FIRE RESEARCH IN THE PINE BARRENS OF NEW JERSEY

Kenneth Clark[1†], John Hom[1], Nick Skowronski[1], Yude Pan[1], Steve Van Tuyl[1], and Warren Heilman[2]

We are developing an interdisciplinary fire research program based at the Silas Little Experimental Forest in the Pine Barrens of New Jersey to better estimate wildfire risk, quantify the tradeoffs between hazardous fuel reduction treatments and carbon sequestration by forests, and measure the impact of hazardous fuel reduction on emissions of EPA-criterion pollutants near urban nonattainment areas. We are using an integrated network of field plots, fire weather and eddy flux towers, remotely sensed data layers, and validated fire weather and forest ecosystem models. Extensive field plots and LIDAR measurements have been used to estimate fuel loading and the presence of ladder fuels across the Pinelands. In addition, pre- and post-prescribed fire measurements of fuel loading are used to evaluate fuel reduction treatments. These activities provide better estimates of hazardous fuel loading and the cost effectiveness of fuel reduction treatments in the Pine Barrens. We installed and operate six new fire weather towers providing real-time weather data to fire managers over the internet (http://climate.rutgers.edu/stateclim/). A fuel moisture index based on forest energy balance measurements made from the flux towers is operational in New Jersey, and is being tested at a number of Ameriflux sites. We are using the network of fire weather and flux towers in conjunction with a SODAR to measure windspeed and direction up to a height of 700 m to validate predictions of MM5, a regional fire weather model, and smoke emission models. Biometric measurements, flux towers, and ecosystem- to landscape-scale models (PnET CN, BiomBGC) are used to estimate rates of forest productivity and fuel accumulation in the Pine Barrens. Collectively, these data are leading to the "next generation" of fuel models in which the dynamics of 1, 10, and 100 fuels and fuel-reduction treatments are integrated to estimate transitions among fuel models in a GIS database. These research products and other decision-support tools for managers and policymakers enable the latest science-based knowledge to be incorporated into decision processes at local to regional scales.

[1†] USDA Forest Service, Northern Research Station, Northern Global Change Program, Newtown Square, PA 19073, [2]Northern Research Station, USDA Forest Service, East Lansing, MI 48823 [†]Corresponding author; 609-894-0325, email: kennethclark@fs.fed.us.