social consciousness have drastically changed over the recent years. "...Outdoor recreation users contribute large sums of money to the tax base [however] little of this revenue is used to maintain and manage the sites whence it was generated" (Bates, 2). The governments budget requires that the money made on public property be used to help pay for issues such as healthcare and education and therefore outdoor recreation fees was deemed necessary by the Forest Service (Bates, 2). The advantage from the fee-demo project, as seen by the federal agencies, is that 80% to 100% of all the monetary funds collected stay on the actual site. This acquisition of additional money helps with the direct application of funds where it is needed most on the land (Hayhurst, 2).

Disadvantages that are associated with fee demonstration are that it targets the lower income families. It is argued that the people who can actually find the time to visit these outdoor recreation areas are not as capable as a person with augmented wealth to rearrange their work schedules to attend the proposed "free-day" that eliminates the money required to enjoy outdoor recreation activities. Also, passionate environmental groups such as the Sierra Club and the American Land Alliance are concerned by the possible transformation in land and recreation management of the outdoors resulting in a

commercialized enterprise due to fee demonstration. The fear that the integrity of the land and its intrinsic value will be jeopardized if the main concern for the land is anthropomorphized by issues of road accessibility for camping and motorized vehicles such as RV's, snowmobiles and cars (McManus, 1). "Recreation...it is big business coming to our National Forests, promoting equipment-intensive play where nature is little more than a scenic backdrop and proving ground for the latest and priciest toy" (Words of the Wild, 1). The environmentalists argue that due to these escapades there is no more room for nature. This will ultimately lead to the destruction of the land due to overuse and implementing people's needs, which will create air, earth and water pollution.

An example of fees implemented on a refuge in the state of New Hampshire is the Great Bay National Wildlife Refuge (NWR) located in Newington. Their new approved activity deals with a new deer hunt fee. Another source of money is from federal agencies for example Senator Judd Gregg has just recently awarded The Great Bay NWR \$1.4 million to purchase 35 acres in Newington, which is to prevent pollutants from developmental encroachment. In addition, Sunapee and Pillsbury State Parks, also located in New Hampshire, are purchasing land consisting of 6,287 acres and putting it into a conservation easement. These easements ensure that the land will continue to be used as a working forest as well as recreational activities. Gregg also proposed to excuse local residents of the White Mountain area from paying the fees associated with the fee demonstration program while using the forest for recreational purposes (Turcotte, 2-3).

My recommendation to the Hay Refuge located in Newbury, New Hampshire concerning the fee issue on the site is slightly complicated due to the fact that the land is managed by The Friends but is currently under the jurisdiction of Fish and Wildlife Service (FWS), FWS mandates whether or not the Hay Refuge can collect fees or not. Presently, the Hay Refuge only collects fees for the guided tours of the actual Hay estate including the main house. However, a donation box is located at the entrance on the kiosk that encourages the visitors to contribute to the management of the manor. As previously stated, there are advantages to collecting fees and keeping the profits at The Fells. First, the staff at the site knows precisely how and where the money would effectively be applied. Secondly, it would be beneficial for the refuge to have 80% to 100% of the collection rather than the main office only delegating 50% of the funds back to the refuge (Stier, 2002). Furthermore, after a study that has been done in the past in reference to visitation the possibility for excluding people of a lower income status is limited due to the affluence of the surrounding towns as well as the income of the preexisting members. Furthermore, the fee that is suggested is not unreasonable or expensive. A study conducted by the Pennsylvania State University found that 75% of park rangers believe the higher fees (or installation of a fee) have caused no changes in the visitation patterns, furthermore, in a congressional report it illustrated that 85% of visitors were satisfied with the fees or even thought they were too low (Wood, 3).

Due to the fact that fee demonstration is a fairly new issue, since it was only introduced in 1996, it has both advantages and disadvantages that can ignite a heated debate. The underlying issue is money, where it can be obtained and spent to increase the value of the existing land. People may consider the idea of paying a fee to access public lands as absurd because it appears as if individuals would be paying a second tax on land that has already been funded by federal aids. Furthermore, the idea of stewardship is already included in many of the parks' missions for conserving the land because ideally

everyone is aspiring to create a better place for future generations to experience nature. These ideas are good but every option needs to be backed up by funding.

Alternative plans have been suggested instead of installing fees at refuges. For example, there could be a first come first serve admittance to each site. This action could reduce the wear and tear on the site and could provide for a better habitat for the wildlife while preserving the land for the future. This action prevents the overuse of the land and does not indirectly discriminate against any of the social classes. A multitude of alternatives were considered but the idea for the fee demonstration program received the most attention because it provides another source of income for the site other than federal aids. However, charging people an entrance fee can target low-income families and exclude them from enjoying nature and the outdoors such as National Parks like Yellowstone and Yosemite that was preserved for everyone regardless of their augmented wealth.

“The National Park Service itself was established with a dual (and often conflicting) mandates of enhancing public use and enjoyment and protecting resources for future generations” (More, 59). The fulfillment of one requirement overrides the purpose of the other. This conflict of interest led to the installment of fees to access the parks land in the first place. The fees allow for the facilitators of the land to maintain its resources while the public has the opportunity to enjoy and value nature in its true state. Therefore, if fees help preserve the land it should be enforced at National Parks and refuges nationwide. Fee collection at The Fells parcel should be collected and the money that is obtained onsite should remain there and be used for the maintenance of the land and the public will directly benefit from their donations.

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Water Access at The Fells

Nate Bancroft

The Fells property of Newbury, New Hampshire, also known as the John Hay National Wildlife Refuge, is an important area to many aquatic animals and other animals of Lake Sunapee. Guidelines have been set up to ensure the health and well-being of the states waterways similar to it. The Fells property has environmental policies, with regard to water, set up but enforcement of these policies is needed. The following discusses topics that affect water usage in the state of New Hampshire, and more specifically The Fells. These are: federal, state, and local regulations, pollution of waterways, shoreline maintenance, and recreation.

On a national level the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have the power to regulate vessels on any body of water to protect the fish and wildlife of that area. They also have the authority to restrict vessels within and bordering designated national wildlife refuges. The Endangered Species Act and Marine Mammal Protection Act both give the USFWS and NMFS the authority to have regulations in order to protect wildlife. These are examples of how the government is doing its part to protect our natural habitats and wildlife.

The state of New Hampshire is concerned with the integrity of its public waterways. There is great concern relating to the utilization, protection and preservation of shorelines, public beaches (i.e. Hay Refuge) and the effect on public water. The state wants to do everything it can in order to prevent negative impacts on the water, land and inhabitants of these areas. In order to prevent negative impacts the state has gone to great lengths in order to come up with rules and regulations that would meet the needs everyone of the state. "Develop more parking capacity near existing launch ramps, to increase access to the lake by motorized and non-motorized boaters. Satisfy the Fish and Game legislative mandate of assuring public access to Lake Sunapee. Minimize environmental degradation, both short and long term. Avoid increasing the risk of further infestation by invasive species. If a portion of the State Beach is used for Fish and Game access, maintain or enhance revenue potential for Parks and Recreation, and maintain separation of boating and swimming activities. Reduce weekend congestion at the Sunapee Harbor launch ramp. Avoid adding to local road safety concerns. Accomplish all of the above at the lowest possible cost." (Lake Sunapee Public Access Working Group Form, December 11, 2002, page. 1) The state has also made public its development standards, which they believe are necessary in order to preserve, and protects the waters of the state of New Hampshire.

Further the maintenance of safe and healthful conditions is the first of sixteen minimal standards required of the state. Providing for the wise utilization of water and related land resources, preventing and controlling water pollution, and protecting fish spawning grounds, aquatic life, and bird and other wildlife habitats are three more of these standards. These three specifically relate to how we should properly make use of the water in order to benefit not only ourselves but also the environment.

Conservation of shoreline cover and points of access to inland waters is also a standard that is constantly addressed. In order to continue to use public waters for recreational function we must maintain the points of entry in order to preserve the state's lakes, rivers, and estuaries in their natural state.

Promotion of wildlife habitat, scenic beauty, and scientific study is essential not only to the environment but also to those who come to New Hampshire to use the public water for recreation. These standards and others are implemented in order to serve the state and address three important issues that the states waterways are dependent on. These include state water pollution, maintenance of shorelines and public recreation.

The Lake Sunapee Protective Association has done a lot in order to keep Lake Sunapee healthy for people and animals. The association puts out informative newsletters to the community on keeping the lake healthy, they do testing of the water and hold meetings with the N.H. Fish and Wildlife Association to make sure regulations are being followed. The Association focuses on: stewardship of the lands of the watershed, volunteer water quality sampling for laboratory analysis of water quality factors, prevention and control of invasive aquatic species, and education. The information that they put out helps all who use the lake in protecting it and minimizing negative impacts on it, such as pollution or disruption of native animals.

In order to prevent water contamination and pollution the state of New Hampshire requires that “no fertilizer, except limestone, shall be used within 25 feet of the shoreline of any property,” (New Hampshire Department of Environmental Service, December 12, 2002, <http://www.state.nh.us/safety/ss/bodies.html>). The state also requires that “Twenty five feet beyond the reference line, low phosphate, slow release nitrogen fertilizer or limestone may be used on lawns or areas with grass,” (New Hampshire Department of Environmental Service, December 12, 2002, <http://www.des.state.nh.us/cspa/483B.htm>).

Pollution due to the use of fertilizer is not a large concern at The Fells although there are gardens on the property, which use fertilizer. This is because the gardens are far enough away from the lake that runoff would not directly go into the lake and cause contamination. Yet, should areas that require fertilizer be planned for the future The Fells would need to take into consideration where they planned them and if runoff contamination would be a problem?

There are many factors that affect the shoreline of a body of water. According to state regulations an existing woodland buffer should be maintained within 150 feet of the reference lines. These buffers are used to prevent erosion, turbidity, stabilizing soils, prevention of excess nutrients and chemical pollution, maintenance of water temperature, and preservation of natural inhabitants including fish and other wildlife. The Department of Environmental services states that: “Not more than a maximum of 50 percent of the basal area of trees and maximum of 50 percent of the total number of saplings shall be removed for any purpose in a 20 year period,” this is only one regulation that The Fells is addressing. (New Hampshire Department of Environmental Service, December 12, 2002, <http://www.des.state.nh.us/cspa/483B.htm>).

The Fells should they want to change the look of the property by cutting down trees along the waters edge would want to follow the previously stated guidelines. Following these guidelines is essential in preventing erosion and changing the natural aquatic habitat at the waters edge. A disturbance of this magnitude may also affect not only aquatic life but also other mammals and birds that reside near that area. This may affect the desire of people to use and enjoy the area.

The New Hampshire Lake Association recently established a lake host program through which volunteers monitored the public access sites for boats or trailers unknowingly carrying exotic plants. After just three weeks in operation, the program

reported stopping trailers with exotics attached at four lakes. (New Hampshire Department of Environmental Service, December 12, 2002, page. 2.)

Docks, wharfs, piers, breakwaters and other such structures built in the water need approval by the state department before they are constructed. With building these structures comes the use of motor vehicles into and out of the water. They are used for launching watercrafts, which can lead to deterioration of soil on the water's edge.

Using waterways for recreation does not come without its own rules and regulation to keep the people and environment safe. In New Hampshire, by definition a "ski craft" is "any motorized watercraft or private boat which is less than 13 feet in length as manufactured, is capable of exceeding a speed of 20 miles per hour, and has the capacity to carry not more than the operator and one other person while in operation," (Boat safe, December 12, 2002, http://www.boatsafe.com/New_Hampshire/). The term includes jet skis, surf ski and other similar devices.

Each waterway in New Hampshire has its own set of regulations, which are based on its size and depth of water. The Division of Safety Services Marine Patrol Bureau publishes a website that provides information on unsafe and illegal places that ski crafts are not permitted. One such place is along the front of the John Hay National Wildlife Refuge in Newbury, (Division of Safety Services Marine Patrol Bureau, December 12, 2002, page. 1). It is restricted from the use of boats and other motor craft in addition to seaplanes.

These rules are set up as to protect the natural environment that surrounds The Fells property as well as other wildlife refuges. As patches of wildlife preservation land become smaller and more isolated, their ability to maintain healthy populations of a variety of plant and animal species is reduced. Therefore these rules on watercraft use are very important. Individual species can be lost from each fragment, the entire community changes, and the ecosystem becomes degraded.

There is a continuing problem with rafting on the sandy shores of The Fells. They continue to use the area in front of The Fells property to water-ski. This is due to the appeal of the sandy beach that lines part of The Fells property. Areas that have restrictions, such as The Fells, should have more patrolling done by the state in order to enforce these state statutes.

In order to help the state of New Hampshire have healthy waterways The Fells has properly used fertilizer as not to pollute Lake Sunapee, maintained their shoreline as to prevent erosion, and properly used the water along the shoreline. All of these things have done a part to ensure that the aquatic environment and its inhabitants are healthy and remain that way.

I recommend that The Fells continue their progress of development in environmental protection of the flora fauna and the lake with some plan for enforcements of policies and conservation regulations.

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The federal government consists of a large number of people with diverse backgrounds and very different stances on many issues. One increasingly important issue is where these members of the federal government stand in regards to environmental protection and preservation. This issue is particularly evident when it comes to examining our state representatives and senators in Washington. For New Hampshire, the incoming senator is John E. Sununu. John Sununu has been a very controversial member in the House of Representatives when it comes to environmental issues. It is extremely important to examine not only Sununu's professional background but also his congressional record when determining where he might stand on certain environmental issues, in particular the John Hay National Wildlife Refuge in Newbury, New Hampshire.

As a child Sununu lived in Salem, New Hampshire with seven other siblings. His first exposure to public service was when his mother served on the local school board. He attended public schools until he graduated from Salem High School and went to the Massachusetts Institute of Technology and received both a bachelors and a masters degree in Mechanical Engineering. He then attended Harvard Graduate School of Business, and received a second masters degree in Business Administration. Following his graduate studies Sununu spent nearly a decade in the private business sector serving the majority of this time as the Chief Financial Officer and Director of Operations for Teletrol Systems, Inc. in Manchester, NH (Sununu, 2002).

In 1996 he left the private business sector and began his first campaign to become a U.S. Representative for the First Congressional District of New Hampshire. He won this campaign and was elected to Congress. He ran and was elected for three consecutive terms and is currently finishing up his last term in the House. In 2001 he was appointed by the Speaker of the House, Denis Hastert, to be vice-chair of the Budget Committee in the House. He has also served for several years on the Appropriations Committee where he holds seats on several subcommittees that oversee funding for Veteran Administration, NASA, Treasure Department, foreign aid programs and the Environmental Protection Agency (Sununu, 2002). This past November he was elected to represent New Hampshire in the U.S. Senate. In order to comprehend where Sununu stands when it comes to environmental conservation, preservation and policy it is important to first look at his background pertaining to the environment and where he has stood on certain past issues and bills that came before him while in the House.

The voting record of all members of congress, from both the House of Representatives and the Senate, are examined by the League of Conservation Voters (LCV). The LCV is a private, non-profit organization whose purpose is to not only to inform the public of anti-environmental members of congress but also to run campaigns to defeat them in future elections. In order to do this they create what they call the national environmental scorecard, which examines the environmental voting record of each member of congress. They then compile a list, known as the dirty dozen, which is a list of the twelve members of congress with the worst voting record. This year, New Hampshire U.S. Representative John Sununu was named one of the dirty dozen by the LCV (lcv.org). They say that Sununu "failed to put the interests of NH families first," and "failed to protect the environmental health and safety of NH families when he had the chance," (LCV, 2002; "Sununu Targeted", 2002). They even went on to say that

“Sununu’s lack of commitment to defending New Hampshire’s air and water against environmental threats is clearly reflected in his voting record,” (“Sununu Targeted”, 2002).

As was pointed out by the LCV, Sununu’s voting record in the house is not very impressive. Over the past six years that he has been in the house, his highest percentage of pro-environment votes for any single year was only 38% in 1997 as well as in 2002. This means that for both these years he only voted “pro-environment” 38% of the time according to the LCV. In 2001 he received a score of 36%, 31% in 1998, 21% in 2000 and in 1999 an all time low for him of 19% (LCV, 2002). When combining all these years together the total number of votes made concerning the environment was 81. Out of these 81 votes Sununu only voted “pro-environment” 24 times giving him an overall score of 30%. This is fairly low considering some of his congressional colleagues have scores that are generally in the 50 to 60% range and sometimes as high as 90 or 100%. The LCV feels that this is evidence enough to say that he opposes pro-environmental legislation (LCV, 2002). These scores however, lack not only qualitative data on why he voted no but they also are manipulated in a manner to make candidates look worse than they really are. In the case of Sununu and several others, when they were absent and unable to vote, their absence was considered a negative vote. If these absences had been counted as neither positive nor negative his overall voting record would have gone up almost two percentage points to 32%. If the LCV had counted his absence votes as positive they would have gone up by five percentage points to 35%.

The LCV also backs their scores up by providing several key examples of bills, which he voted in opposition of protecting the environment. This bills included support for a bill that allowed for increases in mercury contamination of groundwater, the weakening of toxic waste cleanup laws, the weakening of the EPA’s reporting requirements for industries that pollute and the support of allowing developers to challenge local land conservation laws in federal court (LCV, 2002; Kriz, 2002, p. 2998). He also opposed, according to the LCV, implementing tougher arsenic standards, raising fuel efficiency standards for automobile manufacturers, cleaning up and raising of emissions standards for coal fired power plants, implementation of certain portions of the Kyoto protocol and of course opposing the prohibition of oil drilling in the Alaska National Wildlife Refuge (LCV, 2002; “Sununu Targeted,” 2002; “John Sununu on Environment,” 2002).

Sununu voted in support of drilling in the Alaska National Wildlife Refuge (ANWR), which is one of his more controversial votes lately. Many people feel that this is representative of his overall stance on the environment and that it shows he puts business in front of environmental protection. However, these people often neglect to acknowledge the fact that it was Sununu who proposed and supported an addendum to this bill that would give access to only 2,000 acres of the 1.5 million acres available to the oil companies. This means that these oil companies would not have free reign over the entire refuge but rather a portion of it that is “only one-fifth the size of Washington D.C.’s Dulles International Airport,” (Spiess & Ruskin, 2001, p. 2). However, one flaw in the bill and Sununu’s proposal that even he admits he overlooked is that they neglected to specify that this should not be all contained in one area rather than spread out in small fragments across the entire refuge. Sununu says that there was “certainly no intention to mislead anyone,” and that it was merely a “technical flaw in the language of the bill,”

(Spiess & Ruskin, 2001, p. 2). Despite the fact that he admits he made a mistake and that his intention was not to harm the environment but rather to find a common ground, many people including the LCV have found fault with this decision in which Sununu had a very large hand.

Despite the fact that others, including the LCV, feel that Sununu has taken an anti-environmental approach, Sununu himself feels that he is very much pro-environment and is merely “in the middle backing a balanced approach to [business] and the environment,” (“Sununu Targeted,” 2002). Sununu has definitely not neglected environmental issues altogether and in fact has done quite a bit in the way of promoting environmental protection and conservation especially for the betterment of human life. He claims that he has “written legislation that today protects New Hampshire’s watersheds like the Lamprey River, and to have secured funding for Epping and Manchester to help clean” the states largest rivers (“Sununu Targeted,” 2002).

In support of his claims he has done quite a bit in the direction of securing funding rather than the passing of laws. This may very well be a result of his seat on the Budget and Appropriations Committees of the House, in particular his seat on the EPA subcommittee. By holding all these seats he is able to appropriate money directly to New Hampshire rather than applying a law to the entire U.S. For example, he has secured \$2 million to clean up the Lamprey River, \$3.5 million to clean up the Merrimack River, \$1.4 million to the UNH Bedrock Bioremediation Center to continue research to eliminate groundwater contamination, \$4 million to purchase conservation easements around the Connecticut Lakes in northern NH, and \$3.6 million to support the conservation of NH forests (Team Sununu, 2002; house.gov press releases, 2002). He has also been able to secure funding on a more national level as well. For example he has helped to allocate \$911 million to support the Land and Water Conservation Fund and \$200 million to the EPA, which doubled its annual budget to help fund clean-up activities (teamsununu.com).

Not only has Sununu supported environmental protection financially he has also supported it legislatively as well. For example he voted to prevent the delay of tougher ozone emissions standards. He voted in opposition to allow drilling for oil in the Gulf of Mexico and on National Monument lands. Also, in order to correct his mistake concerning ANWR he wrote an amendment to designate “new revenue” from Alaskan oil and gas production be put into two accounts: “one for resource conservation an environmental protection” and another for “investments in alternative energy technology,” (teamsununu.com).

The fact that Sununu seems to support the environment more through financial backing rather than from legislation may be as a result of several different aspects. For one, he comes from the “Live Free or Die” state of New Hampshire where governmental legislation is frowned upon particularly from the federal level. By supporting environmental causes through funding rather than legislation it keeps the NH public happy because they still do not have the laws and regulations that they would otherwise have. However, the environment is still protected through monetary rather than legislative means.

Another reason that Sununu may support environmental protection through funding rather than legislation is his background in business and economics. He may have realized that by giving money to the state of NH to be spent on environmental

protection and clean up he can also boost the economy of the state by pumping more money into it meaning that more money is spent resulting in an increase in jobs and income. If just a law or regulation were passed it would not only neglect to inject the economy with that money, but it may also damage it by reducing the productivity of certain industries and individuals. Most likely, Sununu recognizes this and feels that this is the best way to please the people who he represents.

As a result of Sununu's interest in funding rather than legislation he looks increasingly worse on paper when you look solely at his voting record, which is what the LCV does. For this reason it is no wonder that the LCV feels that he is one of the worst members of congress on environmental issues. This shows the faults of using just a quantitative approach to analysis rather than a combination of quantitative and qualitative research and analysis.

It is also necessary to understand that politics is mostly about compromise between leaders in order to come to the best solution. Sununu may not be quite as environmentally oriented as others however, he may also have several priorities ahead of the environment which he feels are more important or equally as important. For example, he may feel that the development of New Hampshire's economy is just as important as protection of the environment and as a result he votes not against the environment but rather tries to find another way to make both sides happy. It seems as though his idea of compromise is providing federal funding to the state and local governments for environmental causes rather than creating legislation that might hurt the economy in the process. This willingness to provide federal funding and support to local environmental causes may be an untapped resource in the State of New Hampshire.

Senator Sununu's fondness of providing funding for environmental protection and preservation may be of great interest to the Hay Refuge in Newbury, New Hampshire. Sununu himself has never heard of the Hay Refuge mainly because it is not located in the first district, which he is most familiar with. However, this may not necessarily be a disadvantage but rather an open door, which the Friends might find useful for future support. The Hay Refuge would most likely find it very difficult to gain the support of Sununu to create and support legislation that would allow divestiture of the property from the US Fish and Wildlife Service to the Friends of the Fells organization due to the complex legislation issues involved. However, they may find it very easy to gain his support through monetary donations for the continued preservation of the Wildlife Refuge. Since the Fells organization receives little and often no federal funding this financial backing would most likely help carry them along into the future until they gain the support of some other member of congress for divestiture of the Refuge. This would be particularly true if the Friends of the Fells could convince Sununu that by supporting the refuge financially it would help out the state and local economies possibly through an increase in tourism and development of nearby business and employment.

Senator elect John E. Sununu may be thought of as an extremely detrimental congressman to the environment however, this judgment is based purely upon his voting record. There are many other aspects, which should be examined when determining his environmental standing, particularly how well he backs up environmental causes in New Hampshire with financial support. Once people realize this organizations such as the Fells may realize that he is not as much of an environmental enemy as they thought and in fact may be a valuable source of support and financial backing.

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FLORA

The purpose of the flora information is to help The Fells in expanding their educational work. Each student was responsible for gathering a sample of several woody plants, including twigs, leaves, bark, and fruits, buds or cones. A digital picture was taken when possible. The samples were scanned and labeled. Write-ups were developed for each species, which contained a description, its location, and some habitat descriptions. Images that were not taken by students were borrowed from Colby-Sawyer College Virtual Herbarium, (<http://www.colby-sawyer.edu/academic/ces/herbarium/index.html>) or the Virginia Polytechnic Institute and State University's dendrology website, (<http://www.cnr.vt.edu/dendro/dendrology/main.htm>).

Alternate-leaved Dogwood *Cornus alternifolia* Dogwood Family
American Basswood *Tilia americana* Linden Family
American Beech *Fagus grandifolia* Beech Family
American Chestnut *Castanea dentata* Beech Family
American Yew *Taxus canadensis* Yew Family
Apple *Pyrus malus* Rose Family
Beaked Hazel *Corylus cornuta* Birch Family
Big Tooth Aspen *Populus grandid* Willow Family
Black Cherry *Prunus serotina* Rose Family
Black Gum/Tupelo *Nyssa sylvatica* Dogwood family
Black Spruce *Picea mariana* Pine Family
Blackberry *Rubus allegheniensis* Rose Family
Broadleaf Meadowsweet *Spirea latifolia* Rose Family
Button Bush *Cephalanthus occidentalis* Rubiaceae family
Choke Cherry *Prunus virginiana* Rose Family
Common Elderberry *Sambucus canadensis* Honeysuckle family
Common Lilac *Syringa vulgaris* Olive Family
Dewberry *Rubus flagellaris* Rose Family
Eastern Hemlock *Tsuga canadensis* Pine Family
Eastern Hop Hornbeam *Ostrya virginana* Birch Family
Eastern White *Pinus strobes* Pine Family
Gray Birch *Betula populifolia* Birch Family
Hobblebush *Viburnum alnifolium* Honeysuckle Family
Japanese Barberry *Berberis thunbergii* Barberry Family
Low Sweet Blueberry *Vaccinium angustifolium* Heath Family
Maleberry *Lyonia ligustrina* Heath Family
Maple-leaf Viburnum *Viburnum acerfolium* Honeysuckle Family
Multiflora Rose *Rosa multiflora* Rose Family
Nannyberry *Viburnum lentago* Honeysuckle Family
Northern White Cedar *Thuja occidentalis* Cypress Family
Partridgeberry *Mitchella repens* Madder Family
Poison Ivy *Toxicodendron radicans* Sumac Family
Red Elderberry *Sambucus racemosa* Honeysuckle Family

Red Maple *Acer rubrum* Maple Family
Red Oak *Quercus rubra* Oak family
Red Raspberry *Rubus idaeus* Rose Family
Staghorn Sumac *Rhus typhina* Sumac Family
Sugar Maple *Acer saccharum* Maple Family
White Oak *Quercus alba* Oak Family
Wintergreen or teaberry *Gaultheria procumbens* Heath Family

Alternate-leaved Dogwood

CORNUS ALTERNIFOLIA

Cornaceae family



Description:

This tree can grow to be 25' tall and have a diameter of 6". The leaves alternate and are clustered at end of the twig. The underside of the leaves has prominent veins and curve upward toward tip of leaf.

The leaves are entire, meaning they are not toothed, and elliptical in shape.

Moist soils in understory of hardwood or coniferous forests.

Location:

This tree can be found by the stonewall, on the cottage side of the

Fast Fact:

It is the only dogwood species with alternate leaves, the rest have opposite.

American Beech

FAGUS GRANDIFOLIA

Fagaceae Beech family



Location

This tree is an early successional tree and can be found in old pasturelands.

Fast Facts

The nuts are spiny-looking but are not sharp. These nuts are a typical food source for the black bear. At times you can see bear nests in trees and their claw marks on the bark. Also, Thoreau once wrote, "I frequently tramped 8 to 10 miles through the deepest snow to keep an appointment with a beech tree".



American Chestnut

CASTANEA DENTATA

Fagaceae Beech family



Description

This is a tree that resides in deciduous forests and has a moderate growth rate.

American Chestnut can grow from 80 to 100 ft. tall. Its leaves are 5 to 8 inches and have an alternative leaf structure. They strongly resemble birch leaves, but are longer, and the teeth on the leaves are more widely spaced.

Location

The American Chestnut is very rare on the Hay Refuge. One exists on the Cottage Access road.

Fast Facts

The American Chestnut was once an important food source and a dominant overstory tree in the East, but was mostly wiped out by an exotic fungus that escaped in 1904.

Its fruit is a nut in a husk and has branching sharp spines.



American Yew

TAXUS CANADENSIS

Taxaceae Yew family



Location

These shrubs can be found in the courtyard at the main house near the entrance to the restrooms, and along the fence of the nursery.



Description:

The fruit of the Yew is a bright red and shaped like an olive. The leaves of the Yew are green needles. The flower is cone shaped and blooms in May. New growth is green rather than woody.

Fast Facts

The American Yew is often shaped in landscaped places, and is favored by deer as winter browse.

Apple

PYRUS MALUS

Rosaceae Rose family



Description:

Leaves are oval shaped with small teeth around the outside edge.

The branches and trunk are gnarly and rough to the touch.

Unlike many other species of trees, it produces a large edible fruit which is ripe from September to October.

Location

This is a tree found around the main house, the gatehouse and the south field.



Fast Facts

The apples are edible to both humans and animals and are a favorite of the deer in the early fall.

American Basswood

TILIA AMERICANA

Tiliaceae Linden family



Description:

This is a tree found on the eastern edge of the parking lot near the gatehouse. Its leaves are alternate, large and heart-shaped. They are also finely toothed. During the winter their red alternating buds that resemble apple seeds can identify the twigs.

Location:

This is a tree found on the eastern edge of the parking lot near the gatehouse.



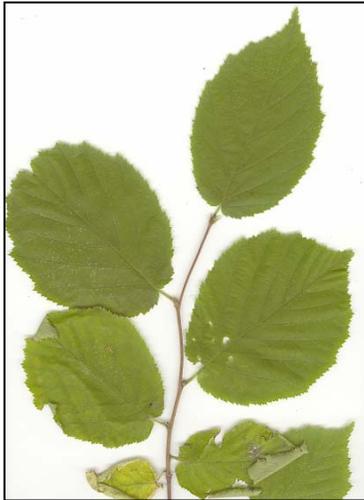
Fast Facts:

You can see by the above picture that the fruit of this tree has an interesting form.

Beaked Hazel

CORYLUS CORNUTA

Betulaceae Birch family



Description

Beaked Hazel is a woody plant that reaches a maximum of three meters in height. The leaves of Beaked Hazel are alternate and double toothed, with teeth in two sizes. The leaves themselves are oval shaped with a rounded or heart shaped base and range from two to four inches in length with pale undersides. The fruit of this plant are small brown nuts and ripen in late summer. The bark of this plant is a light, grayish brown.



Fast Facts

The fruit of the Beaked Hazel, the nut, is especially good eating when ripened in late summer when it turns to a brownish color.

Big Tooth Aspen

POPULUS GRANDIDENTATA

Salicaceae Willow family



Description

Leaves are alternating with 5-15 pair of large teeth. The leaves are 2-6" long. The bark has a yellow-green tint and is smooth until it ages and gains ridges.

Location

This tree can be located in disturbed areas and sandy uphill soils and flood plains. On the hay Refuge it can be found on trails as well as down on the shore where the boathouse fire occurred.

Fast Facts

The Big Tooth Aspen is a fast growing short-lived tree that is 30-40' high and 1-2' in diameter.

Black Cherry

PRUNUS SEROTINA

Rosaceae Rose family



Description:

This tree can grow to 80' tall and have a diameter of 2'. The leaves are 2-5" long 1 ¼ -2" wide and elliptical in shape, with fuzz along the midrib on the underside. Flowers and fruits grow in a long raceme.

The bark becomes very scaly and rough and dark gray in color, resembling burned potato chips.



Fast Facts:

It is a very important economic tree. It is used in furniture, paneling, toys and scientific instruments.

Location:

This tree can be found on the Woods Road.

Black Gum/Tupelo

NYSSA SYLVATICA

Cornaceae Dogwood family



Description:

The leaves are 3 to 5 inches long, elliptical, shiny dark green, and clustered. The purplish-blue fruits, are often found in a cluster of three berries. Twigs are slender, red-brown to gray in color, and the profile of the tree is 'twiggy' in appearance. Tupelo's leaves turn a bright red in the fall, while many other leaves are still green.

Location

Black gum is located on the waters edge on Tupelo point. It's a fairly rare occurrence in this area.

Fast Facts

The bark is often deeply ridged, and has the ability to slough off under heavy snow and ice loads. Branches, too, will sometimes break off under the weight of heavy winter loads, rather than toppling the entire tree.



Black Spruce

PICEA MARIANA

Pinaceae Pine family



Location

The Black Spruce is found in acidic boggy areas, and high-altitude mountain tops. There is no black spruce at the Hay Refuge.



Fast Facts

Black spruce is easily confused with red spruce, but in our area, its location gives it away.

Blackberry

RUBUS ALLEGHENIENSIS

Rosaceae Rose family



Description

The leaves of the blackberry are palmately compound, with oval leaflets that have serrated margins. The branch of the blackberry is ridged and armed with curved barbules. The fruit of the blackberry ripens between July and August.

Location

The blackberry is found in areas with disturbed substrate. Particularly, one may find the blackberry near roadsides and under power lines.



Fast Facts

The blackberry fruit only grows on second year canes. However, there are some varieties that grow a little fruit at the end of first year canes, such as called "primocane."

Low Sweet Blueberry

VACCINIUM ANGUSTIFOLIUM

Ericaceae Heath family



Location

Can be anywhere on the Hay Refuge, but tends to be at dry areas such as under a thick set of trees along side the Woods Road.

Fast Facts

The fruit is edible, and is often found on top of mountains, including Kearsarge and Sunapee. It is popular with people and bears.

Broadleaf Meadowsweet

SPIREA LATIFOLIA

Rosaceae Rose family



Description:

These leaves are toothed, up to two inches long, and of an alternate leaf pattern. The underside of the leaf is lighter in color than the top. The flower is a triangular inflorescence that appears fuzzy with many tiny white to pink flowers.

Meadowsweet has multiple stems and grows up to six feet tall.



Location

Meadowsweet is a common shrub, found in open fields and along roadways. You will see it in the field along the driveway going toward the main house.

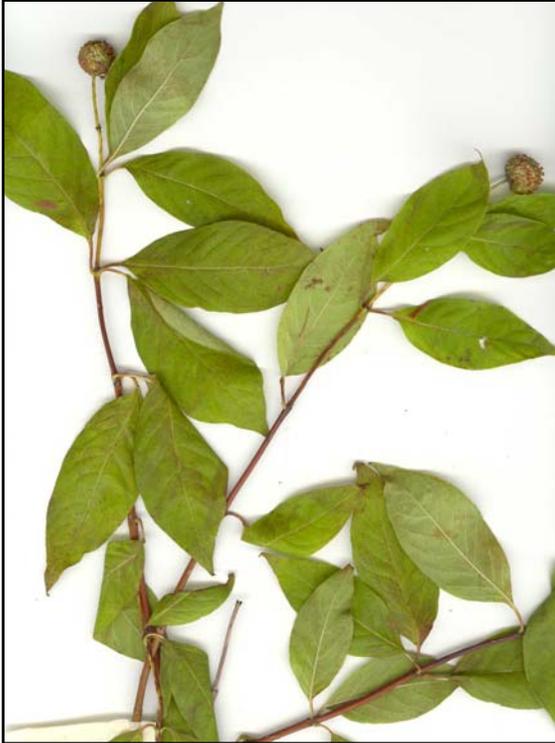
Fast Fact:

There are several species of spirea that are sold as nursery stock, but few, if any, have become naturalized.

Button Bush

CEPHALANTHUS OCCIDENTALIS

Rubiaceae family



Description:

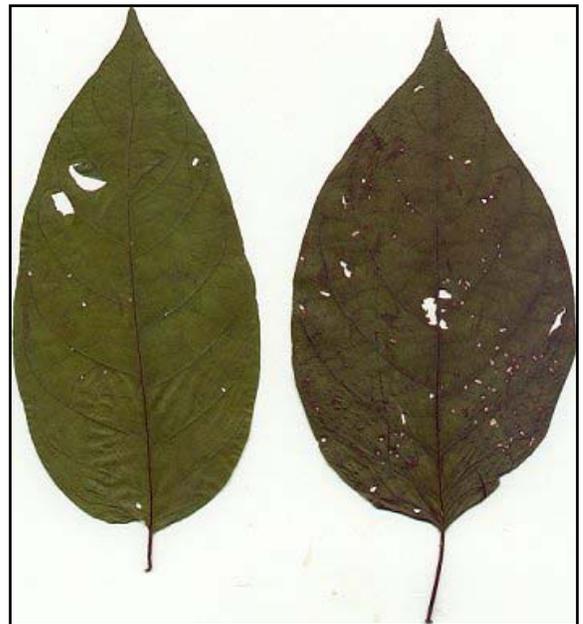
This is a multi-stemmed, full shrub, approximately 3 – 4' high. Its white flowers look like pin cushions and bloom from July to August. Buttonbush requires a wet habitat, so look for it in wetlands along shores.

Location

You can see buttonbush on the Forest Ecology Trail along the beach.

Fast Facts

The fruits, which are brown, 1" balls of tiny nutlets, will help you identify these plants during the winter.



Choke Cherry

PRUNUS VIRGINIANA

Rosaceae Rose family



Description:

This is a shrub which usually grows 6-12 feet tall. The leaves of a choke cherry are egg-shaped with fine-toothed edges. The fruits are purplish berries which last from July to October. Their flowers are white and appear in long racemes. The twigs and bark are smooth and grey-brown.

Location:

Choke cherry is found along the edges of the south field and the field around the main house.



Fast Facts:

The purplish berries are edible but extremely sour and can be used for jellies and pies.

Common Elderberry

SAMBUCUS CANADENSIS

Caprifoliaceae Honeysuckle family



Location

Found in shrubby swamps and wet woodland areas.



Fast Facts

The berries of the Common Elder are often used in making jams, preserves and wines.

Common Lilac

SYRINGA VULGARIS

Oleaceae Olive family



Description:

The leaves of a lilac are heart shaped and have smooth margins. The fragrant, purple flowers bloom in a terminal cluster, and many consider them to be a sign of spring. They are often planted, and the bushes range from 3 – 15’ high.

Location

This spectacular bush can be found along the driveway to the main house.



Fast Facts

It is also called the purple lilac and it New Hampshire’s state flower.

Dewberry

RUBUS FLAGELLARIS

Rosaceae Rose family



Description

The Dewberry is a trailing vine that may reach two feet in height. This plant is characterized by thin red or green branches with stout thorns. The bark is lighter brown towards the base, where it tends to split or peel. The flowers are white, with five petals that bloom in April or June. The Dewberry fruit is blackish and approximately $\frac{3}{4}$ of an inch long.

Location

The Dewberry, like its cousin, the Blackberry, is found in disturbed meadows, forest edges and woodland areas.



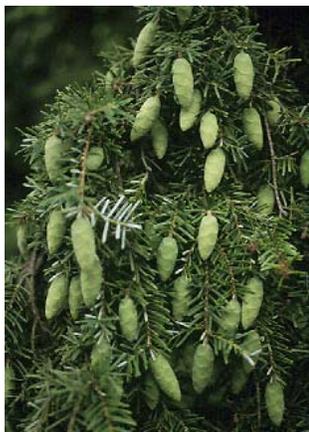
Fast Facts

Some people use the leaves of the Dewberry to make tea and the young shoots are peeled and eaten raw.

Eastern Hemlock

TSUGA CANADENSIS

Pinaceae Pine family



Fast Facts

Tannin in hemlock bark was used by the Indians to soothe burns, and by early colonists to dye wool and leather. This tree is a true treasure of interesting connections...look into it.

Eastern Hop Hornbeam

OSTRYA VIRGINANA

Betulaceae Birch family



Description

Hop Hornbeam's leaves are double-toothed, elliptical and 1 - 5" long. The bark is also distinctive because of its coloring. It is tan to brown with vertical grooves.

Location

The Eastern Hop Hornbeam is a small tree, 20 - 30' high, and 6 - 12" in diameter. It's fairly common in our area, and prefers somewhat shady locations. It can be found along the trails of the Hay Refuge.

Fast Facts

The fruits produced are small nuts that look like "hops". They appear in August - October and can be identified into the winter months.



Eastern White Pine

PINUS STROBUS

Pineaceae *Pine family*



Location:

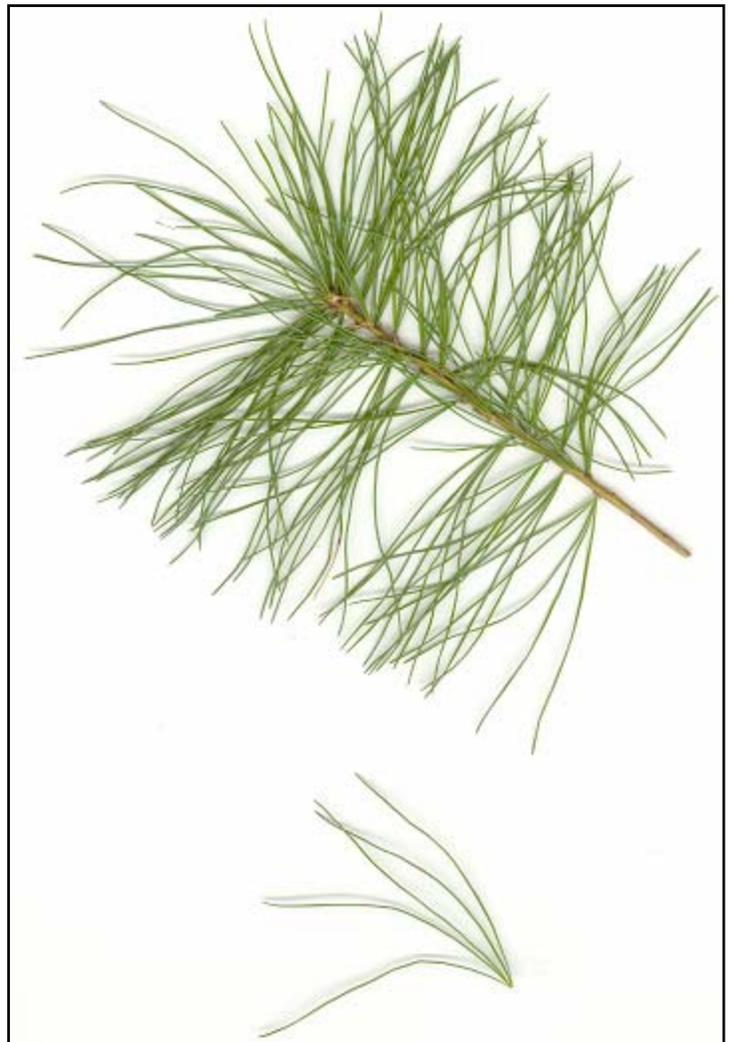
Well-drained sandy soils are its preferred habitat. At the Hay refuge, they can be found along the shore and near the southern end of the property next to 103A, and in the northern parcel are some of the oldest on the property.

Fast Facts:

Logging has claimed the majority of the original pine forest, but they can be found in many different areas, from rocky ridges to moister sandier loams. One whorl of branches is added each year. It grows very straight, and in colonial times, they were used by the British for ship masts.

Description:

The Eastern White Pine is one of the largest pine trees in the United States. They can grow to 80 feet tall and have a diameter of about 3 feet. The needles are 3-6 inches long and in groups of five. The cones are slightly curved and 4-8 inches in length.



Gray Birch

BETULA POPULIFOLIA

Betulaceae Birch family



Description:

This is a tree which usually grows to be 20 to 30 feet tall. Gray Birch Leaves are usually double-toothed and very triangular in shape. The leaves come to a long point at the tip. They often form a short, narrow catkin which will be alone pointing up at the end of a twig. The bark is dirty white but does not peel.

Location

Gray Birch is found throughout much of the Hay Refuge.



Fast Facts

Gray birch is often found in disturbed, dry areas.

Hobblebush

VIBURNUM ALNIFOLIUM

Caprifoleaceae Honeysuckle family



Description:

This is a shrubby plant that sprawls to 10 feet in diameter. It is usually found in lowlands or wet wooded areas.

Hobblebush leaves are usually broad, egg-shaped and 8-10 inches in length.

White flowers of two sized bloom in large clusters (3-4 inches across) at the end of twigs appearing from May to June.

Location:

Hobblebush is found throughout much of the Hay Refuge in shaded under story areas.

Fast Facts:

Their fruits are usually clusters of oval drupes that are initially red and turn black later in the summer. Their leaves turn mauve in the fall.



JAPANESE BARBERRY

BERBERIS THUNBERGII

Berberidaceae Barberry family



Description:

This plant has small wedge shaped leaves and thorny stems. The leaf is smooth and clustered along the stems. There are sharp single thorns found along its stems. Fruits are oval, red drupes.

Location:

This plant can be found around the main house and the tennis court.



Fast Facts:

This plant is on the invasive species list for the State of New Hampshire. Japanese Barberry is a good indicator of former pastureland.

Maleberry

LYONIA LIGUSTRINA

Ericaceae Heath family



Description:

The leaves have an oval shape to them and tend to be between one to four inches in length. The five parted seed is the easiest way to determine that a shrub is a Maleberry.

Location

This plant loves to be near the water so your best bet is to go down along the shores of the lake to find this species.



Fast Facts

The five seeds of the fruit of the plant are tough enough to last and survive the long winter season.

Maple-leaf Viburnum

VIBURNUM ACERIFOLIUM

Caprifoliaceae Honeysuckle family

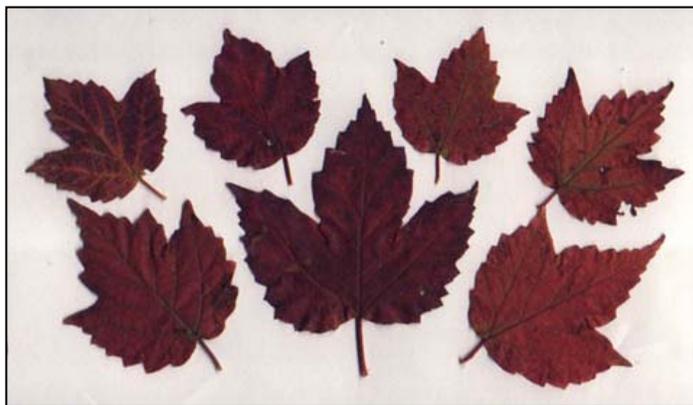


Description

The Maple-leaf Viburnum grows to about six feet in height. The leaves are arranged opposite from one another, are palmately veined, heavily toothed and grow to about three to four inches in length. The flower is white and about three inches across. The Maple-leaf Viburnum fruit is red and then black when ripe, growing in clusters. The twig is slender and gray colored with “stalked” buds

Location

The Maple-leaf Viburnum grows in woodland areas and open fields. The above specimen was found bordering 103A.



Fast Facts

The late season colors of the Maple-leaf Viburnum are astonishingly variant, ranging from shades of red, as below, to even pink or purple.

Multiflora Rose

ROSA MULTIFLORA

Rosaceae Rose family



Description

This is an invasive plant that can reach a height of 15 feet. It is a dense shrub that has compound leaves that are toothed and alternate and the number of leaves can vary from 7 to 9. The fringed stipule is a key indicator for this member of the rose family.

Location

This is a shrub found in open woodlands and forest edges.

Fast Facts

Multiflora rose blooms in May or June and one plant can produce up to 500,000 seeds



Northern White Cedar

THUJA OCCIDENTALIS

Cupressaceae Cypress family



Description:

Northern White Cedar is a Gymnosperm which means it contains needles or scales rather than leaves. In this case it contains scales rather than leaves.

The branches are usually covered with scales that grow in a manner which gives them a flattened look.

These are usually small to medium sized tree that is very full and shaped like a pyramid with a round top.

Location:

Northern White Cedar may be found near the main House.



Fast Facts:

Northern White Cedars form cones which are usually a ½ inch long that are red-brown in color.

Partridgeberry

MITCHELLA REPENS

Rubiaceae Madder family



Location

This can be found anywhere on the Hay Refuge where there is lot of shade and a fairly moist area. One might look on the Gatehouse Link.



Fast Facts

Many different animals enjoy the taste of the berries.

Poison Ivy

TOXICODENDRON RADICANS

Anacardiaceae Cashew or Sumac family



Description:

Poison ivy is a shrubby plant found along the edges of wooded areas such as along the shoreline of Lake Sunapee and the edges of the parking lot. Poison ivy leaves are usually found in clusters of three and vary in shape and color. These leaves are usually ovate in shape, irregularly toothed and shiny on the top.

Some

Their flowers are small, yellowish and bloom from May to July.

Their fruits are small, white, ball-shaped and appear in clusters from August to November.

Location:

Poison ivy is found scattered throughout the Hay Refuge especially along the shores of Lake Sunapee and the edges of the Parking lot.

Fast Facts

All parts of poison ivy contain an oily resin which causes an itchy rash on the skin. The farther down the plant you go the more poisonous it is, with the leaves being the least poisonous and the roots being the most.



Red Elderberry

SAMBUCUS RACEMOSA

Caprifoliaceae Honeysuckle family



Description

Red Elderberry has compound leaves with five to seven leaflets. The leaves are arranged opposite on the branch and usually range from six to twelve inches in length. The edges of the leaflets are serrated and dark green above and pale below. The small, white flowers are born upright in clusters, similar to the red fruit clusters. The twig of the elderberry is soft with a spongy center, and a red pith. The plant may reach eight to twenty feet in height and can grow as much as twelve feet in its first year!

Location

The Red Elderberry prefers rich rocky soils with ample moisture and may often be associated with mature forests.



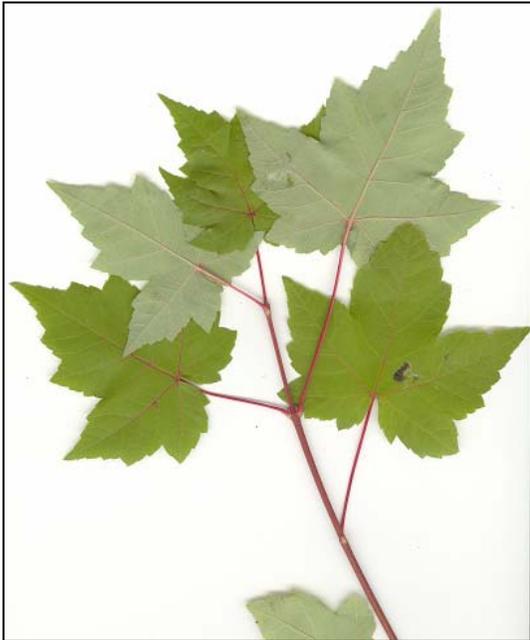
Fast Facts

Red Elderberry may be used to create dyes from the bark, fruit, and stems, and an insecticide from the dried leaves.

Red Maple

ACER RUBRUM

Aceraceae Maple family



Fast Facts

The Red Maple's telltale sign is its truly red twig color in early spring. Also, a helpful hint for identification is to count the leaf lobes: 1-2-3, as in, R-E-D.

Red Oak

QUERCUS RUBRA

Fagaceae Oak family



Location

Red Oaks grow in valley areas, gravelly areas, and rocky outcrops and prefer a well-drained site for their tap and deep spreading roots.



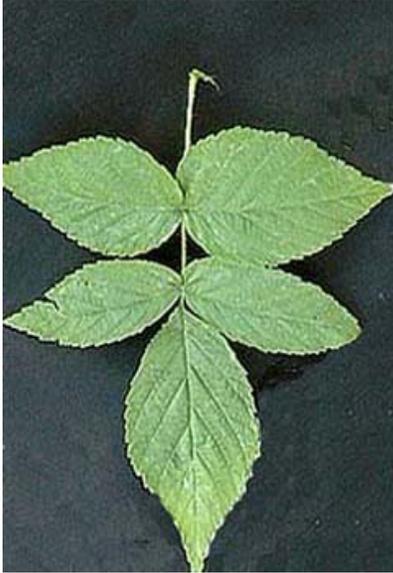
Fast Facts

The Red Oak, like all other oaks, are derivatives of the family *fagaceae*, a tropical plant that, historically, has not had to shed its leaves in the fall months. This fact accounts for the oak's persistence in holding its leaves through winter.

Red Raspberry

RUBUS IDAEUS

Rosaceae Rose family



Fast Facts

The Red Raspberry is acclaimed for its tasty berries.

Staghorn Sumac

RHUS TYPHINA

Anacardiaceae Sumac family



Location

Staghorn Sumac is usually found along forest margins, road banks, fencerows and old fields.



Late season coloration

Description

The Staghorn Sumac has alternately pinnate compound leaves with eleven to 31 leaflets. The leaves range in length from sixteen to twenty-four inches and the leaflets range from two to five inches and are serrated along the edges with hairy undersides. The flowers are born on the upright conical fruit, usually purplish in color and approximately eight inches long. The bark of the sumac is usually velvety to the touch on the upper ends of the branches and rougher below, usually gray or brown in color. The plant may reach heights of over twenty feet.



Fast Facts

In addition to being an excellent source of food and protection for small animals and birds, Staghorn Sumac is used in wine and juice making!

Sugar Maple

ACER SACCHARUM

Aceraceae Maple family

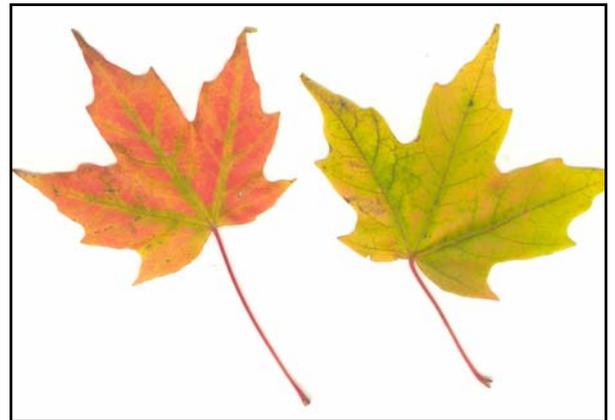
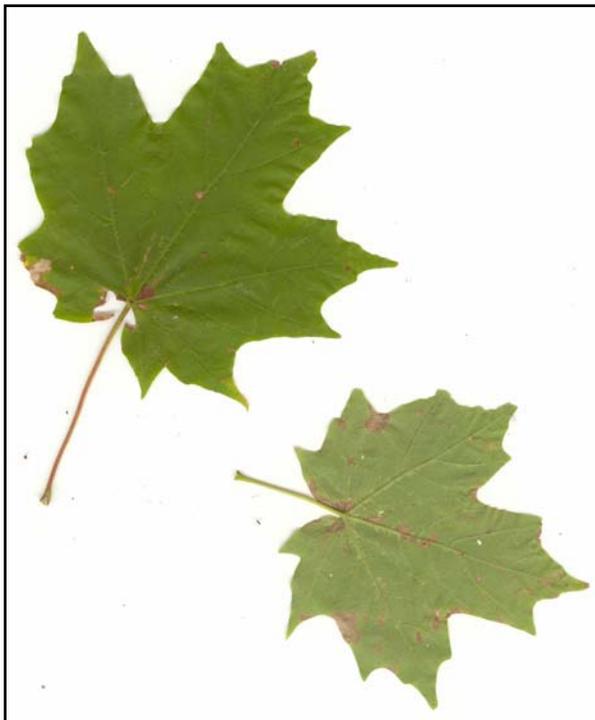


Description:

Sugar maple can be found throughout much of the Hay Refuge. It is a medium to large tree which can grow to 100 feet tall. Sugar maple leaves are usually 2 to 10 inches long and contains five “U” shaped lobes. These leaves usually turn orange to yellow in the fall. Their twigs are reddish brown and end in a long pointed bud that is very sharp and has two smaller buds on either side of it.

Location:

Sugar Maples are found throughout the Hay Refuge.



Fast Facts:

In the spring sugar maples can be “tapped” in order to gather its sap. This sap is then boiled to form maple syrup. It usually takes 40 gallons of sap to make one gallon of syrup.

White Oak

QUERCUS ALBA

Fagaceae Beech family

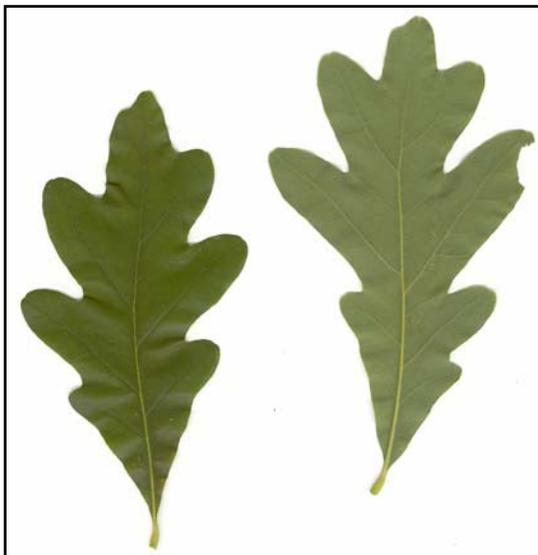


Description:

This is often a very large tree which can grow 60 to 80 feet tall. Often its branches span farther out than it is tall. White oak leaves are very deeply lobed and the ends of the leaves are rounded rather than pointy like those of the red oak. The twigs are red-brown to some what gray and contain red-brown buds which are clustered at the end.

Location:

Oaks can be found scattered throughout the hardwood areas of the Hay Refuge.



Fast Facts:

Oaks are one of the most valuable trees because of their slow growth rate and extremely hard wood.

Wintergreen or teaberry

GAULTHERIA PROCUMBENS

Ericaceae Heath family



Description:

Wintergreen is a very small shrub (since it contains a woody stem) which grows only to a maximum of 6 inches tall but spreads across the ground of dry, acidic forests. Wintergreen leaves are shiny and 1 to 2 inches long, and smell like wintergreen when crushed. It produces a red, round berry from July to September.

Location:

Wintergreen is found in partly shaded spots of the Hay Refuge particularly around the parking lot and along the shoreline.

Fast Facts:

The red berries are edible and taste like wintergreen. The leaves can also be made into tea, hence the name teaberry.



Witch Hazel

HAMAMELIS VIRGINIANA

Hamamelidaceae family



Description:

A small tree particularly noticeable in the fall, when it features a multitude of slender, golden flowers after other trees have lost their leaves. Witch Hazel blooms from September to November. The leaves of witch hazel have a wavy margin, which is unlike any of the other trees in shrubs in our area. The rounded seed pods are persistent through the winter, and will appear split once their seeds have been dispersed.

Location

Located throughout the woodland area, especially near the water.

Fast Facts

Bark and leaves are distilled and alcohol is added for use as an astringent, and in the treatment of various skin conditions.



MAMMALS

Our class was given the task to each take two mammals that could be found on the Hay Refuge property and create a report and panel for each animal. The panel might be used at the Hay Refuge for visitors too enjoy at the gatehouse. Within the report each student gave information about the animals such as habitat, diet, and unique features of that mammal. These reports will be a good feature at The Fells for visitors to get an idea of the kinds of animals that inhabit the. Our primary resource for completing this project was Stokes' *Guide to Nature in Winter* (1979).

Black Bear *Ursus americanus*
Chipmunk *Tamias striatus*
Coyote *Canis latrans*
Fisher *Martes pennanti*
Moose *Alces alces*
Porcupine *Erethizon dorsatum*
Raccoon *Procyon lotor*
Red Fox *Vulpes vulpes*
Snowshoe Hare *Lepus americanus*
White-Tailed Deer *Odocoileus virginianus*

Black Bear

Ursus americanus



A typical bear usually lives a life of solidarity.

Description

The black bear is approximately 4 to 7 feet from nose to tail, and two to three feet high at the withers. It has small eyes, rounded ears, a long snout, a large body, a short tail, and shaggy hair. It differs from grizzly bears in being smaller with a smaller shoulder hump, a furred rear instep, a less concave facial profile, smaller claws that are more tightly curved, and longer, smoother, and more tapered ears.



Bear tracks in the snow display a distinctive pattern that identifies the pace and hopper track.

Defense

Very few adult bears outside of national parks die of natural causes. Nearly all adult bears die from human-related incidents. Most are eventually shot. Vehicles kill a few. The average age of death in hunted populations is three to five years of age. Bears less than 17 months old sometimes die from starvation, predation, falls from trees, and other accidental causes.

Diet

Nuts, acorns, fruit, insects, meat and less succulent greens are eaten when preferred foods are scarce. A scarcity of such foods can result in failed reproduction, stunted growth, failure to add optimal amounts of fat, and death of young bears, especially cubs.

Habitat

Black bears like large forests with many different kinds of food sources. Small sunny openings within the forest provide many kinds of food for the bears. Lowlands and wetlands provide tender and juicy vegetation. Streams and woodland pools provide water for drinking and cooling. Mothers with cubs like large trees (over 20 inches in diameter) with furrowed bark (like white pines or hemlocks) for bedding sites. These trees are safest for small cubs to climb.



This beech tree exhibits claw marks made in order for a bear to obtain its nuts.

Reproduction

Mating season usually lasts from late May to early July. In the eastern deciduous forest, mating season can extend into August. The birth takes place in January or early February. The number of cubs in a litter is usually 2 in the western United States and 3 in the eastern United States. First litters are often only 1 or 2. Litters of 6 have been reported in several eastern states. Cubs tend to weigh 1/2 to 1 pound at birth. By their first fall, cubs may weigh as little as 15 pounds or more than 165 pounds, depending on food supply.

Fast Fact

The greatest misconception about black bears is that they are likely to attack people in defense of cubs. They are highly unlikely to do this. Black bear researchers often capture screaming cubs in the presence of bluff-charging mothers with no attacks. Defense of cubs is a grizzly bear trait. About 70 percent of human deaths from grizzly bears are from mothers defending cubs, but black bear mothers have not been known to kill anyone in defense of cubs.



Chipmunk

Tamias striatus

Description

The Chipmunk is part of the squirrel family in the order of the rodents. Its Latin name stands for striped hoarder. It is 5-6 inches and only weighs 2 ½ to 4 ½ ounces. These furry creatures have a bushy tail and dark black stripes along their bodies. Its other distinguishing features are its pointy-head and whiskers.



Diet

This mammal mainly feeds on seeds, nuts and fruits. However, they can also eat insects, frogs, and rob ground nests. These hoarders carry food to their nests from their pouches. These pouches are loose folds of skin on each side of their mouths. Chipmunks have been known to have a huge carrying capacity. 8 quarts of acorns and 32 quarts of shelled nuts is enough to feed an average chipmunk up to a year.



Trail Pattern

Habitat

Chipmunks are mammals that live underground in dens and burrows. Within these tunnels they have distinct chambers for winter food, storage and sleeping. They prefer to burrow near or under a rock, log, or other solid object. You can tell a chipmunk hole by the lack of a dirt mound at the entrance. The entrance is usually covered slightly by either grass or leaves. However, there can be more than one entry to the burrow. A chipmunk will continue to dig, for its entire life. Burrows have been found to be over thirty feet long. There are always side chambers and one will be where the chipmunk sleeps. It is usually filled with grass, leaves and/or feathers. Other chambers are used to store the chipmunk's food supply.

Fast Fact

During their tunnel excavation process the tunnels can be up to 100ft. with chambers that measure 6 to 8 inches in height and 12 inches in diameter. Also, Chipmunks have the ability to detect the presence of a predator in their burrow by the sudden change of air pressure: therefore they keep a second entrance in order to escape an intruder such as a weasel.



Coyote

Canis latrans

Description

A grizzled gray or reddish-gray coat with buff under parts, long, rusty or yellowish legs and a bushy tail characterize the coyote. They have arresting, yellow eyes and prominent ears. Average weight is 20-40 pounds.



Reproduction

The coyote has a high reproductive potential, they can reproduce up to 12 pups, although the average is 6. Such a reproductive capacity explains the ability of the coyote to respond so rigorously to removal efforts, and its ability to expand its range throughout the southeastern United States within 25 years.



Through the 1960's, coyote numbers continued to decline with increased use of Compound 1080 and other predator-control toxicants. Coyote numbers generally increased throughout the Great Plains after 1972 when the use of toxicants on federal lands was prohibited. Coyote populations fluctuated from 1915 to 1950, but bounty records suggest a general decline after 1915.

Diet

Recent studies of coyote diets on the Great Plains also have shown the importance of rodents and rabbits as coyote prey. In contrast to earlier studies, however, domestic livestock and chickens are eaten infrequently. Other common coyote foods today include certain insects, fruits, and wild birds.

Fast Fact

Young coyotes are more likely to kill in a manner not typical of that which is expected, but some coyotes consistently kill in an atypical manner. Coyotes, like other animals, are individuals and each may have unique food habits and behavior depending on circumstances.



Fisher

Martes pennanti



The fisher is known by several different names including, fisher-cat, black cat, wejack and the pekan.

Description

The fisher is a member of the weasel family. They generally weigh between twelve and twenty pounds and are usually around three feet long and fifteen inches tall. Male fishers are almost always twice as large as females. Their heads are broad with a pointed snout and small ears. One of their most distinguishing factors from other members of the weasel family is that they have a very long bushy tail.

They are found throughout much of the middle and southern provinces of Canada and also the

northern states of New England and New York

Habitat

Fishers are usually found in large, mature and continuous coniferous or mixed wood forests. They are particularly fond of forests with a large number of red and white cedars, spruce and a mix of hardwoods. Fishers prefer a forest containing a high canopy with a fairly constant amount of overhead cover. Male fishers will cover a range of eight to fifteen miles in diameter while females will be slightly less. Most importantly they are generally found away from society.



Fishers are often found in dead tree snags where they either live or hunt for squirrels or mice.

Food

Fishers are the only animal other than the puma that prey on porcupines. They kill porcupines by circling them and lashing out at their face until they either pass out from blood loss or slow down enough to go in for the kill. Sometimes, the fisher will force a porcupine up a tree and out onto a limb where it

falls to its death.

Fishers are also very fond of snowshoe hares, young beavers, birds, frogs, insects, nuts and berries. Ironically, fishers are not fond of the water and as a result rarely eat fish.

Breeding

Fishers are mostly solitary animals and mate during only two or three days in mid April. Their young are born in mid March and range from one to four kits. As with many other members of the weasel family, fishers have a long gestation period known as delayed implantation. This delayed implantation allows the egg to be fertilized but not implanted into the uterus for 338 to 358 days after mating occurs. After implantation occurs, development of the embryos begins and 30 to 60 days later the young are born, roughly a year after the original fertilization.



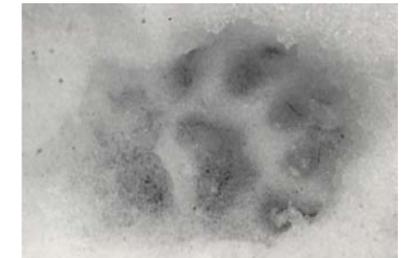
Fisher kits are usually born in litters of one to four in mid March

Tracks

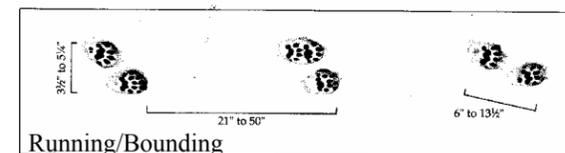
On the front print of a fisher track, the palm pad is c-shaped curved away from the toes and sometimes the heel pad will show as well. These tracks are usually $2\frac{1}{8}$ to $3\frac{7}{8}$ inches long and $2\frac{1}{8}$ to $3\frac{1}{4}$ inches wide. The rear tracks are relatively similar in size and shape however they do not ever have a heel pad. These tracks are usually $2\frac{1}{8}$ to 3 inches long and 2 to 3 inches wide.



The rear paws of a fisher do not contain a heel pad but they do have the fifth claw.



Fisher tracks, unlike many other



Fishers do not have retractable claws and therefore the presence of claws is common.

Fishers by nature are bounders when they run, as are many other members of the weasel family. This means that their front and hind feet are often found next to or slightly skewed from each other. When they are walking though they often have the alternating pattern common to many other animals.

Scat

The scat of a fisher is usually dark in color, twisted and overlapping with large coarse hairs in it making it loosely compact.



Moose

Alces alces



Moose are the second largest land animals in North America following only the Bison. The largest moose are found in Alaska followed by those from Maine, New Hampshire and Vermont.

Description

Moose are found mostly throughout Canada and Alaska but can be found as far south as Northern New England. New England moose can weigh as much as fourteen hundred pounds and measure up to eight and a half feet long by seven feet tall. They are dark brown in color with long silvery legs. Males are usually about 30% larger than the females and during the summer and fall they sport huge, flattened and palmate antlers that can be over five feet wide with multiple pointy tips.

Habitat

During the winter they spend most of their time in evergreen forests and broadleaf thickets. However, during the summer months, they emerge from the forest into lowland creeks, ponds and swamps. They also prefer regions that do not exceed sixty degrees Fahrenheit. For this reason during the summer they can be found at higher altitudes or around water where wind and evaporation help to cool them down.



During winter, moose primarily feed upon the buds and bark of deciduous trees

Diet

During winter, moose primarily feed upon the buds and bark of deciduous trees such as willow, aspen, alder, white birch and mountain ash. However when these sources of food become scarce they will browse on balsam firs as well as on hemlock and white cedar. During the summer months moose extend their diet to include aquatic plants such as water shield, yellow pond lily and pondweed.

Predators & Threats

Besides man, the moose's main predator is the wolf, which hunt in packs and can take down a Moose. Usually wolves prey on the young, old and sick because they are much easier to kill than a healthy moose. An even bigger threat to moose than wolves is the parasite *Parelaphostrongylus Tenuis* or brain worm that is carried by deer, which it has no effect on. In moose it causes blindness, disorientation, paralysis and eventually death.

Breeding

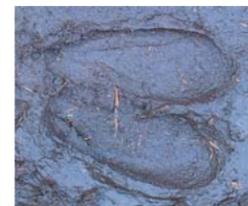
Moose usually mate in October and will have one to two calves in late May. During the mating season bulls will dig pits in the ground, which are known as ruts, which are between three to six inches deep. Once they have dug these pits they will then urinate in them as a sign of dominance. When a bull meets a cow it will dig a pit, roll in it, and then allow the female to do the same. During this process they make a series of "mooing" sounds, which are rarely made during any other time of the year.



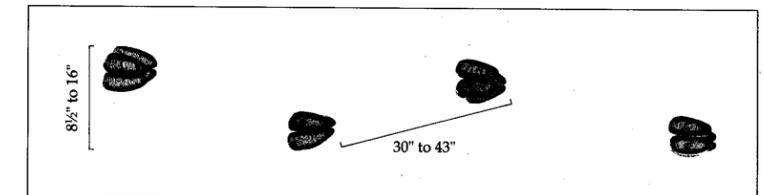
Female Moose usually give birth to one or two calves in late May.

Tracks

Moose tracks are almost identical to deer in shape and are usually twice as large with a length of six to seven inches and a width of five inches.



Moose tracks are usually seven inches long and five inches wide.



Moose walk in an alternating pattern where the front foot will step and then the rear will step in roughly the same location. They usually walk in relatively straight lines depending on their feeding activities.

Scat

During the summer when moose browse on leafy plants its scat will have a pulpy consistency which is found in a "pie" about seven to eleven inches in diameter. During the winter when their diet is drier and more fibrous their scat will be in multiple pellets which are usually oval and one to two inches long.



During the summer, moose scat will form a "pie" (Left). However, in the winter moose scat will consist of piles of small pellets (right).

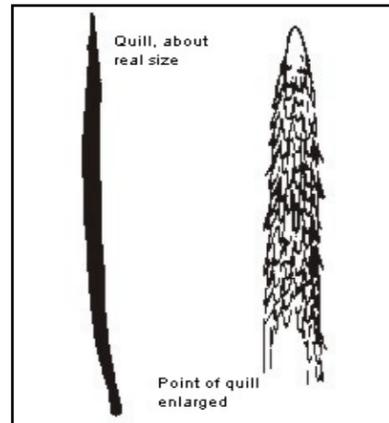


Porcupine

Erethizon dorsatum

Diet:

The porcupine is an herbivore sticking mainly to twigs, leaves, clover in the winter, and bark. The Porcupine loves hemlock bark and the Gatehouse Link Trail has many hemlocks.



The porcupine quills fly off of their bodies when an animal or human is near the porcupine. Most of the time it just happens without effort from the porcupine.

Defense:

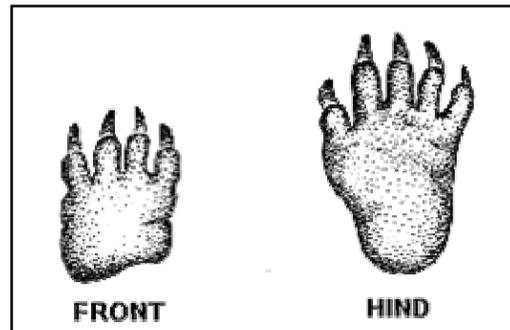
The main defense that the porcupine has are the sharp quills that are on the back and the tail. These slow down or stop predators such as fishers, coyotes, bobcat, and bear. The only way that these animals can kill a porcupine is to flip them over, but most of the time

Description:

The porcupine is a slow moving animal that waddles when it walks. This animal is nocturnal so it is unlikely that one would see it during the day. For it blends in with the surroundings. Even though the porcupine is active year round it is even harder to see during the winter.

Habitat:

The porcupine tends to live in coniferous, deciduous, and mixed forests. On the Hay Refuge that means that the species could be found on any part of the property. Because of this an individual should be aware that *the* porcupine could be nesting near a trail or right off a trail. The porcupine is a unique animal and should be treasured. The animal loves to climb trees and many times is found up in a tree. The porcupine is a great climber because of its claws and also when walking an individual can see claw marks on the base of trees. A porcupine might also take refuge in a hollowed out log that might have falling down on the property.



Unlike a canine set of paws, the porcupine has two different sized paws.

predators fail. The other defense that a porcupine can use is creating a bad odor and or chattering their teeth to scare away animals that want them.

Reproduction:

This animal mates in the months of October thru November and give birth to one cub in-between May and June.

Fast Fact:

There is an estimated amount of about 30,000 quills on each individual porcupine during its lifetime.



Porcupines love to climb trees. This not only helps them hide from predators but also acts as a source of shelter.

Raccoon

Procyon lotor



Raccoons are most active at night. They do not hibernate in the winter. They grow thick coats of fur and spend a lot of time sleeping when it is cold.



Fast Fact
Raccoons are well known for their curiosity and mischievousness.

Description

The most distinguishable characteristics of the raccoon are its black mask across the eyes and bushy tail with anywhere from four to ten black rings. The forepaws resemble slender human hands and make the raccoon unusually dexterous. Both their forepaws and hind paws have five toes.

Reproduction

The young are born in a nest of leaves made in a hollow tree or log. They are blind for the first three weeks. Mother teaches them how to hunt and to climb trees to escape from enemies.



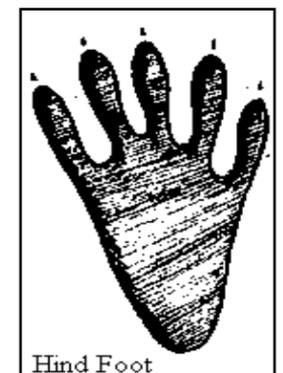
Front Foot

Diet

In most habitats plants provide a larger percentage of the raccoon's diet than animals do. Plant foods vary from fruits to nuts, including wild grapes, cherries, apples, persimmons, berries, and acorns.



Trail Pattern



Hind Foot



Red Fox

Vulpes vulpes

Diet:

This fox loves to eat just about anything it can get its paws on. It could be found at the beech trying to catch a fish or other water animal. It also goes after any bird like a lazy crow or might eat off the apple trees near the main house. If the staff had a garbage can that wasn't properly secure on the property the fox would try and get at it.

Defense:

The Red Fox uses its speed to not only get food but also to defend itself. Along with being quick it is also a small animal, making it able to elude many of its predators. It has sharp teeth and if needed can swim into Lake Sunapee out of harms way. Some of the Red Fox's common enemies is bobcats, bears, hunters, and disease such as rabies.

Reproduction:

The Red Fox begins mating during The late winter or the early spring. It takes about two months after mating for the mother to give birth to pups. The litter is usually 3 to 12 pups depending on the mother.

Fast Fact:

The Red Fox is the most popular and well know of all fox species.

Description:

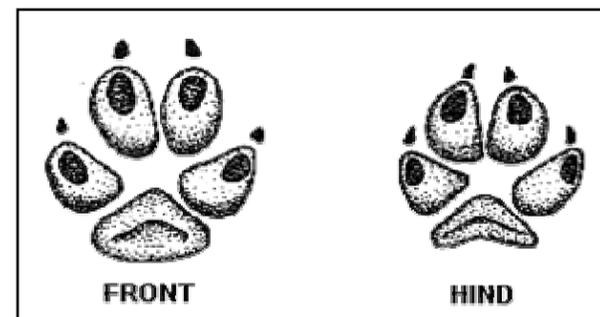
Easily determined if spotted by the black fur on all four legs. No other fox has this feature so if you see a fox on the refuge with black fur legs it is the Red Fox. The Red Fox is mainly red, but can also be seen in a silver color. It also has a black tail with a white tip. Today the fox is still trapped for the animals fur by hunters in the region.

Habitat:

One would look for a Red Fox in certain spots on the Hay Refuge. Some of these spots would be the deer field right near the parking lot, down on the beech, or any open canopies throughout the property. The range of the Red Fox is about one to ten km.



Foxes unlike the domestic dog will walk in a straight line to save energy to help survive in the wild.



A foxes paw tracks are very similar to that of dog tracks but differ mainly in size. A fox track is much smaller.



A Red Fox is always on the look out for food.



SnowShoe Hare

Lepus americanus

Diet:

Snowshoe hares diet consists plants such as grass, strawberry and in the winter their diet consists of twigs, buds and bark.

Description:

The snowshoe hare has densely, well-furred hind feet, which help it stay on top of the snow in winter. The hares fur changes color with the seasons, in the winter it is white to blend in with the snow, and in the summer months it is brown to blend in with the leaves and earth.



Defense:

Snowshoe hares have acute hearing, and this allows for them to freeze in place, and avoid not being seen. Their color is excellent camouflage. If a hare is seen it has a top speed of 27 mph to out run its predator.

Fast Facts:

Snowshoe hares are one of the most widely studied animals. This is partially due to their population fluctuations.

Habitat:

Snowshoe hares are most often found in open fields, fencerows, swamps, riverside thickets, cedar bogs and coniferous lowlands.



White-tailed Deer

Odocoileus virginianus

Description:

The White-tailed deer is named for its most obvious feature, the large white under side of its tail. This tail can be seen when the deer is scared and running. The color of the body of the deer is reddish brown in the summer months and then turn more of a grayish color in the winter.

Diet:

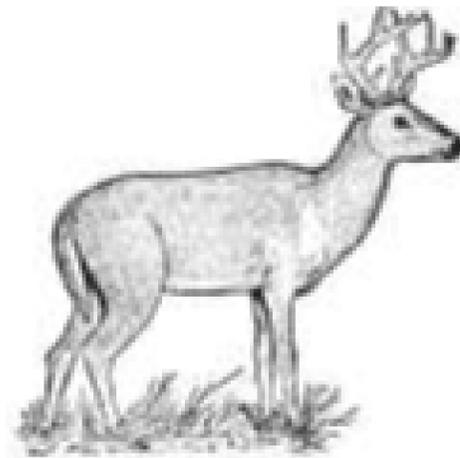
White-tailed deer are herbivores, or plant eaters. They eat a variety of herbaceous plants, lichens, mosses, tree leaves and barks that are primarily made up of twigs of maple, poplar, aspen and grasses.

Reproduction:

The white-tailed deer will mate in November. A buck will mate with several does, and fawns are born after a gestation period of about 201 days, from early May through late September. They weigh approximately 5.5 to 7.5 pounds. A doe may produce as many as 3 fawns.

Habitat:

White-tailed deer live in wooded areas. Deer could be seen anywhere on the refuge



Defense:

It can run up to speeds of 30 mph. Deer have developed keen senses to help them avoid predation. They depend on scent most of the time, particularly in thick cover, but also have excellent sight and hearing.

Fast Facts:

The white-tailed deer is the most important big game animal in North America



INTERVIEWS

Purpose

People often have very different views of and uses for public lands. The Fells in Newbury, NH is one with a very wide range of attitudes and perceptions concerning its management and uses. In order to further understand how people use and view The Fells, Colby-Sawyer College students enrolled in CES 301/302 conducted a survey regarding the attitudes and perceptions of The Fells members.

The overall purpose of this study was to gain an understanding of how and why the members use The Fells. The questions asked explored what the interviewee views as the most important feature, what their feelings are towards the transfer, and what they would like to see in the future, including the possibility of additional fundraising activities and programs. From these interviews a wide variety of answers provided some very useful results regarding each of the intended sections.

Methodology

The survey was developed by the CES 301/302 class and conducted in person by each of the six members of the class. Each member of the class interviewed 3 Fells members, one board member and two general members. These interviewees were chosen from The Fells membership list at random and then contacted in order of their occurrence in the random number list. From this members were eliminated who wished not to participate or who lived too far away from the area to be interviewed. These interviews were conducted at one of three locations; the interviewees home, The Fells gatehouse or Colby-Sawyer College. Each interview lasted approximately 20 minutes to a half an hour and each participant signed the consent form and was fully aware that the conversation was going to be tape-recorded so the conversation could be transcribed later. The interviewee remained confidential following guidelines for Human Subjects Research from the Colby-Sawyer College Institutional Review Board (IRB).

Qualitative inquiry was the research approach used for the project. In general, a phenomenological approach was followed. According to Leedy and Ormrod (2001) a phenomenological study is a study that attempts to understand people's perceptions, perspectives, and understandings of a particular situation. A typical sample size for a phenomenological study is 5-25 individuals. Additional insights into qualitative research were taken from Creswell (2003) and Burns (2000) – this included strategies for gathering data, transcribing the interviews and identifying important themes and perspectives in the interviews. The list of interview questions and basic strategies for in-person interviewing were adapted from *How to Conduct In-Person Interviews for Survey* by Sabine Oishi (2003). The general approach was to clearly dissect the holistic idea of research and break it down into a series of manageable and coherent steps. Copies of the interview questions, participant consent form and introduction letter can be found in the appendix.

Findings

Below is some basic descriptive information about the individuals that participated in the interview project.

Length of Membership

0-3 years	4-6 years	7-9 years	10+	Not certain
5	4	3	5	1

Gender of Participants

# of participants	Men	Women
18	9	9

Age (estimated)

40-50	50-60	60-70	70-90
2	6	6	4

Next, are summary statements that express the most common responses to the interview questions. The first set of interview questions focused on participant involvement at The Fells.

WHY ARE YOU A MEMBER?

Responses ranged from supporting conservation, the community, and a resource for study in ecology, horticulture and history.

HOW OFTEN DO YOU VISIT THE FELLS?

Responses fell into three categories

- 3-4 times per week
- 3-4 times per year
- only for special events

The next set of questions asked participants to consider what they believe are some of the most important features of The Fells.

WHAT DO YOU DO WHEN YOU VISIT THE FELLS?

Responses included hiking the trails, working in the garden, touring the house and gardens, attending functions and meeting.

WHAT DO YOU REALLY LIKE ABOUT THE FELLS?

The majority of the people interviewed identified three main characteristics, physical properties, emotional connections, and historical aspects. Physical properties include the lake and the gardens. Emotional aspects include the beauty, tranquility and personal connections with The Fells.

WHAT DOES THE FELLS CONTRIBUTE TO OR PROVIDE THE COMMUNITY?

The Fells provides a sense of history, volunteer opportunities, public access, and cultivated gardens to the community.

WHAT FEATURE AT THE FELLS APPEALS TO YOU THE MOST?

The most common features that attract people to The Fells are the gardens, the main house, and the trails.

WHAT DON'T YOU LIKE ABOUT THE FELLS?

The features that do not appeal to the members are the parking problem, the location, and the relationship with U.S. Fish and Wildlife.

WHAT IS THE MOST IMPORTANT ASPECT OF THE FELLS?

The most important characteristics of The Fells are its size, volunteer community, educational opportunities and horticultural aspects.

The following set of questions asked participants to discuss their thoughts about the anticipated transfer ownership of The Fells from the US Fish and Wildlife Service to another entity such as the Friends of The Fells or a regional environmental organization.

TO WHAT DEGREE ARE YOU AWARE OF THESE EFFORTS?

The majority of the members are aware of the transfer, but some are still unclear about it.

WHAT BENEFITS DO YOU SEE FROM SUCH A TRANSFER?

Members feel the benefits of the transfer will be independence, and the ability to raise more funding for the site.

WHAT CHALLENGES DO YOU SEE FROM SUCH A TRANSFER?

The major challenge of the transfer will be funding, and planning for the future.

IN WHAT WAY DO YOU FEEL THE TRANSFER WOULD OR MIGHT AFFECT YOUR PARTICIPATION AT THE FELLS?

Participation by members will stay the same or possibly increase when the transfer takes place.

Next participants were asked about what they would like to see in the future at The Fells.

WHAT PHYSICAL CHANGES WOULD YOU LIKE TO SEE AT THE FELLS?

The majority of interviewees felt that physically The Fells needed to focus on the continued maintenance and upgrade of the main house and gardens.

WHAT PROGRAMMATIC CHANGES WOULD YOU LIKE TO SEE?

Programmatically interviewees would like to see more educational functions dedicated to all ages, in particular the younger crowd.

IN ORDER TO IMPROVE THE FINANCIAL SECURITY OF THE FELLS WOULD YOU SUPPORT MORE PRIVATE FUNCTIONS, SUCH AS WEDDING RECEPTIONS?

Interviewees supported the idea of private functions such as weddings if they were occasional and kept in mind that these are not the main purpose of The Fells.

WHAT NEW INCOME GENERATING ACTIVITIES WOULD YOU LIKE TO SEE AT THE FELLS?

Interviewees suggested that The Fells needs to come up with several more large income-generating activities such as, a silent auction, parties and even more weddings.

WHAT WOULD YOU NOT LIKE TO SEE?

Interviewees do not want to see too many large events, which would require volunteers and disturb the peacefulness of The Fells.

WHAT WOULD YOU LIKE TO SEE HAPPEN AT THE FELLS IN 5 YEARS?

Interviewees would like to see continued maintenance of the property as well as an increase in funding and expansion of fells staff/volunteers.

WHAT COULD THE FELLS DO TO ENCOURAGE MORE PEOPLE TO BECOME MEMBERS?

In order to increase membership interviewees suggested that The Fells increase its public image through the use of publicity, free or advertised.

WHAT DO YOU THINK YOUR FUTURE LEVEL OF INVOLVEMENT WILL BE?

In the future three interviewees thought that they would be less involved, two said more involved and the rest said their level of involvement would be about the same.

ADDITIONAL COMMENTS OR QUESTIONS?

The interviewees seemed to feel that The Fells is doing a good job and should keep up the good work.

Data Interpretation

The following sections display the analytical portion of the interview process. The themes identified and addressed in the following sections include demographics, The Fells attributes, the transfer from the US Fish and Wildlife Service (FWS), the future, and any additional feedback or comments.

The first theme addressed in the interviews dealt with a member's status and level of involvement at The Fells. Because every participant involved with the interview project was contacted with the same method (random numbers generated from the membership list) it is possible to state that they were all members. However, to ensure that all participants were members every interviewee was asked if they were a member of The Fells at the start of the interview. Furthermore, six of the respondents were contacted because of their role as Fells board members. No contact tool was used to insure the presence of volunteers, yet at least seven members visited The Fells regularly in such a capacity.

Most members interviewed have been involved at The Fells for less than nine years, with five members being recently joined. However, a few members may boast involvement for over ten years and one may even claim involvement at The Fells since the beginning.

When asked about why they were members nearly all respondents stated that they believed in the mission of The Fells. Answers were commonly focused on The Fells as a place that increases senses of community solidarity, a place of significant conservation, and a place of importance for ecological, horticultural and historical study. The following quote illustrates this trend:

“I think it is a wonderful place for so many reasons, for study of nature, for an example of architecture of that period, and the wonderful gardens, and then the historical aspect of that family was so incredible (Interview 11, p.1).”

Members explained various personnel attractions to The Fells. When asked about the last time they visited The Fells, members cited various events and occasions, including: the annual Christmas party, special educational classes and normal visits as nature goers or volunteers. When applicable, member responses to why they have not visited in a while included such reasons as weather or busy personal schedules. However, no single member described his or her absenteeism from The Fells as an intentional avoidance.

The most important features at The Fells are subjective but beneficial to identify to further the connection between the community and this non-profit organization. The Fells mission states the importance of its historical, horticultural and educational objectives and it was evident through the conducted interviews, the public recognizes those attributes as the central features offered at The Fells as well.

The interviews consisted of a section that asked about what the most important features were of The Fells. There were three common characteristics, emotional connections, physical attributes, and historical aspects. The common trends among the interviews were The Fells provides a sense of community and history with volunteer opportunities. The most common features that attract people to The Fells are the gardens, trails and the house. Horticultural aspects, educational opportunities and its size were important to the interviewees. The relationship with US Fish and Wildlife, parking, and location were aspects that did not appeal to the members.

One of the aspects that is not popular among members is the parking situation. This was a common theme when asked, “what don’t you like about The Fells?” and the following quote is a good example.

“Gosh, well what we all don’t like is probably the parking lot and when the driveway gets chopped up like a couple of years ago. I think the drive is very beautiful. I would probably say the parking situation” (Interview 14, p. 2).

The following quote is an excellent example of why people visit The Fells, the gardens are a very important feature.

“I go to see the gardens, the rock garden, all the gardens...you know, that whole setup” (Interview 9, p. 2).

The sense of community and the opportunities to volunteer was a strong attribute, which the following quote is an example of.

“I should actually say probably more important are the volunteers... their knowledge; these are women that don’t mind getting in with their kneepads and their fingers in the dirt” (Interview 17, p 2).

The historical and natural aspects of The Fells are what keep it a popular place. The undeveloped shoreline, and the house kept in its traditional condition are very important to members as this quote summarizes.

“If you go down the forest ecology trail and you look across the lake you see boathouse after boathouse after boathouse after dock and this is really the only place that this doesn’t happen” (Interview 1, p. 2).

The Fells has many attributes that are popular, preserving these as they are is going to be important for the future. The weaknesses such as relationship with FWS, and

the parking problem are issues that can be resolved, and or in the process of being resolved. It is important The Fells preserve what makes it such a special place.

Focusing on the transfer issue during the interview was helpful in deciphering whether the transition from a publicly to a privately owned parcel would effect membership or raise any concerns.

The transfer set of questions had to deal with the plan being developed to move (transfer) ownership of The Fells from the US Fish and Wildlife Service to another entity, such as The Friends or a regional environmental organization. This idea is supported both by The Fells board and the US Fish and Wildlife Service. While there is support for the transfer there was also concern. The following quotes exemplify those two perspectives.

“Yes, right. I think that they [United States Fish and Wildlife Service] funded a lot of important infrastructure stuff last year that was very, very good. Um, I also, so I think that might be the only area that is going to be hard, is how will The Fells support itself without that kind of backing.”(Interview 3, p. 2)

“I think if we were privately owned as a conservation preservation historic entity we would have better luck in raising money I think people are reluctant to give more substantial sums because its owned by the federal government they are already paying taxes so why should they do it again.” (Interview 3, p. 2)

The second quote expresses the thought that the Friends would accomplish their goals for generating more money without being associated with the federal government. Another interviewee expressed concerns about the financial implications of the transfer.

“I think the challenges are financial and I would hate to see it under our control, and not have figured out a way to finance it, that’s the beginning of the end. People start saying you know you could sell this off and there it goes.” (Interview 4, p.4)

Another interviewee gave great insight into how he feels The Friends would handle the ownership of The Fells.

“...it will give more autonomy to the Friends, to design programs and activities there that they think will be a benefit to members. A lot of times the Friends want to do things and they have to get approval from Fish and Wildlife Service and things get bogged down and other things like they can’t use the cottage for any type of activity and that could be a great income generating opportunity for the Friends to rent that out as a summer cottage or some other use.” (Interview 1, p. 2)

And another interviewee was concerned with the consequences of the transfer and how others would receive the federal land transfer ownership to a private entity.

“One of the greatest concerns about that is the precedent that might set for shifting management of public lands into private entities. I think its going to be something that the Friends will have to be very careful about because if it is seen as taking away land from the public and giving it to more focused or specific group I think could be very unfortunate. Not only the local implications, but nationally it could be an issue too because if we turn this national wildlife refuge over to a private organization that sets a precedent for turning over a national seashore or some other federally owned property. I think the Friends have the best intentions for both the site, but I think Fish and Wildlife should be very careful.” (Interview 1, p. 4)

The transfer will provide opportunities for growth and ease in running The Fells. The majority of the members are aware of the transfer, but some are still unclear about it. Multiple members feel that the benefits of the transfer will be independence and allow them to raise additional funding for the site. However, some of the challenges will be independent funding and planning for the future. Participation by the members will stay the same or possibly increase when the transfer takes place. However, there is still a concern expressed by members at The Fells about being able to handle the weight of the organization without federal backing.

The future at The Fells is important to reveal public opinion especially that of the members of this organization since they play an integral part in The Fells’ survival. Common responses in this section of the interview dealt with funding issues, autonomy from the federal government, possibly a future endowment, physical changes (referring to the parking lot) and programmatic alterations as well. The majority of the members expressed that The Fells needed different kinds of functions such as small weddings to contribute to the funding of the site and more property exposure for the local community. One problem that may arise would be overexposure to the property such as the lawn and gardens due to the new abundance of people (depending on the size of the wedding). Overall, the members were unanimous with the additional comments that The Fells’ staff were doing a wonderful job and looking forward to the future.

This first quote describes that if done correctly, The Fells can support weddings at the property.

“Without becoming overpowering with control issues, I thing that if people, if it can be developed so that you can have weddings there...considering that there wouldn’t be any destruction to the property I think that would be lovely. The setting is just gorgeous.” (Interview 8, p. 3)

Having more weddings at The Fells will be an important step for The Friends group in the future if they do decide to push towards that decision. However, they must first break away from the Fish and Wildlife Services to truly move on to this next step.

Currently, The Fells specializes in accommodating older adults in the community and offers limited the children's programming. This is partly because the surrounding communities reflect an older population. There have also been some concerns expressed about the impact on the gardens and other facilities if more children were participated in programs on the property. That being said, several interviewees expressed their interest in seeing more programming for children and younger families at The Fells. The possibility of newer and younger generations using The Fells will benefit The Friends in two different areas, economical and educational. It will also ensure the future of the site.

“I personally am very much interested in The Fells group in making a greater commitment to the next generations so I am very much interested in instating children's programs maybe as a community group, that will leave a impression on the children, you have to start young... I think programs for children should be a focus with the future.” (Interview 5, p.5)

Below is another quote that is geared towards the importance of adding children to the programming at The Fells.

“I have always pushed over the years that I have been involved with The Fells for this to be a place for families to come. I realize that we are restricted as far as kids running around the rock garden because there are a lot of sensitive plants there and they can't do that. They have to be controlled but it's my feeling that if we do not get young families involved our future is endangered. So we need to provide activities for children and ways for families to come and enjoy the site so they are invested in it so if we are in trouble in future they're gonna care and think that we don't want to lose this.” (Interview 14, p. 5)

Some of the interviewees suggested that by creating programs for children The Fells would maintain a better bond with the surrounding communities.

Along with the weddings there was suggestions of getting more functions like auctions and benefit parties. As long as it doesn't drain the volunteers and staff working on each event, then this is a good idea. A good distance between each event will keep the money coming in and the workers still active in the social dynamics in the behind the scene work. For example, one interviewee suggested that the auction be held every other year.

“I personally think that we should have the auction every other year. Well it's a huge fundraiser for them, but there are a lot of people that have auctions now...we are a finite community, and economic times

are not as great as they could be, so its harder to spread your money around, or for people to participate with these auctions... if they were able to do that every other year I think that they might find, better things to donate..." (Interview 17, p.4)

The fifth section of the interview was ideally for the interviewee to share any additional feedback or voice any concerns that were not addressed in the prepared questions. The main focus was for the interviewee to clarify any areas that we did not cover or mention in the previous questions. Most of the comments expressed at this point in the interview focused on praise for the staff and volunteers of The Fells.

"I congratulate all the people who put in the tremendous energy at The Fells. My husband worked in the perennial garden and is very proud to go down and see some of the stuff that he literally knows because he sweats equity into it. And I think that it has just brought back, kind of a lost area that is now going to be enjoyed for many, many years to come and I think it is fantastic for people to do that much." (Interview 8, p. 4)

"Well, I think the more members the better. It is such a treasure, it is such a wonderful thing for people to come and see." (Interview 12, p. 4)

"It's such a pleasure to go there [The Fells], the staff that they have is very limited but they're excellent. They're very excellent and it is such fun to be around them because they do such a superb job." (Interview 11, p. 2)

As mentioned above, most of the interviewees were was very supportive of The Fells and it's employees.

Recommendations

The main topic identified throughout the interview process was the importance of adapting educational programs at The Fells to focus or include events structured for children. Including a younger generation will instill understanding and acknowledgement for the natural world that surrounds them. Furthermore, it will ensure The Fells survival as their own entity without government aid such as The Fish and Wildlife Service. Other recommendations from the interviews include diversifying programs and functions that are currently offered. For example, trying to get different people involved in activities or doing an auction every other year and spicing up the venue with a variety of other fund raising efforts as for example, Christmas at The Fells. The physical attributes of The Fells and the amazing progression of the site over the years were always touched upon. The gardens and the house were mentioned in every

interview, they are definitely one of the main attractions offered on the parcel. The fact that the Fells is accessible to the public and provides an undeveloped section of Lake Sunapee, cultivated gardens and hiking trails appeals to a variety of visitors.



Nathan Bancroft, from South Burlington, VT, is a junior in the Community and Environmental Studies program and is minoring in Communication Studies. This summer Nate will complete an internship with Vermont Department of Transportation developing inventories of wildlife corridors and invasive plant species.



Bill Doenges, from Moretown VT, is a senior in the Community and Environmental Studies program and is minoring in Studio Art. During the summer of 2002, Bill completed an internship with the Lake Sunapee Protective Association. Bill is currently completing a senior research project that is analyzing strategies for improving habitat for grouse through the release of old apple orchards in Camels Hump State Park in Vermont.

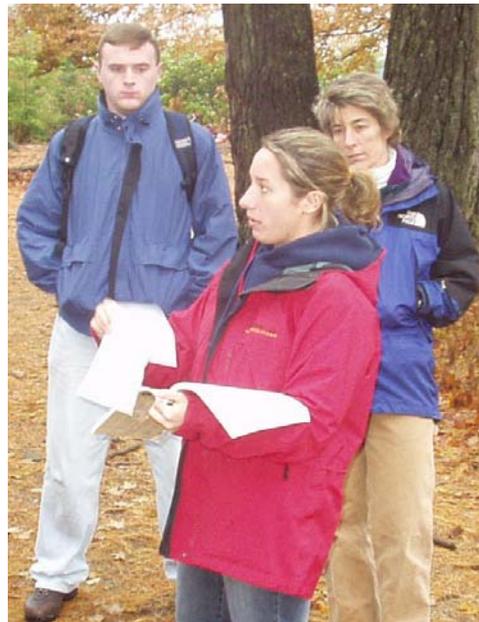
Jon Evans, from Farmington, CT is a junior in Community and Environmental Studies and is pursuing a minor in Business Administration. This summer, Jon will complete an internship with the New Hampshire Department of Transportation. He will help analyze the effectiveness of interstate sound barriers. Jon will also assist on an invasive species project with the New London Conservation Commission





Jamie Irving, from Gilford, NH is a senior in Community and Environmental Studies and is completing a minor in Philosophy. Last summer, Jamie completed an internship with the Ausbon Sargent Land Preservation Trust. He is also completing a wildlife inventory at the John Hay National Wildlife Refuge for his senior research project.

Lindsay Micarelli, from Carlisle, MA is a senior in Community and Environmental Studies and is pursuing a minor in English. For her senior research project, Lindsay is identifying priority areas for the eradication of invasive plant species in New London. She will continue her work on the invasive species initiative this summer through an internship with the New London Conservation Commission.



Matt Timmons from Northfield, NH is a senior in Community and Environmental Studies and is pursuing a minor in History. Matt is currently completing an internship with the New Hampshire Department of Environmental Services Solid Waste Division. He is working on the “Green Yards” program – an attempt to improve the environmental compliance record of salvage yards. For his senior research project, Matt is working with food services staff at Colby-Sawyer College to determine the amount of food waste in the college dining room.

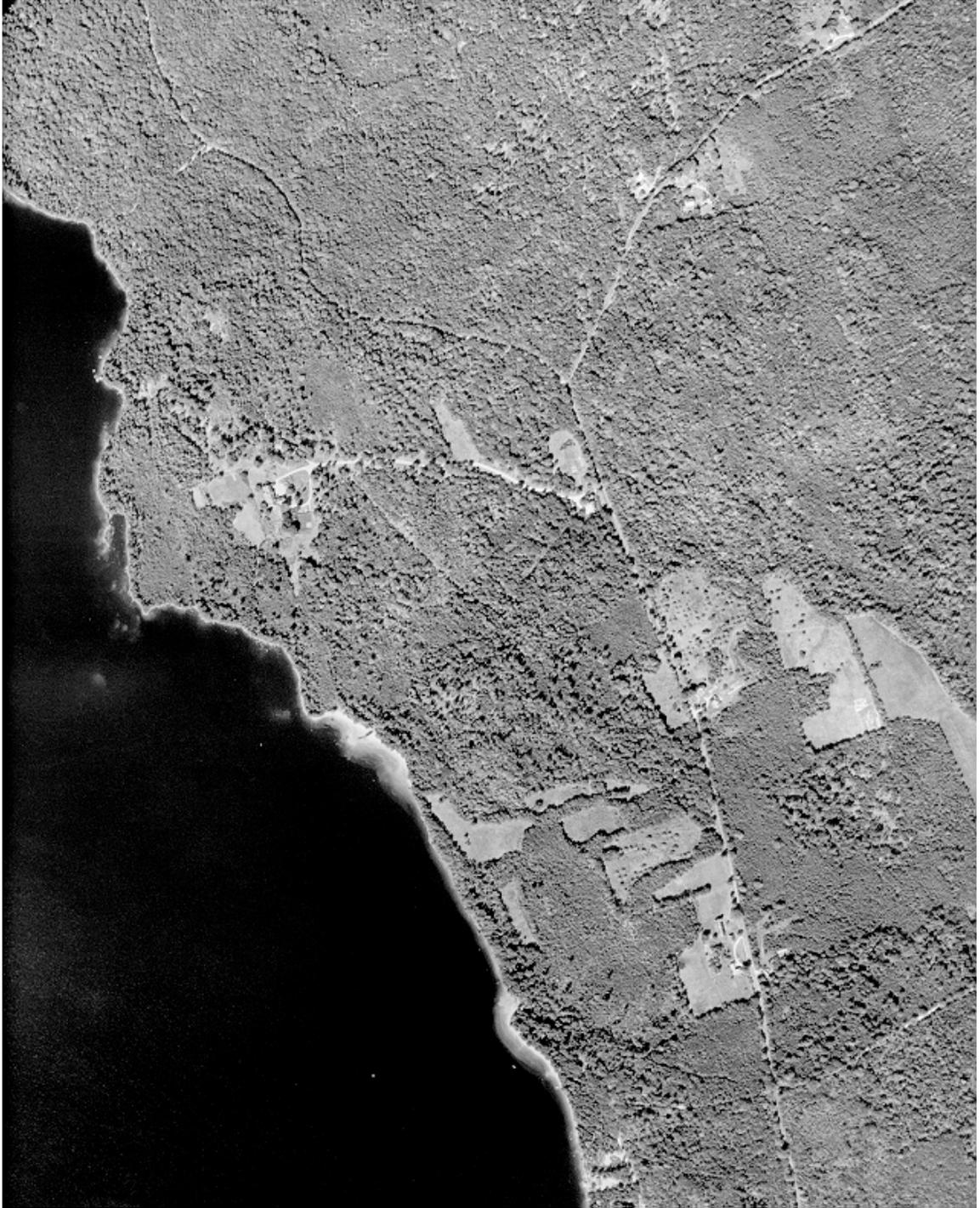




(Matt Timmons, Jamie Irving, Lindsay Micarelli, Nate Bancroft, Bill Doenges, Jon Evans)

APPENDICES

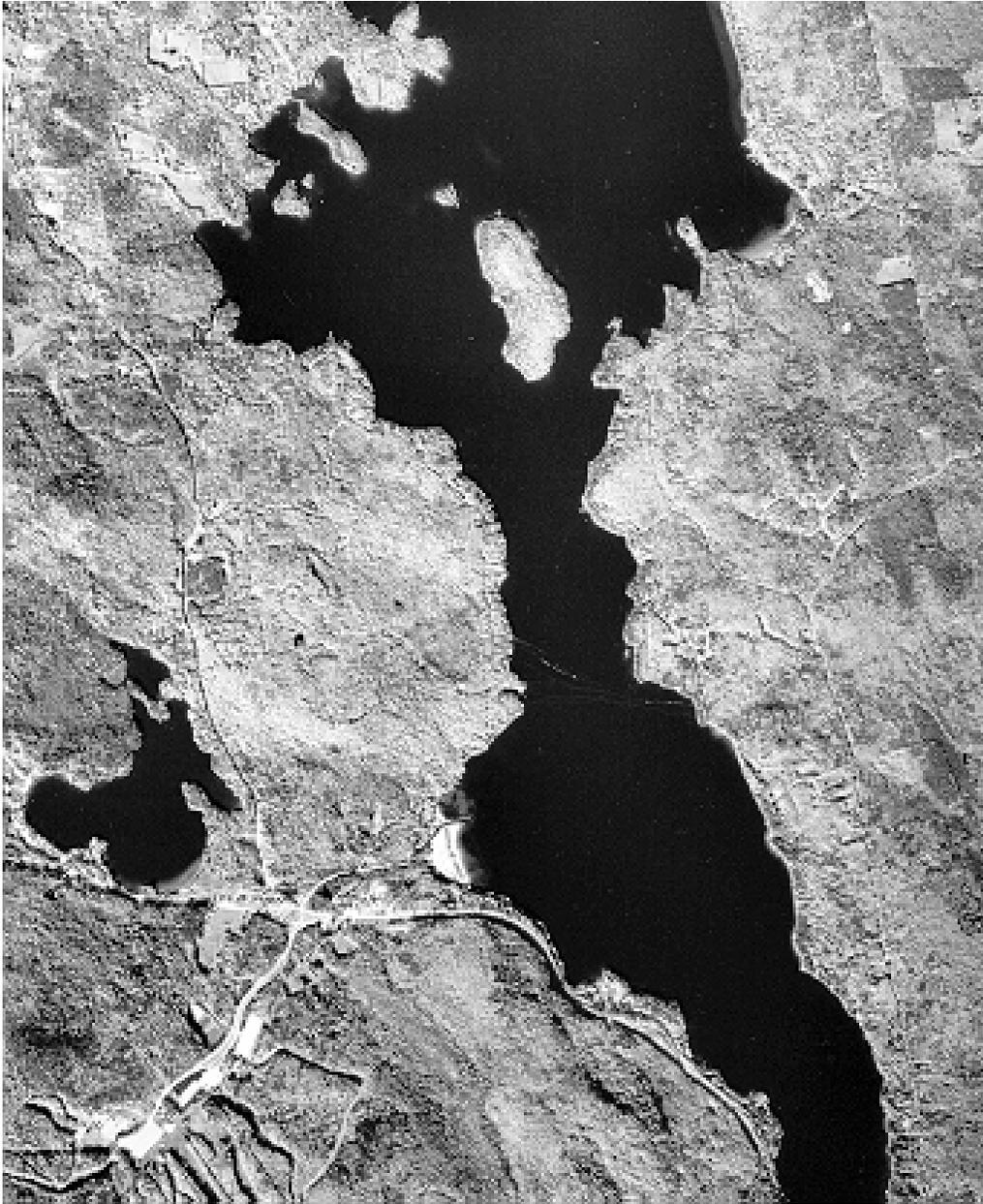
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1953
1:660



1974
1:33013



1981

1:33019



1999a

1:33000



1999b

1:33000

Executive Order 13112

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. 4701 et seq.), Lacey Act, as amended (18 U.S.C. 42), Federal Plant Pest Act (7 U.S.C. 150aa et seq.), Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 et seq.), Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), and other pertinent statutes, to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause, it is ordered as follows:

- Section 1. Definitions
- Section 2. Federal Agency Duties
- Section 3. Invasive Species Council
- Section 4. Duties of the Invasive Species Council
- Section 5. Invasive Species Management Plan
- Section 6. Judicial Review and Administration

Section 1. Definitions.

(a) "Alien species" means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

(b) "Control" means, as appropriate, eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions.

(c) "Ecosystem" means the complex of a community of organisms and its environment.

(d) "Federal agency" means an executive department or agency, but does not include independent establishments as defined by 5 U.S.C. 104.

(e) "Introduction" means the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity.

(f) "Invasive species" means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

(g) "Native species" means, with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

(h) "Species" means a group of organisms all of which have a high degree of physical and genetic similarity, generally interbreed only among themselves, and show persistent differences from members of allied groups of organisms.

(i) "Stakeholders" means, but is not limited to, State, tribal, and local government agencies, academic institutions, the scientific community, nongovernmental entities including environmental, agricultural, and conservation organizations, trade groups, commercial interests, and private landowners.

(j) "United States" means the 50 States, the District of Columbia, Puerto Rico, Guam, and all possessions, territories, and the territorial sea of the United States.

Section 2. Federal Agency Duties.

(a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,

(1) identify such actions;

(2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them; and

(3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

(b) Federal agencies shall pursue the duties set forth in this section in consultation with the Invasive Species Council, consistent with the Invasive Species Management Plan and in cooperation with stakeholders, as appropriate, and, as approved by the Department of State, when Federal agencies are working with international organizations and foreign nations.

Section 3. Invasive Species Council.

(a) An Invasive Species Council (Council) is hereby established whose members shall include the Secretary of State, the Secretary of the Treasury, the Secretary of Defense, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Transportation, and the Administrator of the Environmental Protection Agency. The Council shall be Co-Chaired by the Secretary of the Interior, the Secretary of Agriculture, and the Secretary of Commerce. The Council may invite additional Federal agency representatives to be members, including representatives from subcabinet bureaus or offices with significant responsibilities concerning invasive species, and may prescribe special procedures for their participation. The Secretary of the Interior shall, with concurrence of the Co-Chairs, appoint an Executive Director of the Council and

shall provide the staff and administrative support for the Council. (b) The Secretary of the Interior shall establish an advisory committee under the Federal Advisory Committee Act, 5 U.S.C. App., to provide information and advice for consideration by the Council, and shall, after consultation with other members of the Council, appoint members of the advisory committee representing stakeholders. Among other things, the advisory committee shall recommend plans and actions at local, tribal, State, regional, and ecosystem-based levels to achieve the goals and objectives of the Management Plan in section 5 of this order. The advisory committee shall act in cooperation with stakeholders and existing organizations addressing invasive species. The Department of the Interior shall provide the administrative and financial support for the advisory committee.

Section 4. Duties of the Invasive Species Council. The Invasive Species Council shall provide national leadership regarding invasive species, and shall:

(a) oversee the implementation of this order and see that the Federal agency activities concerning invasive species are coordinated, complementary, cost-efficient, and effective, relying to the extent feasible and appropriate on existing organizations addressing invasive species, such as the Aquatic Nuisance Species Task Force, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds, and the Committee on Environment and Natural Resources;

(b) encourage planning and action at local, tribal, State, regional, and ecosystem-based levels to achieve the goals and objectives of the Management Plan in section 5 of this order, in cooperation with stakeholders and existing organizations addressing invasive species;

(c) develop recommendations for international cooperation in addressing invasive species;

(d) develop, in consultation with the Council on Environmental Quality, guidance to Federal agencies pursuant to the National Environmental Policy Act on prevention and control of invasive species, including the procurement, use, and maintenance of native species as they affect invasive species;

(e) facilitate development of a coordinated network among Federal agencies to document, evaluate, and monitor impacts from invasive species on the economy, the environment, and human health;

(f) facilitate establishment of a coordinated, up-to-date information-sharing system that utilizes, to the greatest extent practicable, the Internet; this system shall facilitate access to and exchange of information concerning invasive species, including, but not limited to, information on distribution and abundance of invasive species; life histories of such species and invasive characteristics; economic, environmental, and human health impacts; management techniques, and laws and programs for management, research, and public education; and

(g) prepare and issue a national Invasive Species Management Plan as set forth in section 5 of this order.

Section 5. Invasive Species Management Plan.

(a) Within 18 months after issuance of this order, the Council shall prepare and issue the first edition of a National Invasive Species Management Plan (Management Plan), which shall detail and recommend performance-oriented goals and objectives and specific measures of success for Federal agency efforts concerning invasive species. The Management Plan shall recommend specific objectives and measures for carrying out each of the Federal agency duties established in section 2(a) of this order and shall set forth steps to be taken by the Council to carry out the duties assigned to it under section 4 of this order. The Management Plan shall be developed through a public process and in consultation with Federal agencies and stakeholders.

(b) The first edition of the Management Plan shall include a review of existing and prospective approaches and authorities for preventing the introduction and spread of invasive species, including those for identifying pathways by which invasive species are introduced and for minimizing the risk of introductions via those pathways, and shall identify research needs and recommend measures to minimize the risk that introductions will occur. Such recommended measures shall provide for a science-based process to evaluate risks associated with introduction and spread of invasive species and a coordinated and systematic risk-based process to identify, monitor, and interdict pathways that may be involved in the introduction of invasive species. If recommended measures are not authorized by current law, the Council shall develop and recommend to the President through its Co-Chairs legislative proposals for necessary changes in authority.

(c) The Council shall update the Management Plan biennially and shall concurrently evaluate and report on success in achieving the goals and objectives set forth in the Management Plan. The Management Plan shall identify the personnel, other resources, and additional levels of coordination needed to achieve the Management Plan's identified goals and objectives, and the Council shall provide each edition of the Management Plan and each report on it to the Office of Management and Budget. Within 18 months after measures have been recommended by the Council in any edition of the Management Plan, each Federal agency whose action is required to implement such measures shall either take the action recommended or shall provide the Council with an explanation of why the action is not feasible. The Council shall assess the effectiveness of this order no less than once each 5 years after the order is issued and shall report to the Office of Management and Budget on whether the order should be revised.

Section 6. Judicial Review and Administration.

(a) This order is intended only to improve the internal management of the executive branch and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any other person.

(b) Executive Order 11987 of May 24, 1977, is hereby revoked.

(c) The requirements of this order do not affect the obligations of Federal agencies under 16 U.S.C. 4713 with respect to ballast water programs.

(d) The requirements of section 2(a)(3) of this order shall not apply to any action of the Department of State or Department of Defense if the Secretary of State or

the Secretary of Defense finds that exemption from such requirements is necessary for foreign policy or national security reasons.

WILLIAM J. CLINTON
THE WHITE HOUSE,
February 3, 1999.

CHAPTER 88

HB 1258-FN - FINAL VERSION

24feb00.....3231h

13april00.....4134-EBA

2000 SESSION

00-2030

08/10

HOUSE BILL ***1258-FN***

AN ACT relative to invasive plant, insect, and fungal species.

SPONSORS: Rep. L. Pratt, Coos 4; Rep. Babson, Carr 5; Rep. Melcher, Hills 11; Rep. Owens, Merr 6; Rep. Philbrick; Carr 4; Sen. Russman, Dist 19; Sen. Disnard, Dist 8

COMMITTEE: Environment and Agriculture

ANALYSIS

This bill:

I. Requires the commissioner of agriculture, markets, and food to conduct research and educational activities which address the effects of invasive plant, insect, and fungal species upon the state.

II. Requires the commissioner to make recommendations for control of invasive species.

III. Creates an invasive species committee to advise the commissioner on matters relating to invasive species.

IV. Requires the commissioner to publish annually lists of invasive species that present potential or immediate danger to the environmental and economic interests of the state.

V. Provides the commissioner with authority to prohibit collection, possession, transportation, sale, propagation, transplantation, or cultivation of listed species.

VI. Allows the commissioner to accept grants, gifts, bequests, and donations which support the purposes of this bill.

VII. Provides the commissioner with rulemaking authority to carry out the provisions of this bill.

VIII. Provides the commissioner with authority to administer and enforce the provisions of this bill.

IX. Provides penalties for violations of the provisions of this bill.

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Explanation: Matter added to current law appears in ***bold italics***.

Matter removed from current law appears [~~in brackets and struckthrough.~~]

Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

24feb00.....3231h

13april00.....4134-EBA

00-2030

08/10

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand

AN ACT relative to invasive plant, insect, and fungal species.

Be it Enacted by the Senate and House of Representatives in General Court convened:

88:1 New Subdivision; Invasive Species. Amend RSA 430 by inserting after section 50 the following new subdivision:

Invasive Species

430:51 Declaration of Purpose. The purpose of this subdivision is to recognize the adverse environmental and economic effects of invasive plant, insect, and fungal species upon the state; to establish the means by which the state shall address and minimize such adverse effects; to promote research and educational activities dealing with invasive species so as to achieve the best possible protection of agricultural, forest, wildlife, and other natural resources of the state and of human health; and to prevent and control the spread of invasive species in the state.

430:52 Definitions. In this subdivision:

I. "Alien species" means with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating or reproducing that species, that is not native to that ecosystem.

II. "Commissioner" means the commissioner of agriculture, markets, and food.

III. "Committee" means the invasive species committee as established by this subdivision.

IV. "Control" means, as appropriate, eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking

steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions.

V. "Fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.

VI. "Insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insecta, comprising 6-legged, usually winged forms, as, for example, beetles, bugs, bees, flies, and to other allied classes of arthropods whose members are wingless and usually have more than 6 legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

VII. "Invasive species" means an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

VIII. "Native species" means with respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

IX. "Person" means any individual, governmental entity, firm, partnership, corporation, company, society, association, or any organized group of persons whether incorporated or not, and every officer, agent, or employee thereof.

430:53 Powers and Duties of the Commissioner.

I. The commissioner shall conduct research and educational activities which address the environmental and economic effects of invasive species upon the state. The commissioner shall solicit support for and participation by other state and federal government entities, the University of New Hampshire and private entities in such activities.

II. The commissioner shall disseminate information on and make recommendations for control of invasive species.

III. The commissioner shall consult with the invasive species committee and prepare and publish by April 1 annually a list of invasive species deemed to present an immediate danger to the health of native species, to the environment, to commercial agricultural or forest crop production, or to human health. The commissioner shall have authority to prohibit collection possession, importation, transportation, sale, propagation, transplantation or cultivation by any person of any species so listed. Such list shall be known as the "New Hampshire prohibited invasive species list."

IV. The commissioner shall consult with the invasive species committee and prepare and publish by April 1 annually a list of species which present the potential for environmental or economic harm but for which such potential may be reduced or eliminated by cultural or biological practices. Such list shall be known as the "New Hampshire restricted invasive species list."

V. The commissioner shall apply for and accept grants, gifts, bequests and donations which support the purposes of this subdivision.

430:54 Committee Established.

I. The invasive species committee is hereby established to advise the commissioner on matters relating to invasive species in the state. It shall consist of the following 9 members:

- (a) The state entomologist.
- (b) The commissioner of environmental services, or designee.
- (c) The commissioner of resources and economic development, or designee.
- (d) The commissioner of transportation, or designee.
- (e) The executive director of fish and game, or designee.
- (f) The dean of the college of life sciences and agriculture of the University of New Hampshire, or designee.
- (g) Three persons appointed by the governor with the advice and consent of the executive council who shall each serve for a term of 3 years. One shall represent horticultural interests, one shall represent environmental interests, and one shall represent the general public.

II. The committee shall annually choose one of its members to serve as chairperson.

430:55 Administrative Authority; Inspection; Rulemaking. The commissioner of agriculture, markets, and food shall adopt rules in accordance with RSA 541-A for carrying out provisions of this subdivision. The commissioner shall, in person or by deputy or agent, have free access at all reasonable hours to any place, building or vehicle in which prohibited species may be harbored. The commissioner shall have general authority to administer and enforce the provisions of this subdivision and the rules adopted under this subdivision, and to prosecute violations thereof.

430:56 Hearings. When the commissioner learns of any violation of any provision of this subdivision, notice of such violation, together with a copy of the findings, shall be given to the person or persons concerned. Persons so notified shall be afforded a hearing under rules adopted by the commissioner. Affidavits under oath may be received by the commissioner.

430:57 Penalties.

I. Any person who is convicted of violating any provision of this subdivision or rule adopted under this subdivision shall be guilty of a misdemeanor. For any subsequent offense, a person shall be guilty of a misdemeanor if a natural person, or guilty of a felony if any other person.

II. Any person who violates any provision of this subdivision or any rule adopted or order issued under this subdivision shall, in addition, be liable for a civil forfeiture not to exceed \$5,000 for each violation, for each day of a continuing violation, which may be collected in a civil action or in connection with an action for injunctive relief brought by the attorney general.

III. Any person who violates any provision of this subdivision, or any rule or order of the commissioner, shall be subject to the imposition of an administrative fine levied by the commissioner, not to exceed \$1,000 for each violation.

88:2 Effective Date. This act shall take effect upon its passage.

(Approved: April 27, 2000)

(Effective Date: April 27, 2000)

LBAO

00-2030

12/6/99

HB 1258-FN - FISCAL NOTE

AN ACT relative to invasive plant, insect, and fungal species.

FISCAL IMPACT:

The Administrative Office of the Courts (AOC), Judicial Council and Department of Corrections have determined this bill may increase state and county expenditures by an indeterminable amount in FY 2001 and each year thereafter. There will be no fiscal impact on local expenditures or state, county and local revenue.

METHODOLOGY:

The AOC stated this bill creates a new category of misdemeanor and felony level offense. The AOC has determined this legislation will have little, if any, fiscal impact on the Branch as it will not significantly impact caseload.

The Judicial Council assumed that any cases arising from the enactment of this law for which the Indigent Defense Fund may be liable, will in the first instance be handled by the Public Defender or contract attorneys who accept these cases on a fixed fee basis of \$250 for each misdemeanor charge. If an assigned counsel attorney must be used, the hourly rate of \$60, with a fee cap of \$1,000 for misdemeanor cases will apply. If a motion to exceed the fee cap is approved and/or "services other than counsel" are approved, these will also be chargeable to the Indigent Defense Fund. The Council is unable to predict the number of cases or trials which may arise as a result of the passage of this legislation, therefore, they are unable to estimate the dollar amount of the anticipated costs of such representation.

The Department of Corrections is unable to determine how many individuals would be convicted of a felony and serve time in the state prison. The average cost of incarceration for FY 1999 was \$19,358 per inmate. The average cost of probation/parole supervision was \$842 per offender.

The Department of Agriculture stated any costs of administering this program will be borne by the Department's existing budget. The work falls within the scope of normal activities already being carried out by the Department.

March 3, 2003

Dear Fells member:

We are students of the Community and Environmental Studies program at Colby-Sawyer College and are contacting you for help with our community-based research project The Fells. This project is multifaceted and covers many areas including a natural resource inventory, environmental impact studies and flora identification. One of our main interests in completing this research is gathering information about member attitudes and perceptions of The Fells and the future of the Hay Refuge.

To obtain a reliable understanding of member perceptions and attitudes we are conducting a number of in-person interviews. Your name was selected at random from the entire membership list and we are requesting your participation in this interview, which can be held at your convenience. The duration of the interview will be no longer than a half-hour and your participation is absolutely voluntary. The information you may provide will be of great assistance to The Fells' present and future operations. Questions will consider the nature of The Fells and your perception as to what changes may be beneficial to the visitor and member experience. Your identity in relation to your answers will be held in strict confidentiality.

Over the next two weeks we will be calling approximately 20% of the members that received this letter to inquire about being interviewed. You may or may not be contacted by us.

Again, your participation in this survey would be greatly appreciated. If you any have questions about this study, please contact our faculty advisor, John Callewaert, at 526-3793.

Sincerely,

Nathan Bancroft

Bill Doenges

Jon Evans

Lindsay Micarelli

Jamie Irving

Matt Timmons

INTERVIEW QUESTIONS

INTRODUCTORY STATEMENT

WE ARE CONDUCTING INTERVIEWS FOR INFORMATION ABOUT MEMBERSHIP OPINIONS AND PERSPECTIVES ABOUT THE FELLS.

YOU ARE A MEMBER, CORRECT?

IF YOU WOULD LIKE TO CONTINUE PLEASE SIGN THE CONSENT FORM.
(Review consent form with interviewee).

I ALSO HAVE A COPY OF THE CONSENT FORM FOR YOU TO KEEP. THE FORM HAS CONTACT INFORMATION SHOULD YOU HAVE ANY QUESTIONS OR COMMENTS ABOUT THE INTERVIEW AFTER I LEAVE. THE INTERVIEW WILL TAKE NO MORE THAN 30 MINUTES AND YOU CAN STOP AT ANY TIME OR ASK TO SKIP A QUESTION.

THE FIRST SET OF QUESTIONS WILL FOCUS ON YOUR INVOLVEMENT AT THE FELLS.

Note: age, gender

I Member Profile

1. HOW LONG HAVE YOU BEEN A MEMBER OF THE FELLS?
2. WHAT IS YOUR CONNECTION TO THE FELLS?
3. WHY ARE YOU A MEMBER?
4. HOW OFTEN DO YOU VISIT THE FELLS?
5. WHEN WAS THE LAST TIME YOU VISITED THE FELLS?

(IF OVER A YEAR)

6. IS THERE A PARTICULAR REASON WHY YOU HAVEN'T VISITED

RECENTLY?

THE NEXT SET OF QUESTIONS WILL FOCUS ON WHAT YOU BELIEVE ARE SOME OF THE MOST IMPORTANT FEATURES OF THE FELLS.

II Fells Attributes

7. WHAT DO YOU DO WHEN YOU VISIT THE FELLS?
8. WHAT DO YOU REALLY LIKE ABOUT THE FELLS?
9. WHAT DOES THE FELLS CONTRIBUTE TO OR PROVIDE THE COMMUNITY?
10. WHAT FEATURE AT THE FELLS APPEALS TO YOU THE MOST?
11. WHAT DON'T YOU LIKE ABOUT THE FELLS?
12. WHAT IS THE MOST IMPORTANT ASPECT OF THE FELLS?

FOR VARIOUS REASONS A PLAN IS BEING DEVELOPED TO TRANSFER OWNERSHIP OF THE FELLS FROM THE US FISH AND WILDLIFE SERVICE TO ANOTHER ENTITY SUCH AS THE FRIENDS OR A REGIONAL ENVIRONMENTAL ORGANIZATION. THIS IDEA IS SUPPORTED BOTH THE FELLS BOARD AND THE US FISH AND WILDLIFE SERVICE. THIS MOVE WILL PROVIDE OPPORTUNITIES AND CHALLENGES FOR THE FELLS (FOR EXAMPLE, ADDITIONAL INCOME GENERATING ACTIVITIES, PROGRAMMING, AND/OR RESOURCE MANAGEMENT STRATEGIES)

III Transfer

13. TO WHAT DEGREE ARE YOU AWARE OF THESE EFFORTS?
14. WHAT BENEFITS DO YOU SEE FROM SUCH A TRANSFER?
15. WHAT CHALLENGES DO YOU SEE FROM SUCH A TRANSFER?
16. IN WHAT WAY DO YOU FEEL THE TRANSFER WOULD OR MIGHT AFFECT YOUR PARTICIPATION AT THE FELLS?

THE NEXT SET OF QUESTION FOCUSES ON WHAT YOU WOULD LIKE TO SEE IN THE FUTURE AT THE FELLS.

IV Future

17. WHAT PHYSICAL CHANGES WOULD YOU LIKE TO SEE AT THE FELLS?

18. WHAT PROGRAMMATIC CHANGES WOULD YOU LIKE TO SEE?

19. IN ORDER TO IMPROVE THE FINANCIAL SECURITY OF THE FELLS WOULD YOU SUPPORT MORE PRIVATE FUNCTIONS, SUCH AS WEDDING RECEPTIONS? PLEASE RATE YOUR PREFERENCE FOR THE FREQUENC OF SUCH FUNCTIONS ACCORDING TO THE FOLLOWING SCALE

1	2	3	4	5
NOT AT ALL	RARELY	OCCASIONALLY	OFTEN	VERY OFTEN

20. WHAT NEW INCOME GENERATING ACTIVITES WOULD YOU LIKE TO SEE AT THE FELLS?

21. WHAT WOULD YOU NOT LIKE TO SEE?

22. WHAT WOULD YOU LIKE TO SEE HAPPEN AT THE FELLS IN 5 YEARS?

23. WHAT COULD THE FELLS DO TO ENCOURAGE MORE PEOPLE TO BECOME MEMBERS?

24. WHAT DO YOU THINK YOUR FUTURE LEVEL OF INVOLVEMENT WILL BE?

MORE INVOLVED	LESS INVOLVED	SAME LEVEL OF INVOLVEMENT
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THANK YOU FOR YOUR TIME AND PARTICIPATION IN ASSISTING US IN
OUR DATA COLLECTION.

V Wrap up

25. DO YOU HAVE ANY ADDITIONAL COMMENTS OR QUESTIONS?

CONSENT FORM FOR INTERVIEWING HAY REFUGE MEMBERS

Title of project: *Attitudes and Perceptions of Hay Refuge Members*

Name of investigators: Nate Bancroft, Bill Doenges, Jon Evans, Jamie Irving, Lindsay Micarelli, Matthew Timmons
Phone: 526-3793 (John Callewaert, Faculty Advisor)

Invitation to Participate: You are invited to voluntarily participate in this research study. The following information is provided to help you make an informed decision whether or not to participate. If you have any questions, please do not hesitate to ask.

Purpose: We hope to learn about membership perceptions and attitudes of Hay Refuge members, the attributes and personal connections associated with membership, and opinions about the future of the Refuge. This research is approved by the Colby-Sawyer College Institutional Review Board and is supported The Friends of the John Hay National Wildlife Refuge.

Participants: You have been selected to participate in this study because you are a member of the Hay Refuge. We have taken a random sample and your name has been selected.

Procedures: If you decide to participate in this research project, we will be audio recording and transcribing the interviews. Signing this release form permits us, the researchers, permission to use the audiotapes for educational purposes or to use the information gathered in any way necessary to complete our research.

Timetable: The amount of time that will be required of the participant will be no more than thirty minutes.

Benefits: Involvement in this study will result in no direct benefit to the participant, however your contribution could enhance the experience of the Hay Refuge for the future members and visitors. Results of this study will be shared in poster format at the Community and Environmental Studies Expo on Wednesday, April 30 at 3-7PM in Wheeler Hall of the Ware Campus Center, Colby-Sawyer College. Results will also be presented in a presentation at The Fells at 3PM on Monday, May 12.

Confidentiality: Any information obtained during this study, which could identify you will be kept strictly confidential. Responses to interview questions may be published in a portfolio that we will present to The Fells board and may also presented at other professional functions. However, your identity will be kept separate from your comments. At the conclusion of the study all research material will be held solely by John Callewaert.

Right to Refuse or Withdraw: You may refuse to participate and still receive the benefits of membership that you would receive if you were not in the study. You may change your mind about being in the study and quit after the interview has started. You may also refuse to answer any of the questions. If the interview design or use of the data is changed, you will be informed and your consent obtained for the revised research study.

Questions: If you have any questions at this time, please ask them. If you have additional questions later, please contact John Callewaert, Director of the Institute for Community and Environmental Studies, at 526-3793 and he will be happy to answer them at that time.

You will be given a copy of this form to keep for your records. Your signature below indicates that you have voluntarily decided to participate in this research project and that you have read and understand the information provided above.

Participant's signature

Date

Participant's printed name

Investigator's signature

Date

Investigator's printed name

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