



## NEW HAMPSHIRE NATURAL HERITAGE BUREAU

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### **Evaluation of proposed ski lease area expansion on Mt. Sunapee – 11/23/2004**

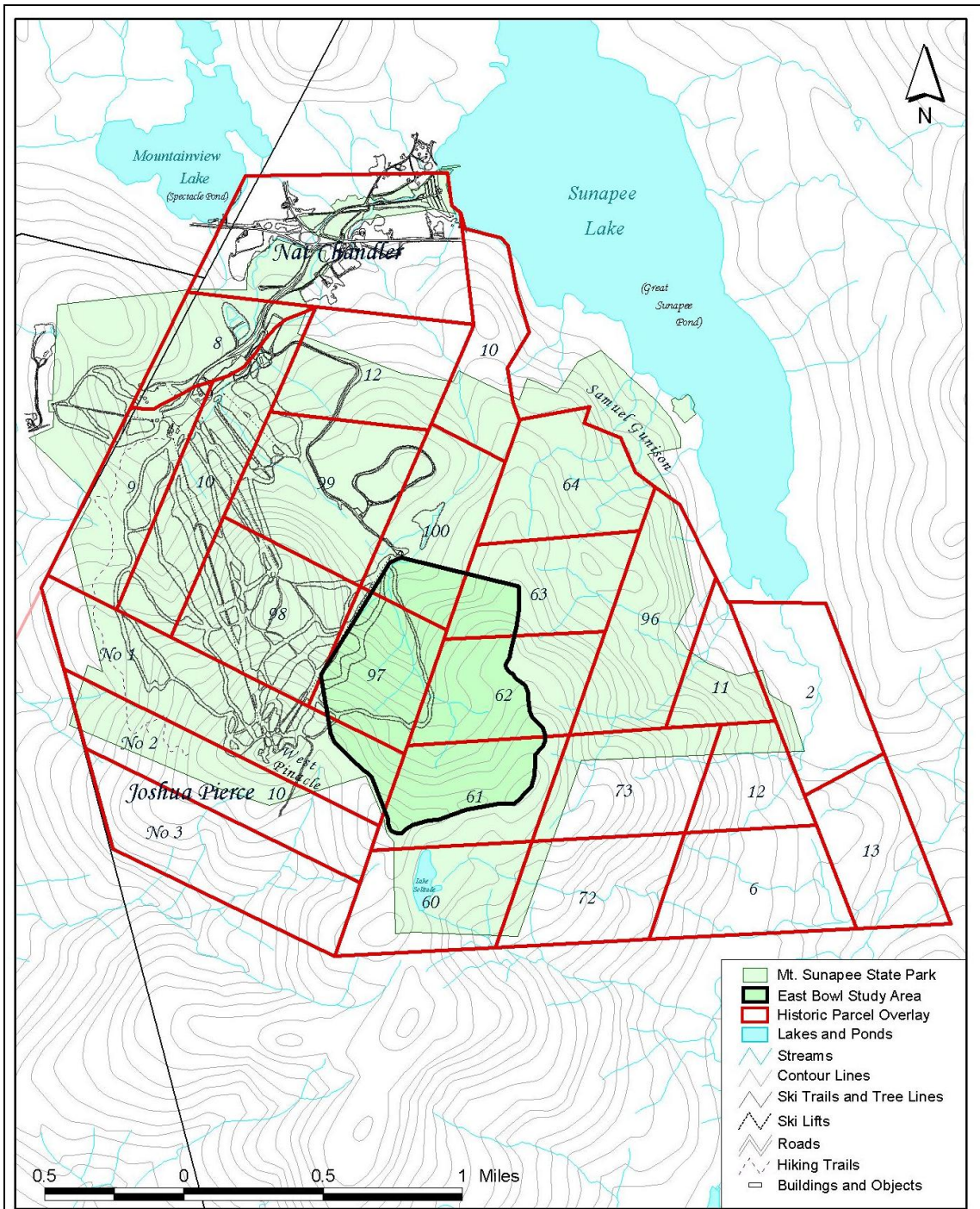
On September 13, 2004 staff from NH Natural Heritage Bureau (NH Heritage) and a volunteer (Chris Kane) conducted a field survey of the newly proposed ski lease area expansion (hereafter proposed expansion) within the current boundaries of Mt. Sunapee State Park. Two areas were assessed: the ~175 acres proposed for addition to the existing Ski Lease area (the so called “west bowl”), and a patch of forest within the current lease area between the Upper Ridge and Beck Brook trails that would also be impacted by the proposed expansion (i.e., the northern section of the “New Ridge Trail”). This patch of forest within the current lease area had been identified in Natural Heritage’s 1999 Sunapee Lease Area report as containing possible patches of old growth spruce forest (see report description of “Polygon 3”), warranting its inclusion in the survey. A second reason for surveying Polygon 3 was that it provided contextual relevance for interpreting the land use history of the broader area.

During the field survey, vegetation data was gathered at 38 observation points and intervening areas, including species composition (trees and understory plants), tree diameters, type and extent of natural communities, site history information, and the extraction of more than 30 tree cores. Tree cores were subsequently mounted and sanded, tree rings counted and patterns interpreted (ages are given as ring counts at breast height). These data were considered in the context of information included in two previous reports on NH Heritage surveys of other portions of Mt. Sunapee State Park. The results of the survey are below:

#### **FOREST HISTORY:**

The lower portion of the proposed expansion area corresponds largely to lot 9, and the upper portion to lots 1 and 2 of Great Lot 10 (see Figure 8 from the Natural Heritage East Bowl Study, below). Polygon 3 within the lease area coincides with lot 1 and perhaps the extreme western corner of lot 98.

There is considerable historical evidence that much of the lower slopes of the mountain has a history of agricultural use (mostly haying and pasturing), timber harvesting, or both. There is no direct evidence of extensive harvesting at the higher elevations 100 to 200 years ago in the historical record. Deed records from 1836 refer to “considerable growth of timber” [that is] “rough...and hard to get off” for lot 98; there is evidence of pasturing and homesteads on the western portions of lots 1 and 2 but not at the higher elevations. In addition, Herbert Welsh’s descriptions (ca. 1907) of the upper slopes of the mountain indicated that both spruce and hardwoods were still standing here in their “primeval condition”. In 1907-1908, Emerson Paper



**Figure 8.** Digitized lot boundaries based on Willey (1809; Figure 7).



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(Figure 8 from former report)

Co. took ownership of lots 1 – 3 of Great Lot 10, and in 1908 released the standing hardwood timber rights to the Draper Company on these lots (retaining the softwood rights). Also in 1908, Emerson released all timber rights on the eastern portion (only) of lot 98, thus retaining rights to timber on western portion. In 1911, many of the surrounding lots and timber rights were acquired by the Forest Society from Emerson and/or Draper (61, 62, 97, 98, with softwood rights retained by Emerson on lot 98) and from International Paper (58, 59, 60, and lots 4 & 5 of Great Lot 10). Thus, during the period from 1911 to 1924 Emerson had the softwood rights on lots 1 and 2, and Draper had the hardwood rights. In 1924, these lots and “...all of the remaining rights and privileges conveyed to the Draper Company...” were transferred to the Forest Society.

### **CURRENT FOREST CONDITION:**

The field survey was corroborative with the historical evidence summarized above. The lower elevations (< 1800 ft.) of the study area consist of moderately young to maturing forests (all < 130 years), much of which was formerly pastured, and almost certainly cut throughout. These areas included an extensive successional stand of red spruce and hardwoods (old pasture); other areas were typified by *hemlock - beech - oak - pine forest*, *hemlock - spruce - northern hardwood forest*, and *sugar maple – beech – yellow birch forest*.

Above 1800 ft, four areas, or polygons, were identified as having potential ecological significance, which are described here as Polygons A, B, C, and D (see map, below).

#### **Polygon A**

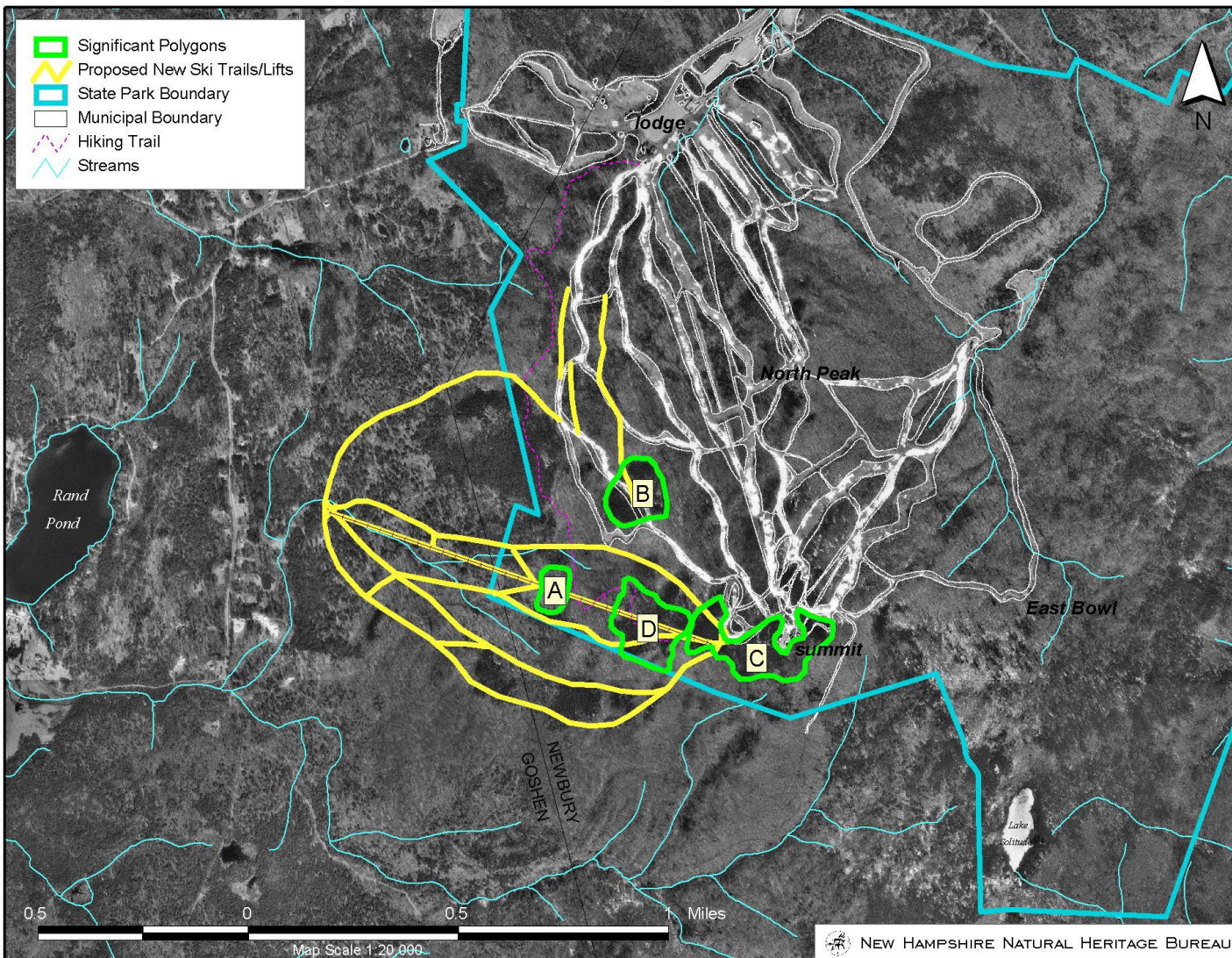
Below the hiking trail above about 1800 ft., there is a mature 4-acre stand of *northern hardwood - spruce - fir forest*. This stand has large, mature *Acer saccharum* (sugar maple), *Fagus grandifolia* (American beech), and *Picea rubens* (red spruce). The large hardwoods cored here were 103, 137, 141, and 188 years of age. One cored spruce in this area was 303 years old, and stump counts of blown-down (dead) spruce were in the vicinity of 130, 150, and 200+ years of age. This area may have been logged for hardwoods by Draper sometime from 1911-1924 during which time most or all of the current 100-140 year old hardwoods here would have been young and not particularly desirable (the oldest hardwood would have been about 14” DBH). Draper did not have softwood rights, but if Emerson had been to this site during this time period for softwoods, they almost certainly would have taken the spruce as it was common practice at the time to take spruce greater than 7 inches for pulp (the spruce would have been 50 – 200+ years old). The surrounding areas are younger and appear to have been cutover and/or hard-hit by the 1938 hurricane; there is no apparent reason why the hardwoods in this part of lot 1 and 2 would have been passed over while the surrounding areas were cut. Thus, we conclude that the forest in Polygon A is likely to have been harvested for hardwoods sometime between 1911-1924 and, as a maturing forest with few older trees, is of local but not statewide significance.

#### **Polygon B**

Polygon B consists of an 11-acre patch of spruce forest within Polygon 3 of the Ski Lease area. The forest of Polygon B is dominated by moderate to large sized red spruce, with most of the ages of cored trees between 89 to 142 years (89, 100, 110, 115, 121, and 142). One tree was 242 years old. There was little dead and downed wood typical of most old growth forests. The forest structure, the age structure, and the fact that some of the trees showed a period of release ca. 91-92 ybp is consistent with the idea that Emerson probably cut this forest over for mature spruce around 1912 during which time they had the spruce rights on the lots involved. As with Polygon A, this forest is not considered to be of statewide significance.



# Areas of Potential Ecological Significance in the Proposed Mt. Sunapee Ski Lease Expansion Area



### **Polygon C**

Located on the upper slopes of the proposed expansion area, Polygon C consists of a moderately young 21-acre patch of *high-elevation spruce - fir forest*, which probably regenerated from heavy hurricane blowdown. This assessment is consistent with reports that only the ridgelines of Mt. Sunapee were severely impacted by the 1938 Hurricane. Although this forest does not contain old trees, Polygon C is considered to be ecologically significant in a statewide context as it is one of only a few known examples of *high-elevation spruce - fir forest* south of the White Mountains. However, given that this polygon is small, isolated, and in very close proximity to existing ski trails, it is of lesser significance when compared to other statewide significant examples in the White Mountains.

### **Polygon D**

To the north of younger hardwoods, and west (downslope) of the *high-elevation spruce - fir forest* (Polygon C), is a mature, possibly old-growth patch of *northern hardwood - spruce - fir forest*. This forest was spared from severe impact from the 1938 hurricane, although the hardwoods may have been impacted. Most of the hardwoods are of moderate size, with scattered large, stag-headed yellow birch that were mostly rotten at the core and difficult to age (see photos, attached). Large red spruce are common in this forest, ranging in age from 129 to more than 200 years (6 of 8 cored spruce trees exceeded 170 years). It is unlikely that the spruce in this forest would have been passed over by Emerson Company if this part of lots 1 and 2 were harvested for spruce in the early part of the 1900s (when they retained softwood rights). Had this stand been harvested, the age and stand structure would have been closer to that exhibited in Polygon B.

Although this polygon's size (16 acres) is small compared to other old growth *northern hardwood - spruce - fir forests* in the state, and ski trails and roads to the north are fragmenting features, Polygon D is considered of statewide significance for the following reasons: 1) the condition is good to very good in that it appears to have never been logged (indicators of this are the forest history, the considerable dead and downed woody debris, and the old trees); 2) even small patches of old examples of this natural community type (*northern hardwood - spruce - fir forest*) are rare in throughout central and southern NH; 3) it is part of a larger mosaic of mature and old growth patches of exemplary forest on Mt. Sunapee; and 4) it is contiguous with and forms the northern extent of the large, un-fragmented forest block to the south (the Sunapee-Pillsbury Highlands).



**Images of Polygon D, 2004**



**coring a red spruce**



**yellow birch**





**“stag-headed” yellow birch**





landscape