

REVIEWS

Burning Questions: America's Fight with Nature's Fire. By David Carle. 2002. Praeger Publishers, Westport, CT. 298 pp. \$26.95. ISBN 0-2759737-1-9.

With recent catastrophic wildfires forcing another re-examination of the nation's fire management policies, David Carle's new book, *Burning Questions, America's Fight with Nature's Fire*, provides a timely, historical overview of the U.S. government's forest fire suppression efforts and the controversial practice of prescribed burning. For those unfamiliar with the story, Carle does an excellent job introducing the subject and describing the individuals involved. He weaves a fascinating story of how twentieth century fire management evolved. It is not, however, a dispassionate examination of people and events. Within the first few pages it becomes clear Carle intends to reveal how wrong-headed fire suppression policy has been during the past one hundred years, lionizing advocates of prescribed burning while deriding its opponents. Using the career of University of California fire ecologist Harold Biswell as a basic framework, Carle portrays the early U.S. Forest Service as an entrenched bureaucracy unwilling to listen to facts in their single-minded crusade to prevent forest fires. Biswell and other proponents of using fire as a management tool are described as quiet crusaders patiently continuing their research while resisting political pressure to do otherwise and not interfere with professional foresters trying to protect the country's natural resources.

The book uses extensive quotes from articles and personal letters to detail the historical debate on the proper role of fire in the nation's forests. The first few chapters describe early resource managers viewing trees as an agricultural crop needing protection from flames and ignoring evidence that fire is often a positive force in maintaining the health of some forests. The use of "light burning" or "Indian forestry" (the original terms for prescribed burning) to reduce forest undergrowth were seen as primitive and misguided. Trees needed to be protected. When three million acres burned in Idaho and Montana in 1910 during a ten-day spell of high winds and low humidity, killing 85 people, renewed political energy was directed toward coordinating fire suppression efforts between state and federal agencies. In 1927 a significant effort began to halt the annual burning practices of rural southern farmers in longleaf pine stands. During World War II, the government turned up the public relations campaign by brilliantly exploiting the dramatic images of the fire scene in Walt Disney's movie "Bambi" and inventing a new fire-fighting

mascot named Smokey Bear. By the early 1950's fire was successfully demonized as a truly evil force. It became the patriotic duty of all citizens to do their share to prevent forest fires. The phrases "Don't Play with Matches" and "Only You" were etched into the public's consciousness, representing one of the most successful advertising efforts in history.

It is now recognized that many land managers did not fully understand the important role fire can play in many forest ecosystems. Our success in excluding fire from some forests was a mistake and the negative consequences have been documented (Agee 1993), the most obvious being fuel buildup on the forest floor. The increased density of both dead and living biomass creates explosive conditions often leading to massive crown fires and extensive loss of life and property. Carle's continual "I told you so" perspective does become distracting at times, but the story he tells still provides an excellent description of how difficult it can be to change public policy in the face of bureaucratic inertia and personal agendas.

Unfortunately, Carle makes the same mistake Harold Biswell did when attempting to apply prescribed burning practices for forests too broadly; both have failed to understand the role of fire in California chaparral, viewing any dense growth of shrubbery as unnatural and in need of removal. In Carle's view, both overgrown forests and old growth chaparral are artifacts of modern fire suppression practices and need to be dealt with in the same manner, preferably by burning. The application of this "one-size-fits-all" model is especially curious since Carle clearly understands the distinctions between different types of forests, each with its own ecological requirements. After discussing the Yellowstone fires of 1988, he wrote, "Not all trees and not all forests are alike, and their relationship to fire form part of that variability. Lodgepole pine forests occupying most of the Yellowstone plateau are adapted to a different fire regime than lower elevation forests. . . ." Commenting on the complexity of the problem he writes later that "All of this can be confusing to people; it would be much simpler if every forest habitat followed one simple pattern."

Carle's misunderstanding of chaparral fire regimes is important because chaparral is California's most fire prone plant community. It is also the most extensive native vegetation type in the state. By repeating one of the more commonly held myths that "fire is necessary to keep the chaparral ecosystems vigorous and productive," Carle adds credence to a discredited idea and reveals a degree of unfamiliarity with current research. The notion that

chaparral needs to burn originated in the mid 1900's with studies concluding animal forage is reduced as chaparral stands age (Biswell et al. 1952). Since measurements were restricted to vegetation below 1.5 meters, above which deer could not reach, the research ignored the upper canopy where most growth occurs. Hanes (1971) gave further legitimacy to the idea by giving it a name; chaparral stands over sixty years old were "decadent" or "senile." More recent studies have failed to support this conclusion by showing no reduction in productivity in chaparral stands nearly a century old (Larigauderie et al. 1991) and increasing, not decreasing, levels of living biomass with chaparral age (Specht 1969; Rundel and Parsons 1979; Schlesinger and Gill 1980).

In reference to whether or not successful fire suppression efforts have created unnatural, dangerous fuel conditions in chaparral, Carle cites only those papers supporting prescribed burning in brushlands and ignores a significant amount of evidence questioning the usefulness of the practice (Dunn 1989; Keeley et al. 1999; Zedler and Seiger 2000). In particular, the Baja fire mosaic model, based on satellite imaging of southern California and northern Baja, is cited as proof chaparral fires remain small and stop at previous burn scars if they have been allowed to burn naturally in the past (Minnich and Chou 1997). No effort is made to question the model's basic assumptions that Baja and southern California landscapes provide valid comparisons, fire perimeters can be accurately determined by the methods described, and that older chaparral is more likely to burn than young chaparral. This is particularly ironic since descriptions of California's most destructive fires, all driven by extreme wind conditions rather than fuel type, are detailed in the same chapter.

The more recent Cedar fire in San Diego County, California in October 2003 demonstrated the relative importance of wind compared to fuel age by burning through multiple age classes of chaparral during dry, Santa Ana wind conditions. An eight-kilometer long, two to four kilometer wide stand of seven year old, chamise chaparral was unable to stop the fire front before it reached and burned several hundred homes in the community of Scripps Ranch and jumped a sixteen-lane interstate highway (Halsey unpublished data). According to prescribed burn proponents, the fire should have terminated in this area and gone no further. However, under severe wind conditions, previous burn scars and age class mosaics are not helpful in preventing the spread of wildfires because flying embers can travel up to a mile or more. Research analyzing fire histories up to 85 years in length from ten large shrubland landscapes between central California to Baja have also demonstrated that hazard of burning shows little relation to fuel age and time since the last fire (Moritz 2003; Moritz et al. 2004). Further

discussion of this subject can be found in Keeley and Fotheringham (2003).

Carle's intense focus on burning vegetation to help solve the danger of wildfire has also overshadowed the other half of the equation, community planning. Although wood shingles, narrow roads, and hillside homes were acknowledged as major contributing factors in the devastating 1991 Oakland/Berkeley Hills fire, the question of future design to help prevent another catastrophe was inadequately addressed. Californians live in a highly fire-prone environment and need to understand vegetation management is only part of an overall strategy to reduce fire risk. To his credit, Harold Biswell accurately predicted what happened in the 1991 fire several years before. His warnings were unfortunately ignored and remain so today by those living in nearby communities.

When Carle returns to discussing forests, however, he is clearly on familiar ground and provides excellent summaries of both the 1988 Yellowstone and 2000 Cerro Grande, New Mexico fires as well as the political fallout. Quoting Bruce Kilgore of the National Park Service, Carle pinpoints the end result of the government's successful campaign to convince its citizens that all forest fires are evil. Referring to the political and public outcry after the Yellowstone fires, Kilgore saw "a breakdown in public understanding of the natural role of fire in wildlands, and particularly in our ability to communicate through television, radio, and the press with the public about that role in Yellowstone and elsewhere."

In stressing the need to return fire back to forest ecosystems, Carle makes it very clear that focusing on just reducing fuels is the wrong approach. Fire must be reintroduced because it "moves across a landscape with random variability that transforms all of its impacts into ecosystem biodiversity for soil, plants, and animals, that makes every forest far 'more than the sum of its cellulose.'" This further complicates the use of logging to accomplish fuel reduction. Not only does timber harvesting take the largest trees and leave behind smaller, kindling-sized material, but also fails to support the necessary steps in creating a healthier forest through the reintroduction of fire.

The costs of excluding fire in certain ecosystems continue to be high as are the costs of failing to understand the risks we take when living within fire-prone environments. Prescription burning is definitely an important tool, but only when used in the appropriate natural community. As Carle writes in his final chapter, "We need to embrace a different, older relationship that humanity once had with fire. To recognize that fires are as essential to most of our wildlands as predators are essential to prey."

In recognizing the proper role of fire, it is also our responsibility to make sure it is applied in a manner consistent with the preservation of healthy communities, both human and wild.

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LITERATURE CITED

- AGEE, J. K. 1993. Fire ecology of the Pacific Northwest forests. Island Press, Covelo, CA.
- BISWELL, H. H., R. D. TABER, D. W. HEDRICK, AND A. M. SCHULTZ. 1952. Management of chamise brushlands for game in the north coast range of California. *California Fish and Game* 38:453–484.
- DUNN, A. T. 1989. The effects of prescribed burning on fire hazard in the chaparral: toward a new conceptual synthesis. Pp. 23–29 in N. H. Berg (ed.), *Proceedings of the symposium on fire and watershed management*. General Technical Report PSW-109. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.
- HANES, T. L. 1971. Succession after fire in the chaparral of southern California. *Ecological Monographs* 41: 27–52.
- KEELEY, J. E. AND C. J. FOTHERINGHAM. 2003. Impact of past, present, and future fire regimes on North American mediterranean shrublands. Pp. 218–262 in T. T. Veblen, W. L. Baker, G. Montenegro, and T. W. Swetnam (eds.), *Fire and climatic change in temperate ecosystems of the Western Americas*. Springer, New York, NY.
- , ———, AND M. MORAIS. 1999. Reexamining fire suppression impacts on brushland fire regimes. *Science* 284:1829–1832.
- LARIGAUDERIE, A., T. W. HUBBARD, AND J. KUMMEROW. 1990. Growth dynamics of two chaparral shrub species with time after fire. *Madroño* 37:225–236.
- MINNICH, R. A. AND Y. H. CHOU. 1997. Wildland fire patch dynamics in the chaparral of southern California and northern Baja California. *International Journal of Wildland Fire* 7:221–248.
- MORITZ, M. A. 2003. Spatiotemporal analysis of controls on shrubland fire regimes: age dependency and fire hazard. *Ecology* 84:351–361.
- , J. E. KEELEY, E. A. JOHNSON, AND A. A. SCHAFFNER. 2004. Testing a basic assumption of shrubland fire management: how important is fuel age. *Ecological Society of America. Frontiers in Ecology and the Environment* 2:67–72.
- RUNDEL, P. W. AND D. J. PARSONS. 1979. Structural changes in chamise (*Adenostoma fasciculatum*) along a fire induced age gradient. *Journal of Range Management* 32:462–466.
- SCHLESINGER, W. H. AND D. S. GILL. 1980. Biomass, production, and changes in the availability of light, water, and nutrients during development of pure stands of the chaparral shrub, *Ceanothus megacarpus*, after fire. *Ecology* 61:781–789.
- SPECHT, R. L. 1969. A comparison of the sclerophyllous vegetation characteristics of mediterranean type climate in France, California and Southern Australia. I. Structure, morphology, and succession. *Australian Journal of Botany* 17:277–294.
- ZEDLER, P. H. AND L. A. SEIGER. 2000. Age mosaics and fire size in chaparral: a simulation study. Pp. 9–18 in J. E. Keeley, M. B. Keeley, and C. J. Fotheringham (eds.), *Second interface between ecology and land development in California*. U.S. Geological Survey Open-File Report 00-62. U.S. Geological Survey, Sacramento, CA.