

WM. D. COUNTRYMAN
Environmental Assessment and Planning
868 Winch Hill Road
Northfield, Vermont 05663
(802) 485-8421
wdcenv@together.net

Preliminary Wildlife and Wildlife Habitat Assessment Mount Sunapee Resort -- West Bowl Expansion

General

Field work to determine the presence of wildlife and the potential for significant habitats was undertaken on 4 and 13 May 2004. In both instances, investigations began at the summit, the first day concentrating on the area proposed for the ski lift, the second day concentrating on areas to the south and west. On both occasions, observations were made during a 'wander search', with objectives to note any wildlife or wildlife sign, and to characterize the vegetative cover and potential wildlife habitat.

On 4 May, snow cover from a storm the night before extended from the summit to about 750 meters elevation. The day was cool but with increasing sunshine and light wind. The second day, 13 May, was warm and sunny with light wind. Between the two dates, the season had advanced significantly, with development of leaves and spring flora much more evident by 13 May.

Land Use

There is little evidence of past human activity on the upper slopes, with the exception of the hiking trail. Although apparently undisturbed for many years, the number of large trees is small. At ca. 600 meter elevation, a few scattered yellow birch (*Betula alleghaniensis*) measuring as much as 87 cm. diameter (34.25 inches) were noted, but most trees are of modest height and diameter. The coniferous forest on a rocky shoulder near the state park boundary contains a few large red spruce (*Picea rubens*) but such trees are uncommon on the project site.

Uniformity of cover type found at higher elevations is missing below ca. 550 meters where recent cutting has taken place, and evidence of old logging roads and fencelines is found. The southern edge of the study area is bounded by a stone wall, indicating that one side or both was once cleared land. Clearings have grown to brush (primarily brambles, pin cherry and aspen), and the general aspect is of a diverse but broken canopy. The base area is a combination of broken woodlots, old field association and remnant orchards typical of once-settled farmland.

Old growth, as described in Neid, et al. (2003) was not observed on the study area. Isolated large trees were exceptionally uncommon, as noted above. The forest cover above 550 meters was generally uniform in height and apparent age, with a sparse shrub understory. There are few downed logs or dead snags in this forest, indicating a relatively even-aged forest that has developed since logging occurred prior to 1924.

Vegetative Cover

From summit to base, the dominant forest changes in distinct bands from coniferous growth at the summit, northern hardwoods between ca 780 and 480 meters elevation, and mixed growth below 480 meters. The summit forest is primarily spruce-fir (*Picea rubens* and *Abies balsamea*) with numerous birches (*Betula papyrifera*). The northern hardwood community includes beech (*Fagus grandifolia*), paper birch (*Betula papyrifera*), yellow birch (*B. alleghaniensis*) and black cherry (*Prunus serotina*), with sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), hophornbeam (*Ostrya virginiana*) and aspen (*Populus tremuloides*) increasingly common at lower elevations. Below 510 meters, stands of hemlock (*Tsuga canadensis*) and scattered red oak (*Quercus rubra*) appear, and in the vicinity of the proposed base facilities, white pine (*Pinus strobus*) is common.

The high elevation coniferous woods has an understory of small trees of overstory species along with hobblebush (*Viburnum alnifolium*) mountain maple (*Acer spicatum*), red maple (*Acer rubrum*) and mountain ash (*Sorbus americana*) and a mossy ground cover which includes wood sorrel (*Oxalis montana*), Canada mayflower (*Maianthemum canadensis*), blue-bead lily (*Clintonia borealis*), wild sarsaparilla (*Aralia nudicaulis*) and goldthread (*Coptis groenlandica*).

The northern hardwood forest is open, with little in the way of saplings or understory shrubs except for striped maple (*Acer pensylvanicum*) and scattered hobblebush. Typical spring flowers such as Canada mayflower, false Solomon's-seal (*Smilacina racemosa*), Indian-cucumber (*Medeola virginiana*), purple trillium (*Trillium erectum*), painted trillium (*T. undulatum*), twisted-stalk (*Streptopus roseus*), bellwort (*Uvularia sessilifolia*) and yellow violet (*Viola rotundifolia*) occur sporadically in these woods, with blue-bead lily becoming uncommon at lower elevations. Ferns (*Osmunda claytoniana*, *O. regalis*, *O. cinnamomea*, *Thelypteris noveboracensis* and *Polystichum acrostichoides*) occur in the hardwood forests, as do clubmosses (*Huperzia lucidula*, *Diphasiastrum digitatum*, *Lycopodium obscurum* and *L. annotinum*).

The lower section of northern hardwood forest has been logged in the past, and regeneration includes sprouts and saplings of the trees listed above, along with shadbush (*Amelanchier* spp.) and pin cherry (*Prunus pensylvanica*). Hayscented fern (*Dennstaedtia punctilobula*) and bracken (*Pteridium aquilinum*) are common in logged forests and clearings.

Lower elevation forests contain a greater diversity of species. All the higher-elevation species are present, with the addition sweet birch (*Betula lenta*), apple (*Malus pumila*), cottonwood (*Populus deltoides*) and basswood (*Tilia americana*). Several shrub species absent on upper slopes are common at lower elevations, including meadowsweet (*Spiraea latifolia*), steeplebush (*S. tomentosa*), brambles (*Rubus idaeus*, *R. alleghaniensis* and *R. occidentalis*), willows (*Salix* spp.), choke cherry (*Prunus virginiana*) and hawthorn (*Crataegus* sp.). Weedy non-native species are common at the base.

One species listed on the New Hampshire Natural Heritage Bureau proposed list of Endangered, Threatened, Watch, Extirpated and Intermediate Plant Species was noted during field work. A single butternut tree (*Juglans cinerea*) occurs on the north side of the existing access road off Brook Road. The area appears to have been an old house site, and there are likely to be additional butternuts nearby. Butternut is of concern because of the threat posed by canker dieback (*Melanconis juglandis*), a widespread fungus disease that weakens and then kills the tree. The tree noted at Brook Road can likely be avoided and therefore not be affected by the project.

Wildlife Observations

The greatest concentration of wildlife sign was observed in the area where logging operations have recently taken place. While occasional evidence of moose (primarily scat) was noted as high on the mountain as 700 meters, such sign is abundant in the upper area of the cut. In addition, there are localized areas of concentrated bark stripping (mostly on red and striped maple) and browsing on maples, ash, aspen and elm. Evidence of deer was sporadic, consisting of widely scattered pellet groups and occasional browsing.

Pine and hemlock stands at lower elevations were investigated specifically to determine whether there was evidence of use by overwintering deer. The stands tend to be small and fragmented, and the overstory does not appear to be dense enough to prevent deep snows from accumulating or to shield the interior from winter winds. Hemlock foliage, within reach of deer, remained unbrowsed. No deer sign was noted in these stands.

No trees scarred by bears were noted during field work, and potential denning sites appear to be limited to areas with ledges and tumbled stone at higher elevations. Such an area was observed on a small spruce-covered promontory at ca. 700 meters near the southern edge of the project area. Talus-like rocks on the west side of this area could provide shelter for hibernating bears, although no indication of such use was seen (Photo 1). This area is south of the southernmost proposed ski trail, and would not be affected by the project as I understand it.

Bird life at Mount Sunapee is typical of deep forest environments at this latitude. Because field work was conducted in early to mid-May, much of the spring migration had not occurred, however, and most birds observed were resident species (hairy and downy woodpeckers (*Picoides villosus* and *P. pubescens*), chickadees (*Parus atricapillus*), blue jays (*Cyanocitta cristata*), ruffed grouse (*Bonasa umbellus*). Ovenbirds (*Seiurus aurocapillus*) are common in the northern hardwood forests. The extensive hardwood forests can be expected to provide habitat for numerous migratory and resident species.

Two partial twig nests were noted in tops of beech trees near the hiking trail at ca. 660 meters (Photo 2). There was no evidence of recent use (fresh twigs, feathers or droppings near the nests, so it was assumed that they were built last year. Being incomplete, the nests were not identifiable as to species. The fact that there were two nests, in trees that

did not stand appreciably above the general canopy, would tend to eliminate raptors as the builders, and I conclude that they were most likely built by great blue herons (*Ardea herodias*).

Miscellaneous observations included evidence of porcupine (*Erethizon dorsatum*) in a small hovel beside a tote road, and a red-bellied snake (*Storeria occipitomaculata*) at ca. 480 meter elevation.

Summary

With the exception of a few scattered large trees, the area appears to have a history of timber operations: prior to 1924 on state park lands, and within the past 20 years on remaining properties. No areas answering to the description of old growth forests as used in Neid, et al. (2003) were observed.

One plant species of concern to the New Hampshire Natural Heritage Bureau was noted next to Brook Road. A single butternut tree occurs at an old house site north of the existing access road, but it appears to be far enough from the road not to be affected by improvements that might take place on the existing footprint. Before work is done, the tree (and any others nearby) should be flagged and a suitable protective buffer established.

The most significant wildlife observation was the two twig nests, possibly built by great blue herons, in tree tops at ca. 660 meters near the Summit Hiking Trail. Neither nest appeared to be finished or under active construction, but their presence indicates potential use of these woods for nesting by such birds. If the nests were active, a large buffer zone would be recommended within which no human activity should take place. Here, however, the birds who built these nests were acclimated to an active hiking trail lies a few yards away.

Wildlife on this parcel is typical of large wooded tracts in the state. Moose are the most obvious large animal, and the species is having impacts on woody plant succession where there is concentrated activity. A broad zone at ca. 540 meters (the upper edge of areas that have seen logging operations) is heavily used by moose, and ash, maples, elms, yellow birches and hophornbeams are especially affected by browsing. Bark stripping on striped maple and red maple is locally common.

Deer sign is light across most of the site, with pellet groups and evidence of browsing uncommon. Areas used by deer as overwintering habitat was not observed on the project area. Pine and hemlock stands occur at the lowest elevations, but they are fragmented and have relatively open canopies. In most instances where hemlocks, a favored browse species, occurs, foliage at heights available to deer showed only sporadic evidence of browsing.

Conclusions

The principal impact of the proposed ski trail development on wildlife will be the fragmentation of a relatively uniform forest. Certain deep-woods species of birds may be affected, depending on the width of the trails, but the number of species is likely to be increased as extensive "edge" habitat is created on both sides of all trails. In addition, the trails themselves will offer openland habitat that is currently not available.

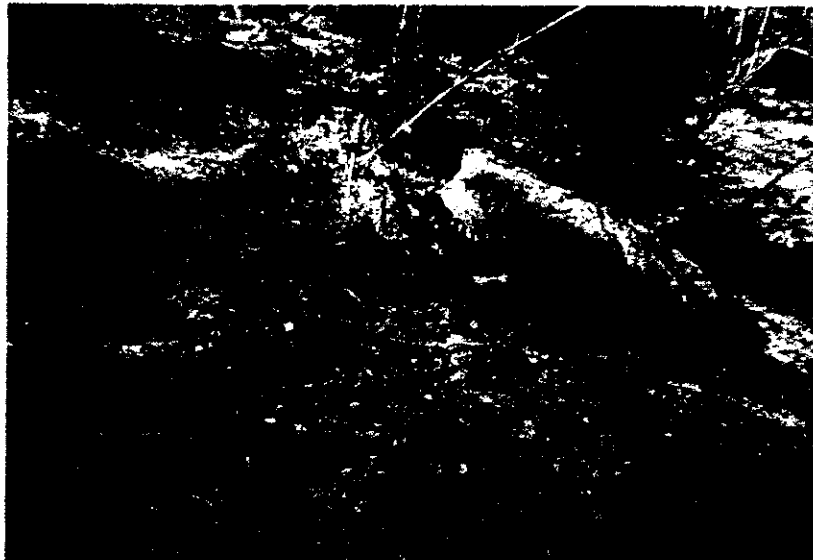
Edge habitat will also provide ample browse for deer and moose, and both species can be expected to increase in numbers. There should be minimal impact on other species of resident mammals.

Literature Cited

Neid, S.L., D.D. Sperduto and K.F. Crowley. 2003. Natural Heritage Inventory of the East Bowl at Mount Sunapee State Park. A report submitted to the State of New Hampshire by the New Hampshire Natural Heritage Bureau. DRED Division of Forests & Lands and the Nature Conservancy. Concord.



Photo 1. Partial twig nests in beech trees, near Summit Hiking Trail at ca. 660 meters.



Isolated rock at ca. 675 meters, midway between proposed lift line and park boundary. With the exception of a rocky promontory at ca. 700 meters near the southern edge of the project area, such rock was rare, but could offer denning sites for black bear.

Characteristic Plant Species Mount Sunapee West Bowl Expansion

TREES

Eastern white pine	<i>Pinus strobus</i>	Scattered mid-slope, in stands at base
Eastern hemlock	<i>Tsuga canadensis</i>	Scattered mid-slope and below, occasionally in small stands
Balsam fir	<i>Abies balsamea</i>	Co-dominant at higher elevations
Red spruce	<i>Picea rubens</i>	Co-dominant at higher elevations, scattered individuals at mid-slope
Trembling aspen	<i>Populus tremuloides</i>	Minor component at lower elevations
Bigtooth aspen	<i>Populus grandidentata</i>	Scattered
Butternut	<i>Juglans cinerea</i>	One tree near Goshen Road entrance
Hophornbeam	<i>Ostrya virginiana</i>	Minor component at lower elevations
Black birch	<i>Betula lenta</i>	Uncommon
Yellow birch	<i>Betula alleghaniensis</i>	Co-dominant in mid to upper level deciduous woods
Paper birch	<i>Betula papyrifera</i>	Co-dominant at high elevations, common at mid-slope
Gray birch	<i>Betula populifolia</i>	Lower elevations
Beech	<i>Fagus grandifolia</i>	Common, often dominant, component of northern hardwood stands
Red oak	<i>Quercus rubra</i>	Minor component in NHW stands
American elm	<i>Ulmus americana</i>	Minor component, lower elevations
Mountain ash	<i>Sorbus americana</i>	Common at higher elevations
Shadbush	<i>Amelanchier</i> sp.	Occasional
Black cherry	<i>Prunus serotina</i>	Common species, lower mid-slopes and above
Hawthorn	<i>Crataegus</i> sp.	Uncommon; lower elevations
Apple	<i>Malus pumila</i>	Lower elevations (old farm sites)
Striped maple	<i>Acer pensylvanicum</i>	Common species lower mid-slopes and above
Sugar maple	<i>Acer saccharum</i>	Common below conifer belt
Red maple	<i>Acer rubrum</i>	Common
Basswood	<i>Tilia americana</i>	Uncommon, below mid-slope
White ash	<i>Fraxinus americana</i>	Common on bottom 2/3 of mountain

SHRUBS

Willows	<i>Salix</i> spp.	Occasional, along watercourses
Beaked hazelnut	<i>Corylus cornuta</i>	Common mid-slope and below
Currant	<i>Ribes</i> sp.	Occasional
Meadowsweet	<i>Spiraea latifolia</i>	Frequent, mid-slope and below
Steeplebush	<i>Spiraea tomentosa</i>	Uncommon, lower slopes
Shadbush	<i>Amelanchier</i> sp.	Occasional, lower 2/3 of mountain
Blackberry	<i>Rubus alleghaniensis</i>	Frequent
Black raspberry	<i>Rubus occidentalis</i>	Lower elevations
Raspberry	<i>Rubus idaeus</i>	Lower elevations
Dewberry	<i>Rubus hispidus</i>	Lower elevations
Choke cherry	<i>Prunus virginiana</i>	Near base
Pin cherry	<i>Prunus pensylvanica</i>	Common from mid-slope & below

Mountain maple	<i>Acer spicatum</i>	Common understory tree
Low sweet blueberry	<i>Vaccinium angustifolium</i>	Clearings at lower elevations
Elderberry	<i>Sambucus</i> sp.	Scattered
Hobblebush	<i>Viburnum alnifolium</i>	Abundant at higher elevations
Mtn fly honeysuckle	<i>Diervilla lonicera</i>	Occasional

HERBACEOUS

Shining clubmoss	<i>Huperzia lucidula</i>	Common at higher elevations
Ground-cedar	<i>Diphasiastrum digitatum</i>	Occasional at lower elevations
Princess-pine	<i>Lycopodium obscurum</i>	Occasional at lower elevations
Bristly clubmoss	<i>Lycopodium annotinum</i>	Occasional
Long beech-fern	<i>Phegopteris conectilis</i>	Occasional
Cinnamon fern	<i>Osmunda cinnamomea</i>	Common
Interrupted fern	<i>Osmunda Claytoniana</i>	Common
Hay-scented fern	<i>Dennstaedtia punctilobula</i>	Common in cutover areas
Sensitive fern	<i>Onoclea sensibilis</i>	Common at lower elevations
Bracken	<i>Pteridium aquilinum</i>	Common in clearings & edges
Canada mayflower	<i>Maianthemum canadense</i>	Common
False hellebore	<i>Veratrum viride</i>	Occasional in wet sites
Blue-bead lily	<i>Clintonia borealis</i>	Common, esp. at upper elevations
Purple trillium	<i>Trillium erectum</i>	Occasional
Painted trillium	<i>Trillium undulatum</i>	Uncommon
Indian-cucumber	<i>Medeola virginiana</i>	Common
Twisted-stalk	<i>Streptopus roseus</i>	Occasional in hardwood forests
Bellwort	<i>Uvularia sessilifolia</i>	Common
False Solomon's seal	<i>Smilacina racemosa</i>	Common
Goldthread	<i>Coptis groenlandica</i>	Common
Buttercup	<i>Ranunculus acris</i>	Common at lower elevations
Partridgeberry	<i>Mitchella repens</i>	Occasional
Blue-eyed grass	<i>Sisyrinchium montanum</i>	Occasional
Starflower	<i>Trientalis borealis</i>	Common
Mountain sorrel	<i>Oxalis montana</i>	Common at higher elevations
Sarsaparilla	<i>Aralia nudicaulis</i>	Common
Cinquefoil	<i>Potentilla simplex</i>	Common at lower elevations
Strawberry	<i>Fragaria virginiana</i>	Common at lower elevations
Yellow violet	<i>Viola rotundifolia</i>	Common at higher elevations
White violet	<i>Viola blanda</i>	Occasional, damp openings
Blue violet	<i>Viola</i> sp.	Occasional
St. John's-wort	<i>Hypericum perforatum</i>	Occasional
Beechdrops	<i>Epifagus virginiana</i>	Occasional under <i>Fagus</i>
Bunchberry	<i>Cornus canadensis</i>	Occasional
Indian-pipe	<i>Monotropa uniflora</i>	Occasional
Speedwell	<i>Veronica officinalis</i>	Disturbed areas at lower elevations
Rough goldenrod	<i>Solidago rugosa</i>	Common at lower elevations
Ox-eye daisy	<i>Chrysanthemum leucanthemum</i>	Common, lower elevations