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## NEW HAMPSHIRE NATURAL HERITAGE BUREAU

DIVISION OF FORESTS & LANDS - DRED

PO Box 1856 -- 172 PEMBROKE ROAD, CONCORD, NH 03302-1856

(603) 271-2214

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**To:** Jeffrey J. Rose, Commissioner

**Via:** Brad Simpkins, Director, Division of Forests & Lands

**From:** Sabrina Stanwood, Administrator

**Date:** January 26, 2015

**Subject:** Addendum to 2004 report on Mt. Sunapee State Park

In November 2014, staff from the Natural Heritage Bureau (NHB) conducted preliminary assessments at Mt. Sunapee State Park (MSSP) and reevaluated the condition of the forest in portions of the West Bowl of Mt. Sunapee that was first surveyed in 2004. In addition, NHB was requested by Mount Sunapee Resort to gather information on land adjacent to MSSP. The following is an addendum to the 2004 NHB report.

According to the Native Plant Protection Act (RSA 217-A:7), state agencies are required to work together to protect New Hampshire's native plants and exemplary natural communities. It states that "All state agencies, consistent with their authority and responsibilities, shall assist and cooperate with the commissioner to carry out the purposes of this chapter. To the extent possible actions funded or carried out by state agencies shall not jeopardize the continued existence of any protected plant species or exemplary natural community."

In 2003 and 2004, several areas in Mt. Sunapee State Park were documented as components of an exemplary natural community system. The approach that NHB applied in all of the surveys was to analyze the forest community and/or system types for the criteria that determine whether their exemplary: size, condition, and landscape context. RSA 217-A:3 defines exemplary natural communities as a viable occurrence of a rare natural community type or a high quality example of a more common natural community type as designated by the Natural Heritage Bureau based on community size, ecological condition, and landscape context.

### **Highlights of the 2003 NHB Survey/Report:**

In 2003, eastern portions of the Mt. Sunapee State Park were surveyed, and research conducted on the history and the land management of the area. NHB staff delineated the study areas on MSSP into sections described as polygons. The 2003 study in the East Bowl utilized numeric polygons (e.g. Polygon 23), the 2004 West Bowl studied labeled the polygons with letters (e.g. Polygon D).

Historical documentation from this period describes remnant patches of "primeval forest", particularly in the areas of the South Peak, the North Peak, and the East Bowl. In New Hampshire, primeval or primary forest (i.e., old growth) is rare, and a majority of the known acreage occurs within and north of the White Mountains. Old growth forests are a result of time and natural ecological processes. They result from a lack of or at least very minimal anthropogenic disturbance. Old growth areas harbor a wealth of biological diversity and legacies that do not occur in managed forests. The continued presence of old growth in the East Bowl was strongly supported by NHB's assessment in 2003. The forest in the East Bowl of Mount Sunapee is ecologically significant and was designated as exemplary by NHB as one of the best remaining examples in the state. Containing higher elevation communities (northern hardwoods and northern hardwood-spruce-fir), it is the only exemplary site for this combination of forest types in southern New Hampshire. The East Bowl contains a substantial area that is in old growth condition, which is also very rare, especially for southern New Hampshire.



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To date, the old growth stands on Mount Sunapee are the only old growth forest remnants known to NHB in Merrimack County.

In 2003, NHB recommended the East Bowl of Mt. Sunapee, as well as north-facing slopes to the west and northwest of the East Bowl receive special conservation status as a formally designated Natural Area due to the age of cored trees, condition, rarity, and its role in a larger mosaic of contiguous forest that forms the northern extent of the large, un-fragmented forest block to the south. Following the 2004 survey of western sections of Mt. Sunapee State Park, areas south and west of the summit were added to the existing exemplary ***northern hardwood - conifer forest system***.

### Highlights of the 2004 NHB Survey/Report:

Mt. Sunapee State Park is located at the northern end of a 30,000-acre continuously forested area in southwest New Hampshire called the Pillsbury Sunapee Highlands Corridor. This block of contiguous forest is one of the three largest contiguous forests in southwest New Hampshire that are not bisected or fragmented by roads. The Pillsbury-Sunapee Highland Corridor has rivers that flow into two federally designated watersheds: the Connecticut River (Sugar and Upper Ashuelot rivers) and the Merrimack River (Beards Brook and Warner rivers).

In 2004, NHB first surveyed the West Bowl portion of MSSP, an area on the western slope of the mountain that had been previously identified as part of an expansion of the Mt. Sunapee Resort. The purpose of the survey was to assess the condition of the forest in the West Bowl, particularly in relation to the forest of the East Bowl, which had been identified as mature forest having old-growth characteristics in a 2003 survey.

The areas identified in 2004 that are relevant to the current proposed expansion were originally labeled "Polygon A" and "Polygon D". Polygon A is a patch of four acres of ***sugar maple - beech - yellow birch forest*** around 1800' elevation with numerous large trees, most of which are between 100 and 200 years old. Because of its relatively small size, and presumed history of timber management, Polygon A was considered locally significant, but not an exemplary natural community at a statewide scale.

Higher on the slope, and west of the summit, is Polygon D, a 16-acre patch of ***northern hardwood - spruce - fir forest***. This area was identified as mature, with possible old-growth characteristics. Several cored red spruce (*Picea rubens*) trees were found to be over 170 years old (6 of 8 cored trees exceeded 170 years). The dominance of spruce suggests that this area has never been logged since red spruce was historically selectively logged on Mt. Sunapee, leaving the hardwoods behind. Polygon D was considered statewide significant due to:

- 1) The condition is good to very good in that it appears to never have been logged;
- 2) Small patches of old examples of this natural community type (***northern hardwood - spruce - fir forest***) are rare;
- 3) Polygon D is part of a larger mosaic of mature and old growth patches of exemplary forest on Mt. Sunapee (East Bowl); and
- 4) It is contiguous and forms the northern extent of the large, unfragmented forest block to the south (Sunapee-Pillsbury Highlands).



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Based on these factors, and on the polygon's contiguity with other significant forest patches, Polygon D was recorded in the NHB database as part of the exemplary ***northern hardwood - conifer forest system*** that had been identified in the East Bowl.

### **2014 NHB Surveys:**

Revisits to Polygons A and D confirmed the original assessment of the forest condition. Polygon A was characterized by large hardwoods, particularly sugar maple (*Acer saccharum*) and yellow birch (*Betula alleghaniensis*) with diameters in the 25" range. A ring count of a sugar maple coring determined that it was 156 years old. There were eight other hardwoods in this area around the same size diameter at breast height (dbh) as the cored sugar maple. The hardwood forest between Polygons A and D was characterized by trees that did not appear to be as large or old (generally 12-18" diameter) as those in Polygon A, but was generally mature and in good condition.

Polygon D was generally dominated by red spruce, with scattered hardwoods, primarily yellow birch. Conditions within Polygon D were not uniform, with patches large spruce and birch stems interspersed with smaller trees. Red spruce in the 22-30" diameter range were unevenly distributed, and ages for two individuals based on trees cores were approximately 120 years old. More trees were cored in this polygon in 2004, and six of eight of those showed ring counts exceeding 170 years old.

Adjacent to MSSP is property owned by the Mount Sunapee Resort. The Resort property includes most of the land west of the state park, as well as a relatively narrow (roughly 1,500' wide) strip of land south of MSSP. The proposed ski resort expansion would impact approximately half of this southern strip, as well as portions of the lower slope areas to the west. There is extensive forestland protected through a conservation easement held by DRED south of the narrow strip of land.

The 2014 NHB surveys assessed the condition of this adjacent parcel, focusing primarily on the southern strip. The larger western portion of the property is on lower slopes (mostly below 1,500' elevation), and there were indications of extensive recent forest management, with evident skid trails, cut stumps, and a generally younger age structure. The southern parcel of land is at higher elevation that rises from roughly 1,500' to nearly 2,500', just south of the summit of Mt. Sunapee. The terrain is mostly west- and south-facing slopes, with a few first-order streams.

The forest across most of the southern strip is dominated by northern hardwood species, primarily yellow birch, sugar maple, and American beech (*Fagus grandifolia*). In areas with particularly steep or rocky terrain there are patches that are dominated by red spruce. For the most part, the forest condition in this southern strip was similar to that of the West Bowl downslope of Polygon D with mostly mature hardwoods, but with some evidence of past management. In general, the condition was good, but not exemplary because it lacked old growth characteristics and showed obvious signs of past management activities.

However, in the northeastern corner of the southern strip of Resort property is an area with larger trees that stand out from the surrounding forest. This area, approximately 10 acres, was characterized by a mix of hardwoods and red spruce, with numerous trees having larger (20-35") diameters. Tree cores revealed trees in the 120-year old range, similar to those in Polygon D. Unlike Polygon D, there were at least two old cut stumps observed within this area, indicating that at least a portion of this stand had experienced timber management.



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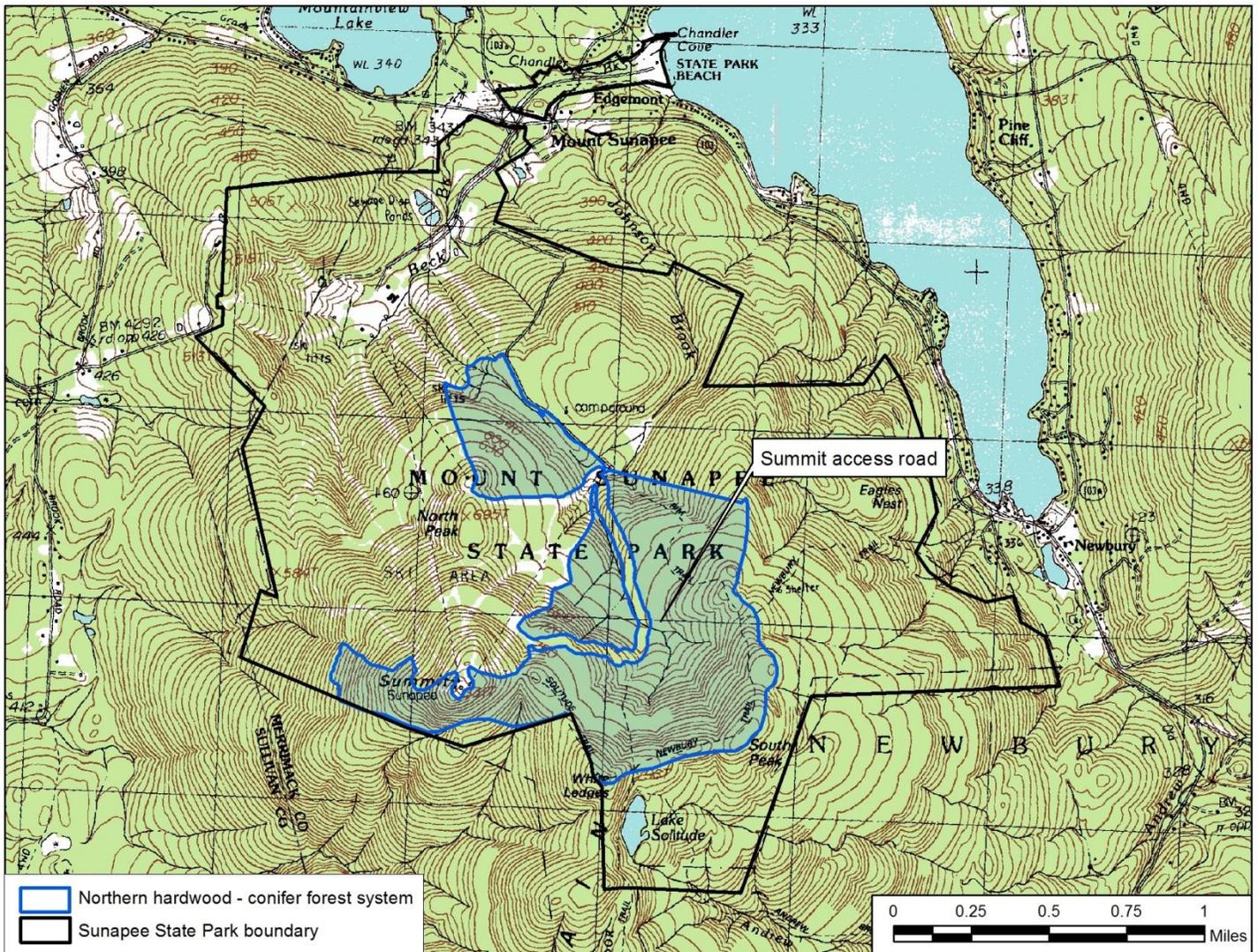
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Due to the condition of this stand, this section may be worthy of inclusion in the exemplary *northern hardwood - conifer forest system* on MSSP. At this location in the far eastern end of the southern strip, the private property is separated from the state park by another area of state-owned land that is a part of the Pillsbury-Sunapee Highlands Corridor. This corridor has never been surveyed by NHB, but could have forest of similar quality that would provide a direct connection to the exemplary forest on MSSP.

There are three natural communities within the exemplary *northern hardwood – conifer forest system* (Image 1) on Mt. Sunapee State Park:

- (1) *high-elevation spruce - fir forest*;
- (2) *sugar maple - beech - yellow birch forest*;
- (3) *northern hardwood - spruce - fir forest*;

**Image 1** Location of exemplary natural community system in Mt. Sunapee State Park





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The sections of mature trees found in the exemplary natural community system add significant value to the larger forest mosaic of Mt. Sunapee. This mosaic in turn has a high ecological value because of its connection to the extensive Sunapee Highlands Corridor. Large, intact systems are more resistant to impacts from natural disturbance, insects and disease, and human disturbance.