California Native Plant Society

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David Peters
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Herger-Feinstein Quincy Library Group
Forest Recovery Act Project EIS
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Dear Mr. Peters:

The following are the comments of the California Native Plant Society (CNPS) on the Quincy Library Group (QLG) draft environmental impact statement (DEIS). CNPS is an organization of more than 10,000 laypersons and professionals organized in 30 chapters throughout California, including several in the QLG project area. The mission of the CNPS is to increase the understanding and appreciation of California's native plants and to preserve them in their natural habitat through scientific activities, education, and conservation. CNPS has actively participated in the management of the Plumas, Tahoe, and Lassen National Forests for many years. CNPS members use these National Forests extensively for recreation, research, and education.

We thank the Forest Service for their extensive use of the internet to facilitate public involvement and to provide information to the public. Because of these efforts, the public has had access to a great deal of extremely useful information that would normally not be available, or would only be available at great cost of paper and postage to taxpayers. We feel that the availability of this information has made our analysis of the DEIS easier and more complete. We hope that this trend will be expanded in future NEPA analyses.

We are disappointed by some aspects of the DEIS presentation. The description of the alternatives in Chapter 2 is superficial and vague. The defensible fuel profile zones (DFPZs), the core of the proposed action, are described in a mere 2 paragraphs. Even with the supplementary material in the Appendix, it is impossible for the reader to understand exactly what treatment is being proposed for 40 – 60,000 acres per year. All of this makes it very difficult for the public to understand what exactly is being proposed and where treatments will occur. This problem is compounded by the omission of some key descriptions of the impacts of the alternatives in Chapter 3. Chapter 3 provides no description, for example, of the relative impacts of the alternatives on rare plants (see further discussion below).

CNPS has long had concerns regarding both the environmental and public policy implications of the QLG proposal. Our concerns have been detailed in comments on the

Notice of Intent and in other phases of the QLG process. In short, our analysis is that the QLG proposal is an immense experiment, poorly founded in science, which will be carried out at enormous taxpayer expense. This experiment is likely to cause substantial adverse impacts to public lands and has not been demonstrated to be likely to return adequate benefits to the taxpayer in terms of ecosystem health or fire hazard reduction. This DEIS has not alleviated those concerns. Thus we incorporate our previous comments by reference. Our DEIS comments will concentrate on the treatment of some issues of primary concern: management of native plants, weeds, and fire management.

Rare Plants and Native Plant Communities

We are concerned about the impacts of the extremely intensive and extensive treatments in the proposed action alternatives to plant communities and rare plant species.

The National Forest Management Act (NFMA) directs the Secretary of Agriculture to issue regulations that will

> "provide for diversity of plant and animal communities … in order to meet overall multiple-use objectives." 16 U.S.C. § 1604(g)(3)(B).

The Forest Service Manual requires that the Forest Service must (FSM § 2670.22):

> "1. Develop and implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions.
>
> Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.
>
> Develop and implement management objectives for populations and/or habitat of sensitive species."

We note that the Herger-Feinstein QLG Act explicitly requires that the obligations of "other environmental laws" be met (QLG Act §401(l)). This admonition includes the National Environmental Policy Act (NEPA), NFMA, the Endangered Species Act, the Clean Water Act, etc.

The report posted on the USFS QLG web page entitled "Plant Biodiversity, Affected Environment" dated March 19, 1999 also provides a good compilation of the laws and policies mandating conservation of habitat diversity and rare plant species.

In order to meet these requirements of the FSM, NFMA, and other laws and policies, the DEIS should demonstrate that the actions being considered will conserve viable populations of plant species and conserve native plant habitats. The DEIS Page 3.-30 presents three indicators of plant biodiversity: (1) ecological type (2) rare plant occupation, and (3) invasive plant occupation. Of these the DEIS only analyzes the impacts of the alternatives to one: invasive plants. It does a good job in that respect.

However, nowhere in the DEIS or BE are the relative impacts of the five alternatives to designated rare plants (Federally and State listed, Forest Service sensitive and watchlist species) or their habitats estimated. Without some comparison of the impacts of the alternatives to these resources, neither the public nor agency decisionmakers can adequately judge the relative merits – or legality - of the alternatives.

It is extremely unlikely that the five alternatives will show no differences in their impacts to rare plants and vegetation communities. While direct impacts may be reduced through mitigation as the DEIS asserts, some direct impacts as well as many cumulative and indirect impacts are unavoidable. The location and intensity of logging activities differ substantially among alternatives. The protection proposed for riparian areas differs substantially as well, with alternative 5 clearly providing superior protection to riparian resources. The thousands of acres of logging, biomass harvest, road construction and other soil disturbing activities in some alternatives are likely to produce substantial changes in sediment loading, water yield (as the DEIS itself acknowledges (Table 3.4, p. 3-18 - 21)), and other hydrologic parameters. These impacts in turn will differentially affect riparian communities and the 15 riparian dependent Forest Service sensitive plant species, 2 vernal pool dependent Federally listed species, and at least 23 Forest Service watchlist species. In addition, many plant species are dependent upon fire for reproduction and creation of suitable habitat. The number of and location of acres burned with prescribed and wildfire varies substantially among the alternatives (DEIS Table 3.43; Table J-1). Rare plants and plant communities are also affected by weeds, and the DEIS (p. 3-48,9) states that the alternatives pose different risks of weed spread. None of these differences in impacts are discussed in the DEIS. We suggest, therefore, that the EIS be supplemented to include a thorough comparison of the direct and indirect impacts of the alternatives to rare species and their habitats.

The only statement made in the DEIS regarding project impacts to rare plants is, “[i]f the mitigation measures listed in section 2.6 are applied, the project would have no effects” on Federally listed or Forest Service Sensitive plant species (DEIS, p. 3-120). As noted above, the accuracy of this prediction is extremely arguable, and the DEIS presents no evidence in its support. In fact, the description of the mitigation proposed in section 2.6 is remarkable for its brevity and lack of substance. It requires a mere 8 lines, despite the fact that this mitigation is supposed to protect all rare plants from all direct and cumulative impacts under all alternatives.

Remarkably, the DEIS makes no reference to the Biological Evaluation (BE), Biological Assessment (BA) or other resource specialist reports in its discussion of rare plants and vegetation. However, the BE, BA and other reports provide extremely useful information and detailed management recommendations for the rare plant species in the project area. Why are these recommendations omitted from the DEIS? The USFS must firmly and explicitly commit to rigorous application of all mitigation measures and management recommendations for rare plants contained in the BE, BA, Forest Plans, and species management guides for the QLG area. These recommendations and mitigation should be incorporated as management requirements in all alternatives.

Although the DEIS uses 3 of its 8 lines of discussion of mitigation to rare plants to address surveys, the reader is unable to discern when surveys will occur because the statements are inconsistent. The “survey” sentence states, “TES plant surveys will be completed prior to project implementation” (we assume this means post-NEPA). In contrast, the “monitoring” section states, “surveys are done in conjunction with planning” (presumably pre-NEPA or during NEPA). It is clearly much more desirable to do surveys in conjunction with project planning rather than merely prior to implementation. Surveying during planning allows survey data to be incorporated into NEPA analysis and planning, and allows the public and decisionmakers to fully understand and comment on possible impacts. Surveying following planning allows only the most minimal mitigation to be implemented and makes it very difficult for project planners to evaluate and avoid possible impacts to habitat or cumulative impacts to rare plants. We suggest that this section be clarified to ensure that all rare plant surveys will occur during project planning prior to NEPA analysis.

The DEIS discusses botanical special interest areas (BSIAs) on page 3-37. BSIAs and other special emphasis areas are proposed as indicators of plant biodiversity in the DEIS (p. 3-30). However, no evaluation is provided of the relative impacts of the alternatives on BSIAs or other special emphasis areas. According to the report posted on the USFS QLG web page entitled “Plant Biodiversity, Affected Environment” dated March 19, 1999 a January 25, 1996 letter to Rangers and Supervisor’s Office Staff from Jody Cook for Mark Madrid, Forest Supervisor stated that

> “All projects with potential to effect these areas will include an appropriate analysis of the potential effects for each alternative. A decision notice for any selected alternative will include in its Finding of No Significant Impact a determination that the selected alternative would not adversely affect the suitability of the area for designation as a Special Interest Area."

This commitment has not been met in this DEIS. The March 19, 1999 Plant Biodiversity report goes on,

> “The proposed actions of thinning, fuel reduction and group selection will impact the attributes within these proposed areas, with the exception of those that fall within SAT guideline buffer zones. “

We request that the EIS evaluate the relative impacts of the alternatives to proposed and designated special emphasis areas and commit explicitly to their protection as part of the mitigation program.

We are concerned about the impacts of the proposed action to forest age class diversity. All the proposed action alternatives provide some protection for what little late seral forest remains in the project area. However, little priority is given to retaining high quality mid-seral forests, from which late seral forests will develop in the future. We note that appendix E (p. 13) states that a priority will be to “regenerate the largest tree size groups as possible” below the 30” dbh CASPO limit. We are concerned that the requirement for

up to 70,000 acres of annual DFPZ construction and group selection will force concentration of impacts in the mid seral areas which contain the most valuable available timber, particularly trees 20"-30" dbh, thus reducing the sustainability of the late seral resource and the potential for its expansion. The discussion in Chapter 3 concentrates on the impacts of the alternative on late seral forest and tree size only. Little information is provided on impacts to other forest age classes. We suggest that the EIS explicitly analyze probable short and long term distribution of all forest seral stages under the alternatives.

Appendix E also states that "[e]astside pine would have the most management flexibility", which we assume means the most potential for harvest. The "Plant Biodiversity" web report referenced above states the following regarding eastside pine:

> "Currently, less than 1% is in old growth or late succession over the Modoc Plateau, northern Sierra Nevada and the High Cascades ecological sections due to logging and wildfire."

Furthermore, the DEIS states (p. 3-40) that

> "2. Commercially important forest types, such as eastside mixed-conifer and eastside pine forests, are most deficient in high-quality late-successional forest relative to their potential and to pre-settlement conditions."

Because of the statement in Appendix E, we are concerned that the small amount of remaining late seral east side pine will be particularly vulnerable to further reduction under the proposed action. This consequence should be discussed explicitly in the EIS.

One reason the DEIS discussion of rare plants and plant communities is so perfunctory may be that no botanist or plant ecologist was included on the core ID team. We pointed out this problem in our scoping comments on this project. Our concerns were not heeded. We suggest the a botanist be added to the core ID team for this project so that the problems we have outlined can be rapidly and effectively addressed.

We refer the USFS to our scoping comments on the Notice of Intent for this project for other suggestions for project level mitigation to protect rare plants and native plant communities.

In addition to our concerns about plants and communities, we also note that this DEIS fails to present scientific evidence that any of the proposed alternatives will meet NFMA and other legal requirements that the viability of many animals will be maintained. On the contrary, regarding the California spotted owl and Pacific fisher, the DEIS states,

> "Analysis of the alternatives raises concerns regarding the long-term viability of the California spotted owl and Pacific fisher. [...]
> At this point, however, the Forest Service does not have sufficient information to make a conclusive determination as to the impacts ... on each species as a whole." (DEIS, p. 3-120)

How can an alternative be selected in the absence of "sufficient information" on impacts to species, particularly declining species? It is difficult to understand how the project can claim compliance with NFMA and FSM viability requirements in light of this acknowledged lack of information. NEPA requires,

> "if the incomplete information…is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the [EIS]." 40 CFR § 1502.22(a).

The DEIS presents no specific plans for complying with this requirement.

NEPA requires federal agencies to include in an EIS information that is "essential to a reasoned choice among alternatives." (40 C.F.R. § 1502.22(a)). This DEIS fails to present any substantive comparison among alternatives of impacts to plant or animal species in direct violation of this requirement.

NEPA also requires that,

> "if a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion." (40 CFR § 1502.9 (a)).

For all of the reasons discussed above, this DEIS clearly falls within this standard and we suggest that a supplemental DEIS be issued in accordance with NEPA requirements.

Fire and Fire Hazard

A primary purpose of the QLG proposal is to reduce fire hazard in the project area. Unfortunately, the discussion of proposed action alternatives fails to demonstrate that this goal will be realized. In fact, we are concerned that the project may increase rather than decrease fire hazard in at least some areas.

DFPZs are the primary bases for the fire hazard reduction predicted in the DEIS. The DEIS is quite frank in its disclosure of some of the shortcomings of defensible fuel profile zones (DFPZs) as a primary method to reduce wildfire hazard. The majority of the DFPZs in the USFS proposed action alternatives will be ¼ mile in width. Since models (e.g. DEIS Appendix J) and field experience (e.g. Tahoe NF Cottonwood fire which spotted 5 miles ahead of front) show that wildfires commonly spot 1 or more miles ahead of the main fire, it is difficult to understand how a network of ¼ mile DFPZs will increase the safety of lives, property, or resources in the project area.

Moreover, the DFPZs and other fuels treatments may increase fire hazard. Reduction in canopy cover and forest density through DFPZ construction, road construction, and thinning opens the forest understory to increased solar radiation which dries the residual fuel load and increases flammability and fire hazard. Moreover, open forests experience higher wind speeds than closed forests do, which tends to increase the drying of fuels and increase the rate of fire spread. Roads and logging also are important vectors for

the spread of flammable annual weeds, as the DEIS acknowledges (p. 3-46). We enclose and include as part of our comments a 1996 letter signed by prominent California ecologists discussing these impacts of logging on fire hazard. We also enclose and include in our comments a paper by a CNPS officer and career wildland firefighter in the project area, discussing his concerns with the DFPZ model (Bishop, 1999). Although very well known, these effects of DFPZ construction on forest microclimate and associated flammability are not discussed in the DEIS. The DEIS merely states that some vegetation changes may increase fire speed or intensity while others may decrease fire speed and intensity (p. 3-131). This is clearly an insufficient discussion of this very central issue. This issue must be evaluated in this NEPA analysis.

One of the proposed action alternatives, alternative 2, inexplicably proposes nine thousand acres of DFPZ construction in the red fir zone (DEIS p. J-1), although the DEIS acknowledges that fire risk and hazard are both concentrated below 6,500 feet. The DEIS implies but does not state explicitly the questionable nature of this proposal. We suggest that the implications of DFPZ construction in red fir be more fully explored in this EIS.

Finally, and perhaps most important, both action alternatives will require extensive and effective slash disposal and constant expensive and labor intensive long term maintenance of DFPZs in order to prevent a net increase in fuels. If either DFPZ maintenance or slash treatment is not performed in any area, fire hazard is likely to increase substantially as a result of the proposed action (see e.g. Weatherspoon et al., 1992). Nowhere does the DEIS commit to any specific program of DFPZ maintenance or slash disposal. The only statement is made on page 3-131 which states,

> "Maintenance of fuel treatment areas will be required to maintain effectiveness"

Nothing is said about how this will be accomplished. A mitigation proposal (p. 3-132) briefly mentions maintenance, but in a sentence that is impossible to understand. The agency has a poor record with respect to both slash disposal and fuelbreak maintenance. Funding, politics, and other wildly variable factors control project level decisionmaking. How does the Forest Service propose to assure the public that the DFPZs and extensive logging proposals will not increase fire danger in the mid to long term? What are the risks to the public and to the resource if DFPZs are not maintained or if slash disposal is inconsistent? These questions must be answered in this NEPA process. We suggest that the EIS evaluate the risks to the public of the various alternatives if DFPZ maintenance and slash disposal patterns mimic historic trends.

We note that the description of the DFPZ prescription in the DEIS is extremely vague (DEIS p.2-8). Nowhere is any precise quantitative description given of the DFPZ. Even the most basic attribute, the width, is not well defined. The EIS should provide a more detailed description of this prescription so that the public can fully understand what is being proposed.

Weeds

CNPS commends the Forest Service on the ongoing improvements to their weed management program, of which this DEIS is an excellent example. Weeds are possibly the most serious threat to biological diversity on public lands in the Sierra Nevada. We hope that this DEIS marks a new era of urgency and vigor in the Forest Service's weed control efforts.

The weed risk assessment and mitigation proposed in Appendix G are excellent. In contrast to the proposed mitigation for rare plants, the USFS unequivocally commits to implementing this mitigation in the DEIS (p. 3-48).

Full implementation of the direction in the DEIS will be extremely challenging. Funding for weed management has been inconsistent. Furthermore, local and regional policy priorities shift frequently, making policy implementation inconsistent as well. Prevention of weed invasion of new areas is the most important priority. Only rigorous application of all the proposed mitigation will achieve this objective.

We have proposed in our comments on the QLG NOI some incentives to encourage Forest Service staff to implement weed control measures. We draw your attention to three suggestions in particular:

1. Funding and other mechanisms shall be employed to provide incentives for keeping areas weed free.

2. Responsible line officers shall prepare a report each year describing the accomplishments of their weed management program, documenting the number of project analyses which included weed surveys and weed risk analyses, and providing explanations as to why project analyses that did not include weed surveys or risk analyses failed to do so.

3. Annual personnel evaluations for responsible line officers will reflect successes and failures in weed management.

Economic Analysis

We are puzzled by the analysis of the economic impacts of the alternatives. It is impossible to fully understand the DEIS economic analysis due to the incomplete information on the IMPLAN model presented in Chapter 3 and Appendix V. However, the DEIS appears to assume – without explaining the basis for the assumption - that logging and biomass harvest are the only activities occurring on National Forests which can provide jobs or income to local economies. This assumption is directly contradicted by the DEIS itself in its description of the affected environment on pages 3-152 through 156, which shows that the relative importance of commodity production has declined in the QLG area economy over the past 20 years and also discusses the impacts of timber industry mechanization on employment.

Inexplicably, the DEIS (table 3.50) concludes that there will be no differences in impacts tourism or recreation in the QLG area among the five alternatives. This conclusion is very difficult to understand and no basis is provided for it. The differences in impacts to riparian resources alone are likely to be substantial, according to the DEIS analysis. Riparian ecosystems are the primary bases for camping, fishing, wildlife viewing, and other important recreational and tourist activities. Clearly, management of riparian areas will impact tourism and recreation.

We suggest that the DEIS add a full disclosure of the basis for the IMPLAN model and for the conclusions that are presented regarding the relative impacts of the alternatives to tourism and recreation and other sectors of the local economy.

Conclusion

We are disappointed by some aspects of this DEIS. We recommend that the USFS develop a supplemental DEIS which corrects the omissions in the current document and meets all requirements of NEPA and NFMA. Without adequate and legally defensible NEPA analysis, neither the public nor decisionmakers can accurately evaluate the impacts of the alternatives to fire hazard, ecosystem health, biological diversity, local economies, or taxpayers.

Based on the information in the current DEIS, we recommend that the USFS select alternative 5 for implementation. Its increased reliance on prescribed burning, strong riparian protection, and reduced reliance on DFPZs and other logging relative to other alternatives gives it the highest probability of all alternatives to effectively reduce fire hazard reduction and improve ecosystem health in the project area in both the short and long term. Concerns about maintenance of fuel breaks, about the spread of weeds, and about impacts to vegetation diversity and rare species are all best addressed by alternative 5. However, due to the incomplete nature of the DEIS, our recommendation of this alternative must be preliminary.

We appreciate the opportunity to provide these comments. Please contact me if clarification or more information is needed. We look forward to continuing to participate in the management of California's National Forests.

Sincerely,

Emily B. Roberson, Ph.D.
Senior Land Management Analyst

Encl. Bishop letter on QLG project
Ecologists letter on logging and fire

References

Bishop, J. 1999. Some thoughts on the Quincy Library Group plan.

Weatherspoon, C.P., S. Husari, and J. van Wagtendonk. 1992. Fire and fuels management in relation to owl habitat in forests of the Sierra Nevada and southern California. In: Verner, J. and others, eds. The California spotted owl: a technical assesment of its current status. Gen. Tech. Rep. PSW-GTR-133. USDA Forest Service, Pacific Southwest Research Station, Albany, CA.

Some thoughts on the Quincy Library Group plan
Jim Bishop, 20 July 1999

A major objective of the QLG Plan is to reduce the risk of severe wildfire. The assumption is that the accumulating fuel load (brought on by fire suppression) has set the stage for more damaging wildfires by making crown fire more likely. However, as reasonable as that assumption is, the hard data is lacking to provide a solid basis for embarking on this large-scale fuel reduction program. Furthermore, other impacts of the planned fuel removal may actually act to increase the risk of damaging fires. As a career wildland firefighter and wildland fire behavior instructor, it is those fire behavior points on which I hope to focus your attention.

1. The evidence for the connection between higher fuel loads and more-severe wildfires is largely qualitative and anecdotal. There is not sufficient data to demonstrate the specific reduction in severe-fire risk for a given reduction in fuel load. To obtain such data, to clearly show the relationship between fuel load and fire severity, would require objective observations of fire intensity together with specific measures of the fuel load and its configuration. Furthermore, other variables that affect fire intensity would have to be controlled for—variables such as fuel moisture, steepness of terrain, wind, and temperature. If fire size is taken as a measure of fire severity, additional variables in the fire-suppression response itself would have to be controlled for.

There is no question that reducing the fuel load can, for some fuel and weather conditions, reduce a fire's severity and the risk of damaging fires. The question is, for a given fuel-load reduction to what degree that risk is reduced? Since this whole issue must balance the expected benefits against potential costs, that very question of degree is important. It is entirely possible that the degree of reduction in severe-fire risk will not be significant, nor worth the costs.

In making the case for the benefits of fuel-load reduction the tendency has been to use one of the best possible examples: yellow-pine forest on not-too-steep slopes, at a post-fire stage with nearly absent surface fuel load, under mature pine trees. Other landscapes (i.e. fuel beds), and even non-optimal stages in the ideal yellow pine landscape, are less amenable to reducing severe-fire risk, and they offer less potential for limiting severe fire by fuel-load manipulation. The QLG Plan area includes those other landscapes.

2. Other consequences of the QLG Plan may offset the fuel-load-reduction benefit, and could even act to increase fire severity. Surface fuels in the treated zones will be subject to influences that can increase flammability.
- The more open forest favors the growth of grasses and shrubs that constitute a more flammable type of surface fuel than the litter that they replace. Other factors being equal, fires in grass/brush fuels spread roughly 10X faster than in litter, and produce longer flame lengths.
- Sun-exposed fuel beds are characterized by lower fuel moistures. Fine, dead fuels are typically a few %-points drier (out of a total of about 10 %-points or less for typical burning conditions) with <50% shading than with >50% shading.
- Removal of the trees exposes the surface fuel bed to more wind. Wind speeds at the midflame level under an open canopy can easily be several times greater than wind speeds under a dense canopy.
All of those changes tend to increase the rate at which fire in the surface fuels will spread.

It is quite possible to have conditions under which a fire starting in the fuel-reduction-profile-zone (FRPZ), keeping in mind that many fire-starts are along roads, would become a severe-fire threat more readily than a fire starting in the current forest stand. Consider a day on which fuel moistures in the dense forest are low, but not extreme, with moderate winds. A fire begins at the roadside in late morning, in the needle litter below a dense canopy. The fuel bed is shaded, and the wind at the surface is reduced by the canopy to near zero. The fire in litter would spread slowly, on the order of a foot (or even less) per minute, perhaps occasionally torching small trees. Fire crews would arrive while the fire was still small and could easily suppress it. On the same day a fire starting in the FRPZ would burn in drier, more flammable surface fuels, and would be exposed to a wind of several miles per hour. This fire could easily spread several 10s of times faster than the above litter fire, and it would be generating longer flame lengths. It could cross the FRPZ in maybe 10 or 20 minutes. Arriving fire crews might find a fire moving into the forest on a front some 100s of feet wide, with enough intensity to trigger a crown fire. It would be beyond control by the initial attack forces.

Furthermore, under extreme conditions, high-intensity fire would not necessarily be stopped by the FRPZs, even with suppression actions occurring in the FRPZ.

To provide the presumed severe-fire-reduction benefit the FRPZs must remain in the optimal state, with scattered trees and light, litter-dominated surface fuel loads. However, there are potential problems in maintaining such conditions. The sparser forest stand will be more subject to blow-down by strong winds, and

extensive blow-down would increase the flammability of the surface fuels. Regrowth of the surface fuels after logging will favor grasses and shrubs over litter fuels. If the follow-up burning and other maintenance programs fall behind (for any of several possible reasons) the overall fire-severity problem could actually increase. And even well maintained areas must go through a cycle that sees the accumulation of surface fuels and the growth of small trees.

The basic assumptions and anecdotal evidence underlying the QLG proposals prompt a good question: "Can we provide a significant reduction in severe fire damage, commensurate with all the costs, by the QLG Plan?" I have outlined some fire behavior issues that bear on the question, and pointed out the need for applicable observational data. The final analysis would also have to consider the locations of FRPZs, the FRPZ area capable of reducing fire severity, and the timing, locations, and number of potentially severe fires that would be affected by the FRPZs. However, the simple fact is that we lack the solid base of scientific observation and information that can provide clear answers.

The QLG proposal is at best a basis for a small-scale, controlled experiment, and a reason to look more carefully at what data does exist. It prompts an investigation that leads us toward the needed answers. But the QLG proposal for widespread implementation does not rest on a scientifically defensible rationale. We could easily be surprised and disappointed with the actual long-term results with regard to reducing fire severity, our investment squandered, and with unexpected new problems to solve. We should not commit prematurely to the costs, economic and environmental, of such a large-scale implementation of inadequately tested concepts.