

Prescribed Fire: Current Status and Future Directions

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and consequent fire effects and to improve feedback of such information to management.

Major conclusions reached included the following:

- In an effort to define more clearly an overall goal for the prescribed fire program it was agreed that the traditional emphasis on restoring fire as a "process" should be expanded to include recognition of the importance of the effects of that fire on forest structure. The goal of the overall program thus was reworded to read **"To restore and perpetuate the fire regime and the vegetation structure (or range of structural variability) that would have existed today had Europeans not come on the scene."** Improved understanding of the relationships between fire regime and vegetation structure will be required before specific structural objectives can be articulated.

- Burning rates in the mixed conifer forest zone need to be accelerated if anything even approaching natural fire regimes are to be restored. Yet, since it was felt that more damage is generally done by not burning than by burning without fully understanding all of the possible effects, lack of information should not be used as an excuse not to burn.

- If constraints to burning more acreage cannot be overcome, serious consideration must be given to identifying areas where natural fire frequencies can be maintained while managing others under either a fire suppression scenario or through application of other hands-on manipulations.

- Increased emphasis needs to be given to second and third burns in the mixed conifer forest zone. Under current conditions initial burns often create more fuels than existed prior to the fire. Similarly, emphasis needs to be given to getting away from the traditional burning of defined blocks under relatively uniform conditions. Use of larger, variable intensity fires set from point ignitions (rather than strip headfires) needs to be encouraged.

- Preparation time spent clearing fuels from around the base of trees in non-frontcountry sequoia groves presents a major time constraint and greatly limits the acreage that can be burned. It was agreed that additional effort should be given to studying the effects of past fuel manipulation practices in the sequoia groves. In addition, if increased sequoia regeneration and recruitment is desired, consideration must be given to finding ways to encourage occasional "hot spots" that punch holes in the canopy during prescribed burns.

- The current fire effects monitoring program does not provide sufficient levels of understanding on cause and effect relationships to permit statistically valid analysis of program effects (such as what frequencies and intensities of fire result in what types of forest structures?). The monitoring program must be supplemented with research studies to understand fully the relationships between fire behavior and effects.

- Smoke and related air quality issues have the potential to seriously restrict future burning activities (and have done so already in Yosemite). Increased emphasis needs to be given to monitoring smoke during different burning conditions and to understanding the effects of smoke on ecosystem properties and human health. Improved communication with local air quality districts also is essential.

- The lack of a base funded long-term research program on fire effects continues to plague program advancement. Critical questions regarding the historical range of fire frequency, intensity, season, and size for different vegetation types, and the effects of varying fire characteristics on vegetation structure, mortality, seedling recruitment and survival, etc., must be answered before we can make sure that program objectives are both reasonable and attainable. Research will be critical to defining the range of forest characteristics that we are trying to achieve as well as establishing criteria for evaluating success. Long-term studies of the effects of different burning patterns will require a base funded commitment to support rotational plots burned under different frequencies and intensities. Support also is needed to fully develop, validate, and implement fire spread and forest dynamics models that will permit managers to test the consequences of various management decisions.

In retrospect, this workshop provided a critical opportunity to reflect on past accomplishments and discuss future directions and needs for the parks' fire management and research programs. Many of the policies and practices that have been ingrained in our system were found to be lacking in the face of modern realities. Improved understanding of the interdependence of fire, climate, and vegetation, together with appreciation for the importance of the spatial and temporal variability of fire characteristics and ecosystem response, has forced recognition of the importance of trying new ideas and techniques. The lessons we learned from the 1963 Leopold report, while still of value, must be updated to reflect a new understanding of ecosystem dynamics. The need for improved understanding of disturbance processes and their effect on ecosystem properties could not be clearer.

Sequoia and Kings Canyon NPs have long been recognized as national leaders in fire management and fire related research. Yet as these programs have matured, new questions and challenges have arisen. If these parks are to remain among the leaders in fire management, everything from program objectives to our understanding of fire effects and how such information influences programmatic decisions must be periodically reevaluated. Specifically, we must improve our understanding of the long-term, cumulative effects of varying fire regimes and management activities on park ecosystems. As our understanding of ecosystem processes and interactions improves, program objectives must be revised as appropriate.

In an effort to facilitate such a review, a prescribed fire workshop was held in the parks in January 1993. Thirty individuals representing park and regional office staff, the CPSU at U/CA Davis, Yosemite NP scientists and managers, the Boise Interagency Fire Center, the USFS, and university researchers participated in this 3-day review.

Workshop objectives were to assess the current status of the prescribed fire management and fire effects research programs; review the existing information base, and determine if (and how) this information and subsequent recommendations have been applied by management; identify management and research concerns and needs, and develop strategies for acquiring and applying new information.

Basically, we asked where we are with the program, how we got where we are, where we want to go, and how to get there. Emphasis was given to identifying data needs and applications and overcoming perceived constraints. The format made for informal, open discussion around general agenda items. The timing was particularly appropriate in that the political and advocacy group pressures that often have driven the program have been relatively quiet in recent years. A growing number of questions from park staff regarding program objectives and accomplishments assured a receptive audience and active participation.

Examples of the issues included: (1) the tendency to emphasize fire behavior rather than ecological objectives as the basis for setting prescriptions and evaluating "success"; (2) the need to articulate more clearly the program goals (what do we really mean when we say "reduce fuels" and "restore fire as a natural process"?); (3) identification of the constraints (funding, air quality, state and regional preparedness planning) that keep more acreage from being burned; (4) whether the current rate of burning is sufficient to make a difference, and (5) ways to improve our understanding of historic fire regimes