

## **1999 OUTREACH AND TECHNICAL ASSISTANCE**

### **News Media**

Stephenson was interviewed by both USA Today and the Sacramento Bee on giant sequoia ecology and management. The interviews focussed heavily on knowledge gained from the Sierra Nevada Global Change Research Program, including fire history and the effects of climatic change on giant sequoia populations. Both stories ran on the newspapers' front pages. Stephenson was also interviewed by a Japanese film crew for a documentary on fire and forest management, and supplied information on giant sequoias to ABC News to be used in its television special celebrating the millennium. Keeley was interviewed by the producer of Nova for an upcoming documentary on fire.

### **Universities and schools**

Keeley and Stephenson were invited participants at a workshop convened by planners of the newest University of California campus, U.C. Merced. The workshop focussed on setting priorities for the University's research focus the Sierra Nevada (including global change), and possible future collaborations. Stephenson gave a presentation to a visiting French school group, focussing on giant sequoia ecology and findings of the Sierra Nevada Global Change Research Program. Keeley gave invited presentations on his fire ecology research at the University of Montana and the University of Calgary.

### **NGOs and the private sector**

Stephenson was called upon by the Save-the-Redwoods League to help assess the privately-held Dillonwood grove of giant sequoias for possible purchase and donation to the National Park Service. Keeley was the invited after-dinner speaker at a meeting of the Society of American Foresters, Sacramento Chapter.

### **Federal, state, and local agencies**

Stephenson remained an active participant of the interagency Giant Sequoia Ecology Cooperative, which includes representatives from the U.S. Forest Service, National Park Service, Bureau of Land Management, California Department of Forestry and Fire Protection, California Department of Parks and Recreation, University of California, and U.S. Geological Survey. The Cooperative provides a forum for exchanging research findings and implications related to the management of giant sequoia ecosystems. Additionally, Stephenson was an invited speaker at the U.S. Forest Service workshop in Sacramento on "Giant Sequoias: a Blueprint for Change." Keeley was an invited speaker at a symposium sponsored by USDA and USGS on biodiversity and fire. Keeley also participated in a fire modeling workshop funded by the Joint Fire Science Board and held at the Angeles National Forest.

### **Department of Interior**

Stephenson acted as a subject matter expert during a fact-finding field trip by Tim Ahern, Secretary of Interior Bruce Babbitt's press secretary, in Sequoia and King's Canyon National Parks. Keeley contributed a peer review to the U.S. Fish and Wildlife Service on their "Draft Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada Foothills." Keeley also

participated in a Bureau of Land Management (BLM) field trip to observe and discuss management of Case Mountain, BLM (Tulare County).

### **National Park Service**

Stephenson, van Wagtendonk, and Keeley were invited speakers and participants at an interagency workshop in Rancho Cordova, convened by the National Park Service, aimed at defining forest structural goals for prescribed fire programs in the Sierra Nevada and southern Cascades. The workshop drew on their knowledge of past forest conditions, in a large part derived from findings of the Sierra Nevada Global Change Research Program. In a similar capacity, Keeley consulted on fire management objectives with the fire management team at Redwoods National Park. Keeley also participated in a workshop to define fire objectives for southern California national parks and monuments, and contributed to another workshop to develop inventory and monitoring strategies for these parks.

### **Yosemite and Sequoia and Kings Canyon national parks**

Through technical assistance, members of the Sierra Nevada Global Change Research Program played integral roles in the management of the national parks of the Sierra Nevada. In Sequoia and Kings Canyon National Parks, Stephenson and Keeley provided extensive and detailed scientific input into the Parks' revision of its Natural Resources Management Plan and Fire Management Plan. Stephenson and Keeley also served as members of the Parks' Fire Management Committee, helping with management decision-making and supplying information needed for setting fire management goals. Both scientists also acted as consultants in planning the Parks' multi-year, multi-million dollar vegetation mapping initiative. Stephenson assisted with annual training of the Parks' interpretive staff, updating them on the latest findings of the Sierra Nevada Global Change Research Program. Additionally, Stephenson acted as a consultant on the construction of a new, multi-million dollar Park museum, supplying relevant scientific information and fact-checking text for the proposed displays. Global Change staff members responded to many other requests for assistance by supplying the Parks with, for example, information on an outbreak of the defoliating Douglas-fir tussock moth (data gleaned from our long-term forest monitoring plots), and meteorological data needed by the Parks' maintenance staff for construction design.

Stephenson, Keeley, and van Wagtendonk gave formal presentations and participated in a major workshop aimed at designing a comprehensive ecosystem monitoring program for the national parks of the Sierra Nevada.

## **PROGRESS TOWARD A SYNTHETIC BOOK**

Fiscal Year 2000 will see a major push to integrate and synthesize results to date of the Sierra Nevada Global Change Research Program. The principal investigators and other potential chapter authors will meet in the Sierra Nevada in spring 2000 to compile chapter outlines. Our tentative book outline is as follows:

1. Introduction: Overarching themes

### THE PHYSICAL TEMPLATE

2. Contemporary climate and water balance
3. Late Holocene climatic variation
4. Scaling the physical drivers of forest pattern

### DISTURBANCE

5. Contemporary fire behavior and effects
6. Late Holocene fire regimes
7. Scaling fire regimes in space

### BIOTIC PROCESSES

8. Recruitment
9. Growth
10. Mortality

### INTEGRATION

11. Interactions, feedbacks, and couplings
12. Scales of variability and the pattern, pace, and mechanisms of change
13. Synthesis and prospectus

## 1999 PUBLICATIONS AND PRESENTATIONS

### Publications

A complete bibliography of the Sierra Nevada Global Change Research Program since its inception can be found at <http://www.werc.usgs.gov/sngc/>. The following publications were accepted for publication or published during calendar year 1999 only.

- Arbaugh, M. J., S. Schilling, J. Merzenich, and J. W. van Wagtenonk. In Press. A test of the strategic fuels management model VDDT using historical data from Yosemite National Park. Proc. Joint Fire Sci. Conf. and Workshop. Boise, ID.
- Carrington, M. E. and J. E. Keeley. 1999. Comparison of postfire seedling establishment between scrub communities in mediterranean- and non-mediterranean-climate ecosystems. *Journal of Ecology* 87:1025-1036.
- Chang, C.-R. 1999. Understanding fire regimes. Ph.D. dissertation, Duke University, Durham, NC.
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- Graumlich, L. J. In press. Global change and wilderness areas: disentangling natural and anthropogenic changes. In Proceedings: Wilderness Science in a Time of Change. Proc. RMRP=P-000. Ogden UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Center.
- Graumlich, L. J., and M. Ingram. 2000. Drought in the context of the last 1000+ years: some surprising implications. Pages 234-242 in *Drought: A Global Assessment*, D. Wilhite, ed., Routledge Press, New York.
- Keane, R. E., R. Burgan, and J. W. van Wagtenonk. In Press. Mapping of fuels for fire management across multiple scales: integrating remote sensing, GIS, and biophysical modeling. Proc. Joint Fire Sci. Conf. and Workshop. Boise, ID.
- Keeley, J. E. 2000. Chaparral. Pages 203-253 in M. G. Barbour and W. D. Billings (eds.), *North American Terrestrial Vegetation*. 2nd Edition. Cambridge University Press, N.Y.
- Keeley, J. E., C. J. Fotheringham, and M. Morais. 1999. Reexamining fire suppression impacts on brushland fire regimes. *Science* 284:1829-1832.
- Keeley, J. E., M. B. Keeley, and W. J. Bond. 1999. Stem demography and postfire recruitment of a resprouting serotinous conifer. *Journal of Vegetation Science* 10:69-76.

- Keeley, J. E., M. Baer-Keeley, and C. J. Fotheringham (eds). In press. *2nd Interface between Ecology and Land Development in California*. USGS Open-File Report 00-62.
- Keeley, J. E., and N. L. Stephenson. In press. Restoring natural fire regimes to the Sierra Nevada in an era of global change. In D. N. Cole and S. F. McCool (eds). *Proceedings: Wilderness Science in a Time of Change*. Proc. RMRS-P-000. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Keifer, M., N. L. Stephenson, and J. Manley. In press. Prescribed fire as the minimum tool for wilderness forest and fire regime restoration: a case study from the Sierra Nevada, CA. In D. N. Cole and S. F. McCool (eds). *Proceedings: Wilderness Science in a Time of Change*. Proc. RMRS-P-000. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- King, J. C. and L. J. Graumlich. In press. Stem-layering and krummholz persistence in whitebark pine (*Pinus albicaulis*) in the Sierra Nevada, USA. *Tree-Ring Bulletin*.
- Miller, C., and D. L. Urban. 1999. A model of surface fire, climate and forest pattern in the Sierra Nevada, California. *Ecol. Modelling* 114:113-135.
- Miller, C., and D. L. Urban. 1999. Interactions between forest heterogeneity and surface fire regimes in the southern Sierra Nevada. *Can. J. For. Res.* 29:202-212.
- Miller, C., and D. L. Urban. 1999. Forest pattern, fire, and climatic change in the Sierra Nevada. *Ecosystems* 2:76-87.
- Parsons, D. J., T. W. Swetnam, and N. L. Christensen. 1999. Uses and limitations of historical variability concepts in managing ecosystems. *Ecol. Appl.* 9:1177-1178.
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- Swetnam, T. W., C. D. Allen, and J. L. Betancourt. 1999. Applied historical ecology: using the past to manage for the future. *Ecol. Appl.* 9:1189-1206.
- Urban, D. L. In press. Using model analysis to design monitoring programs for landscape management and impact assessment. *Ecol. Appl.*

- Urban, D. L., M. F. Acevedo, and S. L. Garman. 1999. Scaling fine-scale processes to large-scale patterns using models derived from models: meta-models. Pages 70-98 in D. J. Mladenoff and W. L. Baker (eds.), *Spatial Modeling of Forest Landscape Change: Approaches and Applications*. Cambridge University Press, Cambridge, UK.
- Urban, D. L., C. Miller, P. N. Halpin, and N. L. Stephenson. In press. Forest gradient response in Sierran landscapes: the physical template. *Landscape Ecology*.
- van Wagtenonk, J. W. In press. Use of thematic mapper imagery to map fuel models. *Proceedings 13th Conf. on Fire and Forest Meteorology*.
- van Wagtenonk, J. W., and R. R. Root. In Press. Hyperspectral analysis of multi-temporal Landsat TM data for mapping fuels in Yosemite National Park. *Proc. Joint Fire Sci. Conf. and Workshop*. Boise, ID.
- Weise, D. R., R. Kimberlin, M. Arbaugh, J. Chew, G. Jones, J. Merzenich, and J. W. van Wagtenonk. In Press. A risk-based comparison of potential fuel treatment trade-off models. *Proc. Joint Fire Sci. Conf. and Workshop*. Boise, ID.

### **Selected presentations** (posters and talks)

- Falk, D. A. and T. W. Swetnam. 1999. Fire and climate histories. Presentation at Northern Arizona University - USGS Colorado Plateau Conference, Flagstaff Arizona, Oct. 26-27, 1999.
- Graumlich, L. J. 1999. Global change and wilderness areas: disentangling natural and anthropogenic changes. Oral presentation at the conference, *Wilderness Science in a Time of Change*. Missoula, Montana.
- Keeley, J. E. 1999. Role of fire in shrubland ecosystems. Abstracts, Annual Meeting of the Ecological Society of America.
- Keeley, J. E. and C. J. Fotheringham. 1999. Reexamining fire suppression impacts on brushland fire regimes. *CAFÉ Symposium on Fire Management: Emerging Policies and New Paradigms*, San Diego.
- Keeley, J. E., and N. L. Stephenson. 1999. Restoring natural fire regimes to the Sierra Nevada in an era of global change. Oral presentation at the conference, *Wilderness Science in a Time of Change*. Missoula, Montana.
- Keifer, M., N. L. Stephenson, and J. Manley. 1999. Prescribed fire as the minimum tool for wilderness forest and fire regime restoration: a case study from the Sierra Nevada, CA. Oral presentation at the conference, *Wilderness Science in a Time of Change*. Missoula, Montana.

- Menning, K. M., J. J. Battles, T. M. Benning, and N. L. Stephenson. 1999. Structural variability of a Sierra Nevadan forest analyzed in prelude to restoration by fire. Abstracts, Annual Meeting of the Ecological Society of America, p. 107.
- Menning, K. M., T. L. Benning, J. J. Battles, and N. L. Stephenson. 1999. Variability in forest fire fuel loads across a montane valley with high variability in forest structure. Proceedings of the 5th World Congress of the International Association of Landscape Ecology, p. 148 (abstract).
- Moore, C. M., N. L. Stephenson, V. G. Pile, A. M. Heard, J. E. Keeley, B. E. Johnson, and P. H. Whitmarsh. 1999. Long-term ecological research in Sequoia and Kings Canyon National Parks, California. Abstracts, Annual Meeting of the Ecological Society of America, p. 284.
- Stephenson, N. L. 1999. Reference conditions for giant sequoia forest restoration: structure, process, and precision. Abstracts, Annual Meeting of the Ecological Society of America, p. 35.
- Swetnam, T. W., J. L. Betancourt, and C. D. Allen. 1999. Comparisons of climate and disturbance history in the Pacific Northwest and American Southwest: insights for land management. Abstracts, Annual meeting of the Ecological Society of America, p. 36.
- Swetnam, T. W., J. L. Betancourt, and C. D. Allen. 1999. Inter-regional comparisons of climate, disturbance, and vegetation histories on a north-south axis in the western US: cautions and insights for land management. Presentation at Ecological Society of America Meeting, Spokane, Washington, August 1999. Abstract published in Bulletin of Ecological Society of America.
- van Mantgem, P. J. 1999. Determining the impacts of unplanned disturbances: coming to terms with pseudoreplication. California Association of Fire Ecologists annual meeting, San Diego, CA (abstract).

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