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Northern Region
California Department of Forestry and Fire Protection
6105 Airport Road
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re: Comments on Revision or Amendment of Lookout THP 2-06-173-TEH(5)

To whom it may concern:

These comments are submitted on the Lookout THP (2-06-173 TEH). Specifically, I have reviewed the “Plant Diversity Study Results” authored by Cajun James (March 12, 2007). These study results were submitted by Sierra Pacific Industries to the California Department of Forestry and Fire Protection, and are cited in the Lookout THP. As noted in detail below, I find these results to be incompletely described and documented. Because of these deficiencies, the claims made about biological diversity in harvest units made on page 1 of the study can not be supported.

I have a B.A. in Botany from the University of California, Berkeley and a Ph.D. in Biology from the University of California, Los Angeles. I am a professional biologist with over 14 years experience evaluating native plant resources in El Dorado County and throughout California. My expertise includes over 10 years experience reviewing and analyzing land management plans and the application of the National Environmental Policy Act and the California Environmental Policy Act to project planning. I have served as a native plant expert on county advisory committees and provided expert advice and technical assistance to government and non-profit agencies on native plant resources.

Establishing Cause and Effect

The study attempts to infer the status of biodiversity as a result of treatment by comparing “treated” stands to “adjacent forest stands.” The “adjacent forest stands” are presumably intended to serve as a control for this study. “Adjacent forest stands” are not defined in the study. Their management history and process for selection are not disclosed. These factors are critical to the evaluation of treatment effect. The management history and developmental stage of the “adjacent forest stands” could significantly influence the numbers and types of species present. For example, if the “adjacent forest stands” were dominated by young, dense forest, the understory diversity would likely be low. This stage of development in mixed conifer forests in California generally contains the least diversity, because the early seral

species have been shaded out. There is low structural diversity as well, which also minimizes the niche habitats that drive species diversity. The management history of the “adjacent forest stands” is also relevant. Stands that historically have undergone treatments to limit vegetation (e.g., herbicide use or plant removal practices) are likely a different representation of understory vegetation compared to untreated stands. The history of the “control” stands is not disclosed and this can not be evaluated. Further the means by which the “controls” were selected is not disclosed. Typically, the bias that can be introduced by the experimenter through the selection of controls is eliminated or minimized by adopting a process to select control and treatment areas. No such process is disclosed.

The sampling design for the study also is not disclosed. The study refers to “complete floristic surveys” but does not define what this means. It could mean that 100% of the area was surveyed for all plant species present, or it could mean that some portion of the area was surveyed for all plant species present. The distinction between these two approaches is significant since the former implies that the entire population of species has been surveyed and the later is a sample of the population. In the later case, sampling design of the control and treatment areas is critical to the elimination of bias and to ensure that the sample is representative of the population. Clearly described and repeatable methods to gather data are necessary to eliminate experimenter bias. These practices are also the foundation of credible research.

The process used to analyze the results also is not disclosed. There is reference to statistical similarity among the floristic results from plantations, but there is no discussion of the statistical analysis used or a report of the statistical findings. The appropriate use of statistics in experimental studies is entirely dependent on the sampling and treatment design. In the absence of any disclosure and discussion about the analytical methods used, the legitimacy of the conclusions can not be evaluated.

Evaluating Biodiversity

The study appears to rely on the total number of species “surveyed” to compare biodiversity among “treatment” and “controls.” The number of species measured is referred to as “species richness.” Measuring species richness is not a simple task and sampling intensity is a major bias in richness estimates.¹ This concern about sampling bias drives the requirement to disclose the experimental methods, as noted above, so that a third party can evaluate the process used to reach the stated conclusions in the study results.

As noted by scientists who study biodiversity, measures of species richness overlook the abundance of specific species in the assessment of diversity. See Magurran (2004) for a discussion of this issue. Other methods, such as the Shannon and Simpson indices, integrate abundance into biodiversity assessment. Species abundance is critical to consider in the determination of biodiversity. A species may rarely occur in the treatment, but commonly occur in the control yet the measure of species richness would detect no difference between treatment and control when difference clearly existed.

¹For a detailed discussion of species richness see: Magurran, A. H. 2004. Measuring biological diversity. Blackwell Publishing.

Conclusions from the Study Results

The study results (page 1) broadly conclude that “biological diversity is not lower when compared to adjacent forest stands, native species are present and persistent in both areas, and that timber harvest operations do not cause environmental degradation over time to biological diversity.” On its face, the study results documented can not support these conclusions, since little or no information on study design, methods, or analysis is presented. These conclusions may also not be supportable in substance, if the actual practices applied in the study were not appropriate or did not consider other factors that affect biodiversity.

Sincerely,

A handwritten signature in cursive script that reads "Susan Britting". The signature is written in black ink and is positioned above the printed name.

Susan Britting