

## National Forest Improves Project-Level Monitoring with FIREMON

**T**he goal of the Pine Creek Historic Forest Restoration Project on the Wayne National Forest in Ohio is to “create an open forest dominated by large, widely-spaced mast producing trees, in which a broad ecological diversity of vegetation and wildlife occupy the landscape.”

The project proposal is currently under revision following the first round of public comments; however, according to the restoration project’s environmental analysis, the type of open forest structure that the project calls for existed prior to European settlement but, due to a lack of fire throughout the landscape, a dense under- and mid-story has developed, and that, in turn, has resulted in a more shade tolerant ecosystem with an increase in species such as red maple, sugar maple, beech, and spicebush, and decreased oak regeneration.

To reverse these trends and restore the forest to pre-settlement conditions, forest managers on the Wayne have prescribed a variety of silvicultural treatments, including timber harvests, prescribed burns, and thinning projects.

However, to insure that they would be able to accurately monitor the effects of their prescriptions, in 2005, Wayne officials assembled an interdisciplinary team to research and evaluate four project-level monitoring systems—the US Forest Service’s Forest Health Monitoring and Silvah Oak systems, the National Park Service’s Fire Monitoring Handbook, and FIREMON—to determine which one best met their needs.

To compare and evaluate the systems, the team conducted a series of field tests. According to Chad Kirschbaum, a botanist on the Wayne National Forest’s Ironton Ranger District, FIREMON was the favorite.

“FIREMON was the most robust and flexible protocol because it allowed us to measure a variety of life forms,” he said. “It’s very adaptable and allows us to customize some measurement processes according to our needs and other measures that are not part of the FIREMON system.”

FIREMON, (which stands for Fire Effects Monitoring and Inventory System) is a plot-level sampling system designed to characterize changes in ecosystem attributes over time and, according to Duncan Lutes, fire ecologist with the US Forest Service and FIREMON development lead, help managers work more efficiently.

“Bob Keane, a scientist here at the [Forest Service’s Missoula] Fire Sciences Laboratory recognized that managers weren’t accomplishing their mandate of getting monitoring done, and the reason was because there was no tool that incorporated all the components that managers need—a sampling strategy manual, standardized sampling methods, field forms, an Access database, and a data analysis program,” he said.

Although the system was designed for fire effects monitoring at the treatment or project scale, said Lutes, it also could be used to monitor the effects of other projects, such as the effects of a silvicultural treatment on a particular species.

Kirschbaum said that there are currently 234 permanent FIREMON plots on the Wayne National Forest. And, save for the 15 Young’s Branch fuel plots that were measured in 2005 and re-measured in 2007 after prescribed burns, the Wayne’s forest man-



Chad Kirschbaum, Wayne National Forest

**A researcher on the Wayne National Forest collects data in one of the 234 FIREMON plots. The information will be used to help managers restore the forest to pre-settlement conditions—an open forest dominated by large, widely spaced mast producing trees, in which a broad ecological diversity of vegetation and wildlife occupy the landscape.**

agers have only collected the baseline data and are just beginning their work. When the measurement taking is finished, the next steps will be to implement the projects, which include various types of timber harvesting, prescribed burns, and fuels reduction projects, and then re-measure the plots to see how they were affected.

Of those 234 plots, 44 were established and measured to evaluate the effects of a 2003 ice storm. The baseline data collection on these plots was performed by seasonal technicians from Ohio University who found fuel loading that ranged from 8 to 33 tons per acre and averaged 16 tons per acre.

“If the ice storm didn’t happen, 16 tons per acre is higher than would be expected,” said Kirschbaum.

Additional plots are being established and measured this winter on the Athens District, with the objective of covering vegetation management projects with monitoring plots to better evaluate the effects of prescribed fire and timber harvesting.

When measuring the plots, the researchers collect a wide variety of data pertaining to both fauna and flora, including numbers of saplings and seedlings, overstory conditions, herbaceous layer diversity, fuel loads, snags, and counts of birds and

reptiles.

In fact, forest managers on the Wayne are using FIREMON to assess how their projects might affect the habitat of the endangered Indiana bat, which is known to hibernate in an abandoned mine on the forest.

“We have one of two bat hibernacula in Ohio for the Indiana Bat,” said Kirschbaum. “Indiana bats like an open mid-story for foraging, so we use FIREMON plots to measure the amount of mid-story clutter by measuring tree canopy volumes and the relative heights of the trees in the mid- and overstory.”

In addition to FIREMON being adaptable enough for monitoring projects beyond those involving fire, Lutes said that land managers are using the system because it’s easy to share data with their colleagues and partners who may work for different agencies.

“Although FIREMON has been linked to the Forest Service, it’s not just for agency employees. It’s meant for everyone and the Joint Fire Sciences program, which funded the project, intended it for interagency use,” he said. “One of its strengths is that it’s really the only commonly used fire effects monitoring systems used by several agencies, including the Bureau of Indian Affairs, the Bureau of Land Management, the US Fish and Wildlife Service, the National Park Service, the Forest Service, and the Department of Defense. Natural resources professionals who work in academia, state

forestry agencies, tribal forestry, and organizations such as The Nature Conservancy, the Student Conservation Association use it, too.”

The system was developed by the US Forest Service, Missoula Fire Sciences Laboratory, in cooperation with the US Geological Survey, the National Park Service, and Systems for Environmental Management. FIREMON works on any computer running Windows 98, ME, 2000, or XP operating systems. It can be downloaded for free at <http://frames.nbii.gov/firemon>.

Work on the next version of FIREMON, which is called FFI, was recently completed and is available at <http://frames.nbii.gov/ffi>, said Lutes. The new software incorporates the National Park Service’s fire monitoring system and FIREMON into one program.

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*Information about the Pine Creek Historic Forest Restoration Project on the Wayne National Forest is available online at [www.fs.fed.us/r9/wayne/projects/ironton\\_district/pine\\_creek\\_historic\\_project.html](http://www.fs.fed.us/r9/wayne/projects/ironton_district/pine_creek_historic_project.html).*