Comment on "Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk"

B. N. Baird

Based on limited sampling 2 years after the 2002 Biscuit Fire in Oregon, Donato *et al.* (Brevia, 20 January 2006, p. 352) concluded that postfire logging reduced seedling regeneration by 71%. Analysis of the study methodology and raw data suggest that this estimate is statistically flawed and misleading and says nothing about the impacts of more prompt postfire harvest.

Donato *et al*. (*1*) reported results from small sections of forest studied 2 years after the 200,000-ha 2002 Biscuit Fire in central Oregon. They cited data collected over a 1-year interval comparing conifer seedling survival and woody debris remaining before and after logging and in control sites that were left unharvested. Based on this limited spatial and temporal snapshot, the authors offered a quantitative estimate of the effects of salvage logging that is potentially misleading and statistically unsound. Their conclusions also fail to consider the potential beneficial or adverse effects of harvest conducted much more promptly after fire, a practice that is commonplace on lands throughout the Pacific Northwest.

Donato *et al*. reported that postfire logging reduced seedling regeneration by 71%, but the methods they used to arrive at this figure are questionable. Close inspection of the raw data [see table 1 in (*2*)] reveals that Donato *et al*. arrived at their 71% figure by comparing preharvest values from one plot with postharvest values obtained in a completely different plot. Absent other information about plot selection or characteristics, it is inappropriate to compare pre- and postharvest values from different plots and attribute causation entirely to logging or to suggest that this one comparison is indicative of logging effects in general. The validity of the 71% figure is further vitiated by the broad range of percent changes in seedling survival across both logged and unlogged plots [table 1 in (*2*)]. In five of the seven unlogged sites, substantial seedling loss, as great as 56%, occurred, perhaps due to factors such as heat mortality or grazing. Thus, even when pre- and posttreatment measures are assessed for the same plots, it is misleading to attribute the entirety of seedling reductions observed over a 1-year period to harvest alone, because some mortality would likely have occurred in the absence of harvest.

There are also questions about the appropriateness of the statistical tests employed in this study. Donato *et al*. tested the significance of their results using the Wilcoxon signed rank test. In doing so, they failed to use a multivariate, repeated measures statistical procedure when they have clearly followed a multivariate research design. By using two or more univariate tests, the Donato *et al*. analysis erroneously inflates the error rate. When a more appropriate Between-Within Repeated Measures Analysis of Variance is performed comparing condition (i.e., unlogged versus logged) by time, the results fail to achieve significance

Although there are a number of ways the data presented in (*1*) could be analyzed, Donato *et al*. drew their conclusions based on very small data sets assembled over a short period of time and using methodologies that cannot sustain the sorts of causal statements made by the authors. Assessments about the ecological importance of postfire logging based on such limited sampling and narrow study design should therefore be considered with due caution. Furthermore, results of this study should not be used to make broad inferences about the impacts of other postfire harvest practices on forest health and recovery.

U.S. House of Representatives, 1421 Longworth House Office Building, Washington, DC 20515, USA.

References

1. D. C. Donato *et al.*, *Science* **311**, 352 (2006).
2. D. C. Donato *et al.*, *Science* **313**, 615 (2006); www.sciencemag.org/cgi/content/full/313/5787/615c.

15 March 2006; accepted 6 July 2006
10.1126/science.1127481

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Science **313** (5787), 615.
DOI: 10.1126/science.1127481