

DATE: 1 November 2002

TO: Jan Self, Wildlife Biologist
Buffalo Ranger District, USDA Forest Service, Ozark-St. Francis National Forests

FROM: Glen Thomas, Ecologist
Ecospectra Services

RE: Fuelbed Assessments for Prescribed Burns: (1) Big Point — Testing and Comparisons; and (2) Preliminary Results for County Line Burn (CLB), Robinson Road (RR), and Stack Rock (SR)

The answer to your question as to why some of the thirty plots sampled post-burn increased in total loading from their pre-burn values is that it was due, at least partially, to the protracted delay between the collections of pre- and post-burn data. To cleanly compare pre- and post-burn conditions, it is **imperative** to sample both immediately prior to and just after the burn. Although the pre-burn data were collected during late November/early December 2001, the burn was delayed and did not occur until 28 March 2002. The intervening winter period had weather conditions (snow, ice, wind) harsh enough to sufficiently alter the number of fuel particles on the ground. The result of the delay in burning almost certainly confounded — to some degree — our ability to accurately determine fuel changes produced by the burn. To fully correct, we would have needed to refresh the pre-burn data just prior to the burn.

Fourteen (47%) of thirty plots showed an increase between pre- and post-burn loading with a mean **per-plot** (not per acre) increase of 2.28 tons. The remaining sixteen plots showed decreased loading with a mean *per-plot* decrease of 5.29 tons. I have built a spreadsheet showing the exact increases and decreases on a plot-by-plot, category-by-category basis. *However*, our entire purpose for collecting data from these plots has not been to examine changes in individual plots, or even groups of them, but to predict mean loading *per acre*. Therefore, I believe it is much more enlightening — and easier, as well — to understand changes by comparing respective differences (Figure 1) between *per-acre* means for individual pre- and post-burn categories.

On the whole, mean loading per acre increased for *all* 0"-2.9" particles by 0.22 tons per acre. This change is relatively small. However, certain factors may have been compounded to contribute to this rise. Winter conditions may have produced a sizable increase in small (0"-2.9") particles, such that they could not all completely burn. Additionally — and not related to winter weather *per sé* — the pre-burn count was conducted after a large number of leaves from the 2001 growing season had already fallen, which obscured many smaller particles from being readily seen and, therefore, counted. This latter reason, by itself, should hold enough sway to not collect pre-burn data in late fall or early winter unless we are able to adjust collection procedures in some way to gather small-particle data more accurately.

Mean loading per acre decreased for *all* 3"+ particles by 1.98 tons per acre. This decrease was largely due to a 1.82-ton decrease in the mean for 9"-20" particles. The 6"-9" particle category mean increased a relatively small 0.32 tons per acre, but I do not place much, if any, emphasis on this individual gain. With that said, a relatively small number of larger (3"+) particles in a data set can produce substantial changes in respective category mean values — a good reason to always install as many plots as possible, over as large an area as practicable.

Mean total loading for all particle-categories combined decreased by 1.76 tons per acre. Of all the categories, only the non-particle ones, duff and fuelbed — which, in planar loading reports, are measured in terms of depth, not weight — showed statistically significant decreases. Using paired *t*-testing, duff showed a significant ($t = 4.46$, $P < 0.05$) decrease of 0.62 inches, and fuelbed showed a significant ($t = 14.22$, $P < 0.05$) decrease of 2.25 inches.

Additionally, preliminary fuel loading results are included for the following: County Line Burn, Robinson Road, and Stack Rock (Figure 3).

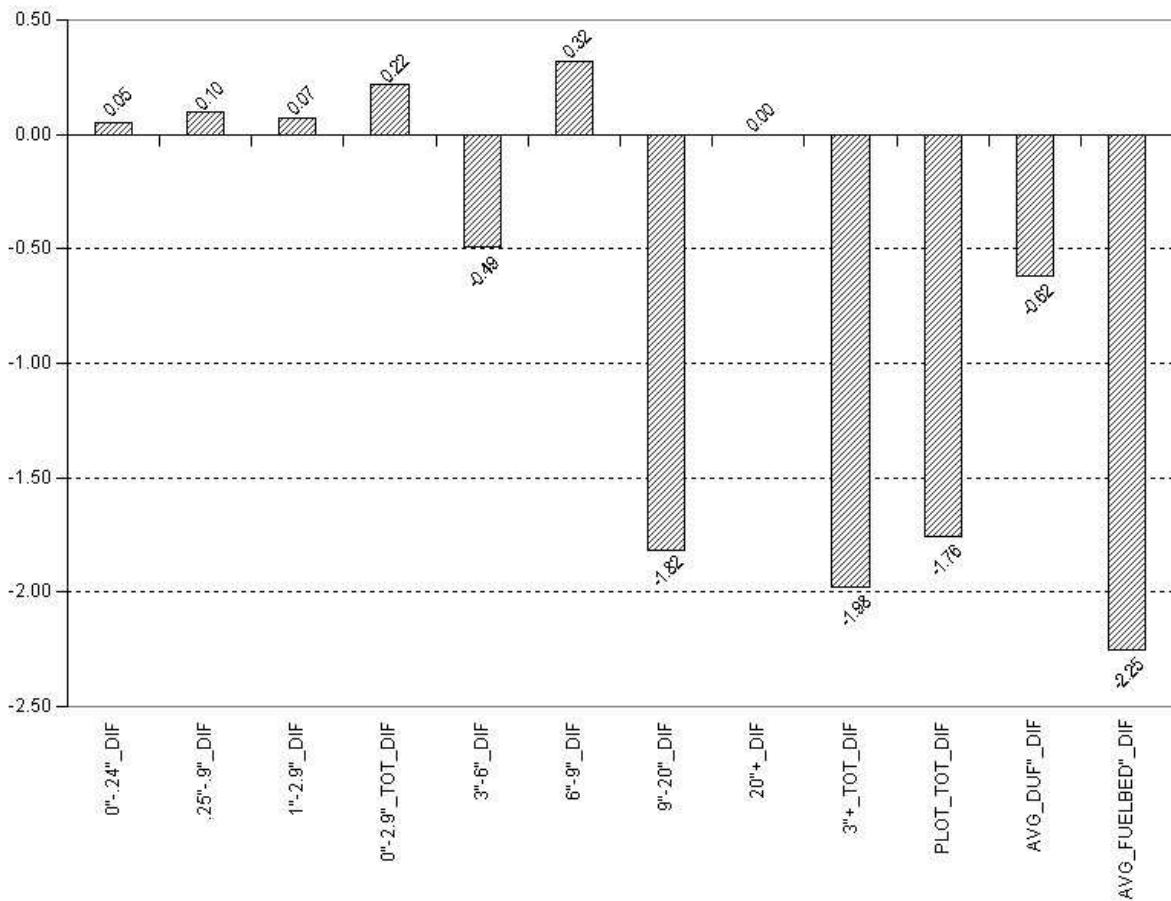


Figure 1. Differences (e.g., \bar{X} post-burn) - \bar{X} pre-burn) between pre- and post-burn mean loading values (tons per acre for counted particles; depth in inches for duff and fuelbed) for the 28 March 2002 prescribed burn at Big Point, Buffalo Ranger District, Ozark-St. Francis National Forests.

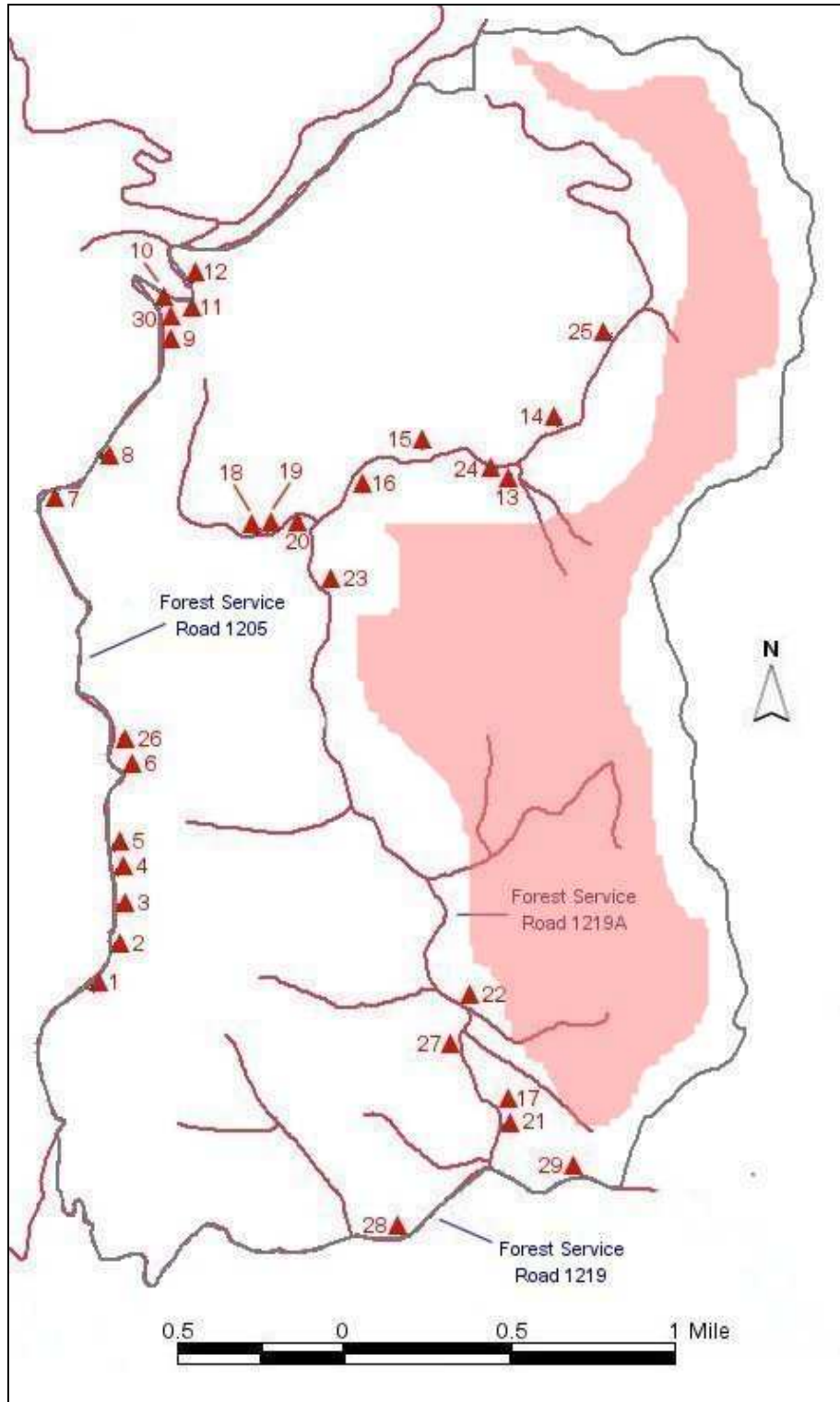


Figure 2. Big Point Map

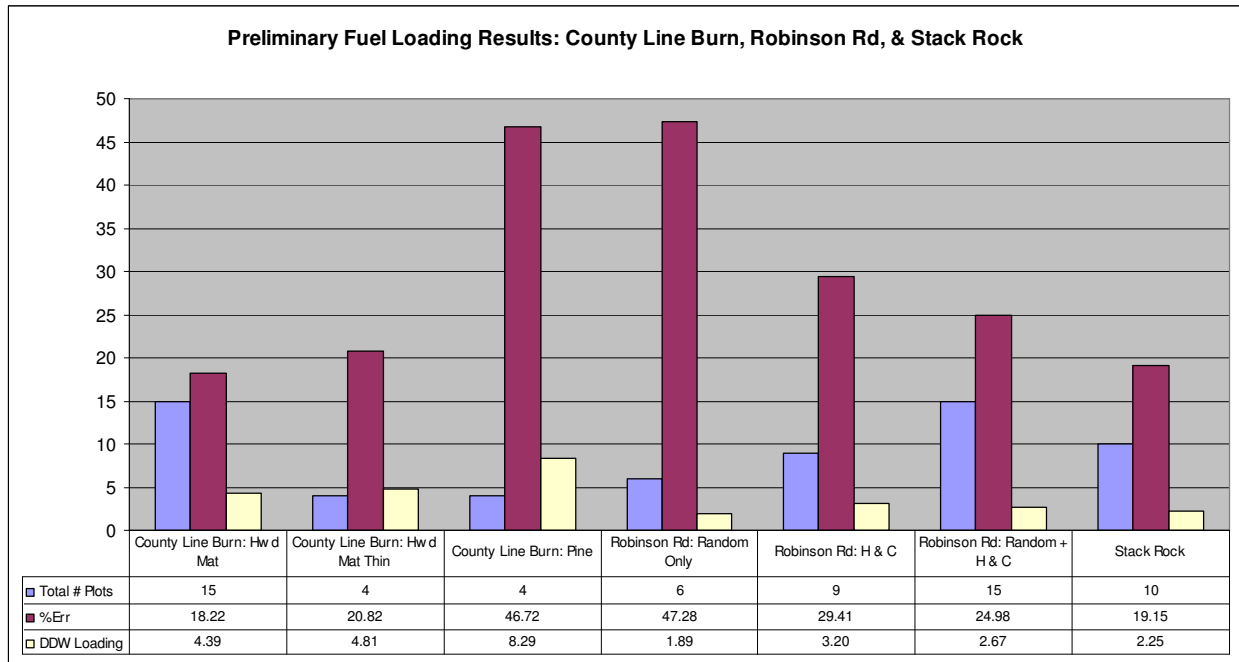


Figure 3. Preliminary Fuel Loading Results: County Line Burn (mature, mature-thinned, and pine plots), Robinson Road ([1] fuels data collected randomly among forest-types and [2] collected in mixed hardwood-conifer stands), and Stack Rock (forest-type descriptions unavailable). Data collected prior to scheduled prescribed burning.