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CAL-FIRE – Northern Region Headquarters
Attn: Forest Practice
135 Ridgway Avenue
Santa Rosa, CA 95401

Re: Bohemian Grove NTMP (1-06NTMP-011SON)

To Whom It May Concern:

My letter is in response to the new Bohemian Grove NTMP (1-06 NTMP-011SON), which I have had an opportunity to review in considerable detail. My basis for this review comes from 40 years of experience as a plant ecologist working with conifer forests in California. I hold the position of Distinguished Professor of Biology in the Department of Ecology and Evolutionary Biology at UCLA, where I have been on the faculty for 26 years. Thus, I feel qualified to discuss the described objectives of this proposed project and the associated calculations of forest ecology, conifer growth and sustained yield, and harvesting levels.

As with my experience in reviewing the 2006 NTMP, I found the revised report to be very difficult to fully evaluate because of the lack of clear information on the manner in which critical data was collected, modeled, and interpreted to provide the data tables in the report. Nevertheless, consistent with my comments on the earlier 2006 NTMP, this new NTMP clearly remains in my opinion a commercial logging project, not a management program to reduce fire hazard or restore original stand structures. Let me first comment on the stated forest management objectives of the NTMP and then focus on the key elements of the proposal related to calculations of stand growth and sustainable yield.

Forest management objectives

The NTMP on page 115 states that the Bohemian Club requires that its property be managed with a series of primary objectives. The first of these concerns the reduction of fire hazard. This goal could be best achieved by maintaining existing large conifers and actively clearing the understory of dead and flammable tanbark oak and other shrub species. None of this requires an NTMP. It is well known that old-growth coast redwood and Douglas fir forests have very low flammability. It is only when these forests are thinned and light openings are present in the canopy that flammable shrubs and tanbark oak can invade these stands. As a result fire intensity, the spread rate of fire, and flame lengths will be much higher after timber harvest than if these stands were left in their natural state. Once a cycle of thinning is established, reduction of fire hazard invariably involves heavy regular applications of herbicides to reduce shrub establishment and prevent the growth of ladder fuels with all of the negative aspects of such herbicide treatments. The maintenance of a tall canopy of old growth conifers obviates this need.

Sustained yield – allowable harvest

The most critical elements in the proposed NTMP are the estimations of sustained growth of the forest stand that are used to predict forest yield and therefore allowable harvest figures. It is important

then to carefully review the means by which these growth figures were calculated. These figures on stand growth are described in the NTMP as having been produced by simulation runs using the CRYPTOS stand simulator. I am disappointed to see that nowhere is there any information in the NTMP about the data base for site index or individual tree data used to parameterize the CRYPTOS model. Such data are essential if one is to evaluate the appropriateness of these parameters and accuracy of the model output (Krumland and Wensel 1980, 1981, 1982, Wensel et al. 1987).

Data in the NTMP on forest yield, most notably that used in Table 4, are apparently based on CRYPTOS model output. In its proper application, I would expect that there should be a separate CRYPTOS model run for each stand type which differs in elevation and/or site index (see guidelines of productivity sampling in Lindquist and Palley 1963). Since Table 4 of the NTMP shows only summed values of growth yield for the entire property, I am assuming that all five property "strata" (i.e. MH2D, RD3D, RD4D, RD4L, and RD4M) were modeled together for the CRYPTOS outputs. This seems inappropriate given the large differences in existing stocking, topography and soil conditions of these "strata". Wouldn't it have been preferable to run a separate simulation for each "strata"? If each "strata" was modeled separately, then these separate data should be provided. I understand a request was denied to have these data on CRYPTOS parameterization made available to the public.

Comparisons of data on sustained yield and growth percentage used in the 2006 NTMP draft and the current draft raise several questions. Table 4 of the 2009 NTMP uses a value of "percent of inventory growth per year" to calculate the period growth in stand volume. The values used here begin at 2.74% and slowly decline to 2.11% over the 100 years modeled, high values compared to literature estimates of stand growth rates for redwoods. These values compare with growth rate values ranging from 2.2% to 1.8% in Table 12 of the 2006 draft. This change in growth percentage has profound implications in raising the estimates of annual growth to 10-25% higher levels than that estimated in the 2006 NTMP, even though those earlier estimates included productivity from the high density areas of the Main Grove. There is no mention in the NTMP of the basis for this increase in growth rate, and thus no way to evaluate these data.

Finally, there are also some questions about levels of accuracy in the CRYPTOS model estimates that require information not contained in the NTMP. The operating instructions for CRYPTOS (Register of Ecological Models <*ecobas.org/www server/rem/mdb/**cryptos**.html*>) state:

> "*The growth models imbedded in the CRYPTOS program have been developed from the records of an extensive collection of permanent growth plots located in Del Norte, Humboldt, and Mendocino counties. The majority of growth plots were located in the coastal zone that is subject to fog influence and is commonly referred to as the northern redwood region…. The reliability of the CRYPTOS model beyond these sample ranges is currently unknown and users who are contemplating using the model in such situations are cautioned to do some additional checking.*"

Since the environmental conditions of Bohemian Grove in Sonoma County offer significantly lower levels of both rainfall and fog than the northern redwood range, Lindquist and Palley (1963) make this point about latitudinal gradients of rainfall in the redwood region. It seems reasonable therefore to assume that this model may overestimate growth for the Bohemian Grove area since it is based on conditions in the northern redwood range. Is this correct?

Target stand structure

A second management objective concerns the restoration of pre-EuroAmerican stand structures and conditions to the forest area. The NTMP designates the Upper Bull Barn Forest Preserve as a reference stand for the conditions to be restored and provides some guidelines for basal area and tree density in this target stand structure. Table 4 gives a figure of 43,829 board feet as the stand volume of conifers at the end of the 100 years of forest management, similar to what seems to be the current forest volume of the Upper Bull Barn Preserve. Such a volume is very low compared to what would be expected in

even heavily managed stands of redwood and Douglas fir. I know of no published studies in the peer-reviewed literature that supports the opinion that typical pre-EuroAmerican structure in redwood/Douglas fir forests would have had such a low conifer volume or an open stand structure with extensive large gaps. This a vision is pure fiction.

Yield data presented by Lindquist and Palley (1963) show that the conifer volume of the Upper Bull Barn Preserve is what would be expected to be achieved in young redwood stands after only 20-40 years of growth on stands with moderate or better site index. More realistically, mature redwood/Douglas fir forests with widespread closed-canopy structure and conifer volume 5-10 times that of Upper Bull Barn would be much more representative of pre-European stand structure. The restoration of stand basal areas of at least 2-3 times that present today in the open structure of the Upper Bull Barn Forest Preserve would be desirable in optimizing biodiversity and ecosystem services, and could be easily achieved by reducing the logging of large conifers.

This target stand structure is also expressed in the NTMP in terms of basal area of large trees per unit area. The desired stand structure would include at least 150 ft^2 of conifer basal area per acre on the forested property (NTMP, page 109), and that there should be 30 ft^2 in 26-32 inch dbh trees and 50 ft^2 of >34 inch dbh trees. Based on NTMP Table 3:

- Only vegetation strata RD4D (201 ft^2/acre) and RD3D (161 ft^2/acre) currently meet the stated goal for conifer basal area; thus, 955 acres of the Bohemian Grove area (41%) would be expected to require only limited logging for many years to allow them to reach the stated goal for conifer basal area; strata MH2D would have to increase more than 5 times in basal area to meet the goal; strata RD4D would have to double in basal area to meet this stated goal

- None of the five classified strata categories currently meet the goals for trees greater than 34 inch dbh

- Only strata RD4L or RD4M currently meet the goals for trees in the 26-32 inch dbh classes.

- Only strata RD4M currently has the desired density of large trees; a 48 inch dbh tree would have a BA of 12.6 ft^2, therefore presenting the goal of only 4 trees/acre of this size over the property; a 40 inch dbh tree would have a BA of 6.2 ft^2, requiring 7.2 trees of this size class per acre.

Since the existing density and basal areas of large conifers in the property are below even the modest target figures proposed, harvesting large trees in these strata over the next few decades seems inconsistent with the stated objectives of the NTMP.

Overview

As currently written, the NTMP lacks details of the parameterization of the modeling outputs that generate the stand growth rates predicted for the future. Without data on site index and stand structure by size class, these output tables on forest growth cannot be evaluated and a reviewer must rely on the report's statement that these data are true and accurate. Such reliance is inappropriate in a document presented for public review, and particularly so because of the controversial nature of the NTMP project and history of logging on the Bohemian Grove property.

If the restoration of pre-EuroAmerican stand conditions together with reducing fire hazard are two primary objectives of the management plan, as stated in the NTMP, it makes no sense to harvest 1070

acres of the property culling 6583 board feet of timber per acre per year in the first decade of management. These objectives can be much better achieved by a far lower volume of logging and preservation of more large trees.

This forest management plan would have much greater credibility if it were to highlight a series of alternative harvest levels and modeled the implications of these implementation plans in achieving a realistic reestablishment of the pre-European stand structures and low flammability that are desired. The proposed level of harvesting seems designed to maximize timber yield at the expense of maintaining open forest stands that are unlike natural stands. Such low densities and small numbers of large trees will lower biodiversity, reduce ecosystem services, and increase fire hazard, requiring continued actions for controlling flammable understory growth.

Sincerely yours,

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