Lichen Monitoring

Sandy Wilmot and Tom Simmons
Department of Forests, Parks & Recreation

A relatively new monitoring effort conducted by the Department of Forests, Parks & Recreation uses epiphytic lichen community composition and abundance as a measure of forest health. The relative simplicity of lichens makes them ideal for use as indicators of forest response to environmental conditions.

Lichens are unique in the plant world as being a combination of a fungus and an algae, growing symbiotically. They rely exclusively on the atmosphere as a source of nutrition and moisture. As such they respond to environmental conditions such as light, moisture, and air quality. The lichen community can generally be descriptive of the environmental conditions at a given location (e.g. a dense forest stand would have different lichen species than a forest edge). Lichens have been successfully used to map ground-level effects of pollution around a number of point sources and industrial cities. They have also been used as indicators of regional air quality in the upper Ohio Valley, Connecticut, and in several European countries. Recent work by the National Forest Health Monitoring program has been successful in using lichen communities as indicators of both regional air quality gradients, and regional climatic gradients in the northeast. Since lichen species differ in sensitivity to sulfur dioxide and sulfate, this characteristic is commonly used in identifying potential air pollution effects on forests.

At the Vermont Monitoring Cooperative sites, we are currently compiling baseline data on lichen species and abundance in association with each of the forest health monitoring plots monitored. While the goal is to survey each of the 14 plots on Mount Mansfield and 5 at Lye Brook, thus far 7 plots have been completed on Mansfield. Using methods developed by the National Forest Health Monitoring program, which surveys only foliose and fruticose lichens, we have thus far identified 46 species from Mt. Mansfield. Five species of sulfur sensitive lichens have been found, and have occurred across elevation gradients. Species richness has varied from 11 to 18 species per location. The most commonly found species thus far have been: *Allocetraria oakesiana*, *Evernia mesomorpha* and *Hypogymnia physodes*. One regionally uncommon species, *Punctelia appalachensis* was found.

Data collection in 2001 will complete plots on Mount Mansfield. The Lye Brook lichen survey is planned for 2002. In addition to these sites, 22 NFHM plots statewide are involved in data collection for lichen communities.

Figure 1-3. Overstory tree health in 1997 compared to 4 year averages (baseline) for survey plots at 2 elevations in the Lye Brook Wilderness Area. Tree health indicators include: crown density (Figure 1), crown dieback (figure 2), and foliage transparency (Figure 3). Letters show statistically significant differences between elevations, "*" shows significant differences between baseline and 1997 averages.