ABOVEGROUND BIOMASS AND NUTRIENT CONTENT IN DEVELOPING HARDWOOD STANDS AT BARTLETT EXPERIMENTAL FOREST, NH

Farrah R. Fatemi

State University of New York College of Environmental Science and Forestry, Syracuse, NY 13210
frfatemi@syr.edu

Biomass and nutrient content estimations serve as crucial indicators of the ecological status and economic value of forested ecosystems. A large portion of forests in the U.S. are second-growth and accurate estimates of aboveground biomass and nutrients in these forests are essential for developing land management strategies. In order to predict the future ecological status of forests and develop long-term management plans, knowledge of how biomass and nutrient content may change in forests over time is critical. Although many authors have investigated forest biomass and nutrient content, few have reported these values for relatively smaller trees (<12cm dbh). We have attempted to characterize the biomass and nutrient content status of four developing stands, two of which are approximately 15 years old and two of which are roughly 30 years old (since clear cut).

These stands are located within Bartlett Experimental Forest (BEF) where research activities have been conducted since 1931. BEF is located within the Saco Ranger District of the White Mountain National Forest in New Hampshire. This experimental forest currently encompasses approximately 2,600 acres. Many silviculture projects have taken place at BEF over the last 75 years, making it a prime site to investigate the properties of developing stands.

To characterize biomass and nutrient content in these stands at BEF, five major species were chosen to sample across each age group. In both stand age categories, younger (15 yr old) and mid-age (~30 yr old), the five species sampled included American beech, red maple, yellow birch and white birch and pin cherry. Three trees of each species per stand were destructively sampled, yielding a total of 60 trees sampled. Trees were destructively sampled by cutting as close to the ground as possible with either a chain or bowsaw. These trees were then separated into three major components; bole wood, branches and leaves. Branches were cut from the tree stem and leaves were stripped off of the branches by hand at the petiole. Each of the three components were weighed in the field and then sub-sampled.

Samples will be analyzed for macro and micronutrients including Ca, Mg, P, K, N, C, Mn, Fe and Zn. We will report nutrient content of leaves, branches, wood and bark for each tree species in each age category. We will also develop allometric equations relating aboveground tree biomass, bole wood, branches and leaf biomass to dbh. Nutrient content and biomass estimations for these small trees can contribute to literature significantly, as most previous studies have focused on larger trees in older stands. However, many of the stands in the Northeast are developing and it will be useful for land managers to be able to estimate aboveground biomass and associated nutrient concentrations for trees of relatively younger age and size.