

**CAN WILDLAND FIRE USE RESTORE HISTORICAL FIRE REGIMES IN
WILDERNESS AND OTHER UNROADED LANDS?**

A proposal to the Joint Fire Science Program
In response to Request for Proposals, 2001-1, Task 1.
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Principal Investigators:

Carol Miller, USDA Forest Service

Rocky Mountain Research Station, Aldo Leopold Wilderness Research Institute
Address: ALWRI, 790 E. Beckwith Ave., P.O. Box 8089, Missoula, MT 59807
Phone: (406) 542-4198 FAX: (406) 542-4196 Email: cmiller04@fs.fed.us

David J. Parsons, USDA Forest Service

Rocky Mountain Research Station, Aldo Leopold Wilderness Research Institute
Address: ALWRI, 790 E. Beckwith Ave., P.O. Box 8089, Missoula, MT 59807
Phone: (406) 542-4193 FAX: (406) 542-4196 Email: dparsons@fs.fed.us

Duration of Project: 2 years; October 1, 2001 through September 30, 2003

Annual Funding Requested: Year 1: \$57,058 Year 2: \$30,458

Total Funding Requested: \$87,516

Total Value of In-Kind and Financial Contributions: \$42,925

Abstract:

Unroaded areas and areas managed as wilderness provide unique opportunities for applying wildland fire use (WFU) as a fuels management strategy and as a method for restoring historical fire regimes. But can WFU successfully restore historical fire regimes? An untested but common assumption is that natural ignitions can be used to restore or maintain historical fire regimes. This project will develop an approach to assess the current conditions of fuels and the feasibility of WFU as a strategy for restoring historical fire regimes in wilderness and on other unroaded lands. The information developed by this project will directly support the development of fire management plans. We will use 6-8 wilderness areas and national parks as study areas to develop our analysis approach. We will determine where WFU can be considered given the current conditions of fuels in the study area and the risks to ecological and social values both within and outside the wilderness or park. In areas where a WFU program can be considered, we will assess the availability of natural ignitions for restoring historical fire regimes and propose management options for those areas where natural ignitions are insufficient for accomplishing management objectives. Two rounds of site visits will facilitate an iterative two-way feedback process between research and management during which expert knowledge and analysis will be integrated with recorded data and model analyses.

Carol Miller, co-PI

David J. Parsons, co-PI

James Saveland, Asst. Director for Research
Rocky Mountain Research Station

INTRODUCTION

Project Justification

Wildland fire and fuels managers face unique challenges and opportunities on unroaded lands which include more than 105 million acres of federally designated wilderness. Reduced access to the interiors of these areas limit the ability to apply prescribed fire, thinning and other mechanical methods for fuels management. Further, manipulative methods for fuels management may be inappropriate for use in designated wilderness, and are limited by current legal and policy constraints. Current federal interagency fire policies facilitate the use of natural ignitions for wildland fire use (WFU). Unroaded areas and areas managed as wilderness provide unique opportunities for applying WFU as a fuels management strategy while satisfying legal and policy mandates to restore natural or historical fire regimes and ecosystem conditions. But can WFU successfully restore historical fire regimes?

Underlying the current fire policies that emphasize WFU is the assumption that natural ignitions are sufficient for restoring or maintaining historical fire regimes. Furthermore, restoring a historical fire regime is assumed to solve the fuels problem in wilderness and other unroaded areas. To date, neither of these assumptions have been tested. In many wilderness areas, current fuel conditions may preclude the use of wildland fire because of excessive risks to natural resource values within the wilderness or to social values in the adjacent wildland urban interface (WUI). In some areas, especially small wilderness areas with extensive WUI areas, WFU may never be feasible. Even in larger unroaded areas, human-caused ignitions are usually suppressed and there will always be an argument to suppress some natural ignitions because of these risks. Ignitions outside of these areas that otherwise would immigrate into wilderness are usually suppressed, further limiting the amount of natural fire that can occur. Before investing limited time and resources in developing and implementing a fire management plan, wildland fire and fuels managers need information and tools to help them evaluate the feasibility of WFU as a fuel reduction strategy and as a method for the restoration of historical fire regimes.

This project will assess the current conditions of fuels and the feasibility and effectiveness of WFU as a strategy for managing fuels and restoring historical fire regimes. If current conditions allow for WFU, we will determine if natural ignitions are sufficient for accomplishing fuels management and fire regime restoration objectives. This information will directly support the development of Fire Management Plans in wilderness and other unroaded areas.

The proposed project directly addresses the research needs described in Task 1 of RFP 2001-1 to “*evaluate the impacts of alternative management strategies*” (specifically WFU) “*on fire regimes in unroaded areas, wilderness areas, and other areas managed for similar purposes.*” The information produced will result in “*improved understanding of the options for restoring and managing fire in unroaded, wilderness, and similar areas*” and will provide a “*tool for evaluating and understanding management and restoration goals in unroaded, wilderness, and other areas with restricted access.*”

Further, through the assessment of current conditions in wilderness, we will be able to characterize the impacts of past policies on fuels, fire hazard, and fire behavior.

Project Objectives

We propose to develop the information necessary to assess the feasibility of wildland fire use (WFU) for restoring historical fire regimes and managing fuels in wilderness and on other unroaded lands. This information will help managers develop effective fire management plans. We will use 6-8 wilderness areas and national parks as study areas to develop our analysis approach. For these study areas, we will answer the following questions:

Where can WFU be considered given the current conditions of fuels in the study area and the risks to ecological and social values both within and outside wilderness or park?

In areas where a WFU program can be considered, are there enough natural ignitions to restore the historical fire frequency?

In answering the above questions, we will be able to identify:

To what degree can WFU be expected to restore historical fire regimes?

How many natural ignitions can be suppressed without compromising the ability to restore historical fire regimes?

What are the management options for areas where natural ignitions are insufficient for restoring historical fire regimes? For example, can human-caused ignitions be utilized to achieve management objectives?

We will identify those areas where restoration objectives can be most easily met through the use of natural ignitions; these areas could be given priority for implementing WFU programs. Results from this project will be used to identify key factors and features of unroaded lands that currently limit the feasibility of using WFU as a restoration strategy. The information developed will also identify areas within candidate WFU zones where the number, location, and timing of natural ignitions are inadequate for restoring historical fire regimes. In these areas, the use of human-caused ignitions will be evaluated in light of restoration objectives.

Background

The wilderness policies of all four federal wilderness management agencies recognize the importance of fire as a natural ecological process and the desirability of restoring the historical role of fire to wilderness ecosystems (Parsons and Landres 1998). In 1995, the Secretaries of Interior and Agriculture issued the Federal Wildland Fire Management: Policy and Program Review, providing policy direction for all federal wildland fire activities (U.S. Department of the Interior and U.S. Department of Agriculture 1995), and this was reviewed and updated in 2001 (U.S. Department of the Interior and U.S.

Department of Agriculture 2001). A guiding principle of the Federal Wildland Fire Management Program is that “The role of wildland fire as an essential ecological process will be incorporated into the planning process.” The current direction provides for allowing fires from natural ignition sources to be managed for resource benefits wherever an approved fire management plan is in place (Zimmerman and Bunnell 2000). Furthermore, the updated policy contains added emphasis on ecosystem sustainability and restoration (U.S. Department of the Interior and U.S. Department of Agriculture 2001).

To successfully integrate wildland fire use (WFU) as part of a fire management plan (FMP), the risks, benefits, and consequences of wildland fire must be considered. Many different approaches have been used for risk assessments (Wiitala and Carlton 1994, Close and Wakimoto 1995, Sapsis et al. 1996, Neuenschwander and Ryan 2000), and recently, some of these approaches have included an assessment of benefits from wildland fire (Caprio and Graber 2000, Miller et al. 2000). An assessment of risks and/or benefits can help delineate zones in a FMP where and under what conditions WFU is appropriate, and can be used to prioritize other restoration treatments such as prescribed fire or mechanical thinning (Burton et al. 2000, Keifer et al. 2000). A prerequisite to assessing risk from wildland fire is describing the current fire potential or hazard. Computer models can be used to estimate expected fire behavior potential from information on fuels and weather (Andrews 1986, Finney 1998) and fire severity is often approximated using these fire behavior predictions. Alternatively, pre-fire and post-fire data from remotely sensed imagery can be used to develop predictive models of fire severity (Medler 2000).

The historical fire regime is often used as a reference condition for fire management planning (Landres et al. 1999, Swetnam et al. 1999). Historical fire frequencies can be reconstructed from fire-scarred trees at points (e.g., Dieterich 1980), and this information is often extrapolated across a landscape or even a region based on vegetation type. With adequate sample size and sampling strategies, fire size can be inferred using the fire scar record (e.g., Swetnam 1993, Heyerdahl et al. 2001). Historical fire severity can be inferred from tree age distributions and knowledge of current fire behavior. Departure from the historical fire regime has been used to help determine what level of fire activity or fuels management is necessary for fire regime restoration (Hardy et al. 1999), where forests have been affected by fire exclusion (Barrett and Ingebretson 2000) and to estimate the ecological need for fire (Caprio and Graber 2000).

Models of ecological need (Caprio and Graber 2000) and fire exclusion maps (Barrett and Ingebretson 2000) have been developed that compute indexes for ranking areas based on the need to restore historical fire regimes. These indexes represent the difference between the amount of time that has elapsed since the last fire and the historical fire return interval, and therefore are well-suited for identifying where fire regimes have been altered. Unfortunately, these indexes do not distinguish between a short fire return interval ecosystem that has recently experienced fire and a long fire return interval ecosystem that hasn't been burned in a long time. However, it's clear that sustainable fire

management strategies and approaches for two such areas will be very different from one another.

Hardy et al. (1999) developed an index of condition class that describes the degree to which fire regimes and vegetation have been altered from their historical range. The condition class is used to suggest appropriate strategies for restoration. For example, where there is a small departure from historical conditions (e.g., Condition Class 1), wildland fire might be appropriate for maintaining conditions. Where conditions have been significantly altered (e.g., Condition Class 3), high levels of treatment may be necessary before fire can be used to restore the historical regime. This approach was intended only as a coarse-scale national assessment and is not appropriate for planning the smaller landscape scale. A project currently underway (LANDFIRE) will modify and apply this approach to a nation-wide mid-scale assessment which could be used for project level planning where finer scale data are lacking, but this project will not be completed for several years (J. Menakis, US Forest Service Fire Sciences Lab, personal communication). Although this approach suggests where WFU might be an appropriate strategy, it provides no information about the availability of ignitions for WFU and therefore does not address the feasibility of using wildland fire for restoring historical fire regimes.

To assess the feasibility of WFU as a strategy for restoring historical fire regimes, the frequency and location of ignitions, as well as their likelihood for spreading, must be evaluated. Decades of ignition location data are readily available from the National Interagency Fire Management Information Database (NIFMID). These point data include the location, date and cause of the ignition. To estimate the resulting fire patterns that might result from these ignition points, models of varying complexity can be used (Farris et al. 2000). Simulating mechanistic fire spread using FARSITE (Finney 1998) is one such modeling approach but the effort required to quantify the necessary fine-scale variables is probably not warranted for most planning purposes. Alternatively, GIS models offer more computational efficiency and flexibility (Farris et al. 2000) and GIS-based approaches can utilize knowledge of fire occurrence, fire behavior, and fire weather to predict the probability of burning for every location on a landscape (e.g., Miller, in review). Finally, predictive models of the probability of burning can be developed using empirical relationships between landscape variables and historical fire data (Chou et al. 1993, Chang 1999, Rollins 2000), but most areas lack the necessary number of samples in the historical fire record.

To develop strategies for the restoration of wildland fire and fire-prone ecosystems, knowledge of the historical fire regime is essential. Managers often do not have this information because of successful fire suppression efforts and a lack of comprehensive fire histories. In the absence of fire history information, estimates of the probability of burning might be used to derive historical fire regimes and preliminary targets for restoration objectives.

MATERIALS AND METHODS

Study areas

We will assess the feasibility of WFU for restoration of historical fire regimes in at least six areas that are managed primarily as wilderness. The selected study areas are from the northern Rockies, Sierra Nevada of California, and the Southwest. The study areas are: the Selway-Bitterroot Wilderness, Frank Church-River of No Return Wilderness, Gila-Aldo Leopold Wilderness Complex, Glacier National Park, Yosemite National Park and Sequoia-Kings Canyon National Parks. These study areas were selected for the availability of fire history information, local expertise and established fire use programs, and for prior collaborative relationships that we have with managers and other cooperating researchers. In addition, these study areas have experienced a relatively large number of fires in the 20th century and therefore provide important data for validating the modeling component of this project. In the final stage of the project, we will add at least two smaller wilderness areas to the study. Areas currently under consideration are Rocky Mountain National Park, Zion National Park, and several small wildernesses in Florida. Although less data may be available for validation, these areas present some of the greatest challenges for restoring historical fire regimes through the use of wildland fire due to their small size.

Data acquisition

Data required to complete the proposed project include recorded and expert knowledge for each of the study areas. Data are either available at or will be converted to 30 m resolution.

Recorded data

Information on historical fire regimes is necessary to provide a benchmark with which to compare the current conditions. Pre-settlement fire histories and digital fire atlas data for 20th century fires will be compiled for each of the study areas. Where possible, data from the fire scar record will be used to derive pre-settlement fire histories, but in the absence of such data, information from the literature and data from similar vegetation types will be extrapolated to the study areas.

Biophysical data required for each of the study areas include information on vegetation and fuels, and a DEM from which elevation, slope, and aspect data layers can be derived. In addition, derived data from a cooperating project “Mapping Fire Hazards Directly with Remote Sensing” proposed by Michael Medler of Rutgers University will be available for the Selway-Bitterroot Wilderness, Glacier National Park, and Yosemite National Park.

Timing and location of ignitions and fire weather data will be acquired from the National Interagency Fire Management Information Database (NIFMID). Ignition density maps will be derived for each month of the fire season and percentile weather conditions will be determined for each of the study areas (Miller, in review).

Expert knowledge

We will conduct site visits to each study area where fire management staff will be asked to review the available recorded data and associated GIS maps that we will derive. We will incorporate their understanding and knowledge of fire histories, past or recent fire behavior, existing fuels and existing fire management plans. This expert knowledge will be used to improve the recorded data. Through discussions with fire management staff, we will also determine the most important values at risk and values that are known to benefit from wildland fire.

Analyses

Modeling analysis

We will improve and use the GIS model described in Miller (in review) to estimate the probability of burning across each of the landscapes. The model improvements will better account for extreme fire weather and resulting rapid fire spread. In addition, the use of different indexes for drought will be tested for their ability to estimate length of fire season, a parameter required by the model.

Expected fire behavior will be calculated from the fuels and weather data using the modeling tool FlamMap (M. Finney, US Forest Service Fire Sciences Lab, unpublished model). These results will be used to estimate where fire effects are expected to be too severe for judicious use of wildland fire. Where expected fire severity has been derived from satellite imagery (e.g., cooperative proposal by Michael Medler), these results will also be used to delineate zones where wildland fire use is unsuitable. Comparison of the two methods provides a valuable validation exercise.

The probability surfaces generated by the improved model and the expected fire severity will be combined and used to evaluate the risks and benefits of wildland fire.

Expert analysis

We will revisit each of the study areas and present the risk-benefit analysis to fire management and planning staff. With the assistance of managers, we will delineate WFU zones within each study area.

Feasibility assessment

For the WFU zones identified through the risk-benefit analysis, we will evaluate the availability of natural ignitions for restoring historical fire regimes. Ignitions falling outside of approved WFU zones will be removed from the analysis and the probability of burning will be recomputed. The probability of burning generated by the model will be used to derive expected fire return intervals across the landscape. The expected fire return intervals will be compared with the fire history data for the area. From this analysis, we will identify where additional ignitions may be needed to restore historical fire regimes and we will assess the availability of human ignitions for this.

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PROJECT DURATION

2 years: October 1, 2001 through September 30, 2003.

	<u>2001</u>	<u>2002</u>	<u>2003</u>
	O N D	J F M A M J J A S O N D	J F M A M J J A S
Data acquisition	XXXXX		
Incorporate expert knowledge		XXXXXX	
Analyses		XXXXXXXXXX	
Identify WFU zones			XXXXXXXXXX
Feasibility assessment			XXXXXXXXXX

BUDGET REQUESTED FROM JFSP

	Year 1	Year 2	Total
<u>Personnel</u>			
Co-PI (Parsons)	\$0*	\$0*	\$0*
Lead analyst and co-PI (Miller)	\$0*	\$0*	\$0*
Research applications staff	\$0*	\$0*	\$0*
GIS analyst/data manager (GS11)	<u>\$29895</u>	<u>\$15470</u>	<u>\$45365</u>
Salary Totals	\$29895	\$15470	\$45365
<u>Travel</u>			
Site visits (6 sites)	\$7400	\$3700	\$11100
Conferences (3 trips)	\$1200	\$2400	\$3600
JFSP PI meetings (2 persons)	<u>\$2000</u>	<u>\$2000</u>	<u>\$4000</u>
Travel Totals	\$10600	\$8100	\$18700
<u>Operations</u>			
Office, computer supplies	\$5000	\$0	\$5000
Facilities/administration	\$4250	\$2125	\$6375
Data acquisition	\$1200	\$0	\$1200
Publication costs	<u>\$0</u>	<u>\$1500</u>	<u>\$1500</u>
Operations Totals	\$14700	\$10000	\$14075
Total Direct Costs	\$50945	\$27195	\$78140
Indirect Costs (12% of TDC)	\$6113	\$3263	\$9376
Total Costs	\$57,058	\$30,458	\$87,516

CONTRIBUTION FROM RMRS

	Year 1	Year 2	Total
<u>*Personnel</u>			
Co-PI (Parsons)	\$3000	\$3000	\$6000
Lead analyst and co-PI (Miller)	\$14300	\$11125	\$25425
Research applications staff	\$3000	\$3000	\$6000
Salary Totals	\$20300	\$17125	\$37425
 <u>Operations</u>			
Office, computer supplies	\$1000	\$1000	\$2000
Facilities/administration	\$2000	\$1500	\$3500
Operations Totals	\$3000	\$2500	\$5500
 Totals	 \$23300	 \$19625	 \$42925

Personnel

A GIS analyst/data manager will be hired as a full-time employee at the GS11 level but will be shared with other projects. Salary and fringe (38%) has been charged at half-time for the first year and one-fourth time for the second year. The GIS analyst/data manager will acquire and manage the digital data, incorporate the expert knowledge gained through discussions with fire management staff from the study areas, and perform the required analyses. Salaries for co-PIs Dr. David Parsons, Dr. Carol Miller, and a research applications specialist will be provided by the Rocky Mountain Research Station. Dr. Carol Miller will serve in a lead analyst role, providing direction for model development and analysis. The research applications staff will assist and support technology transfer efforts.

Travel

Cooperation and coordination with wildland fire and fuels managers is critical for the completion of this project. Two site visits to each study area will be required, and both the lead analyst and the GIS analyst/data manager will attend the first round of site visits. The second round of site visits will require the attendance of only the lead analyst. Travel to the two sites in the Sierra Nevada will be combined to minimize expenses. Travel expenses have been included for presentation of research results at one conference in the first year and two conferences in the second year. Travel expenses to two annual JFSP Principal Investigator meetings have been included for the two co-PIs.

Operations

A laptop computer will be required for the site visits and additional disk storage will be required for use by the GIS analyst/data manager. Charges for the GIS analyst/data manager's office space and supporting facilities administration have been included based on the full-year rate of \$8500 per year. Computer use and supporting facilities administration for the co-PIs and the research applications specialist will be provided by the Rocky Mountain Research Station.

DELIVERABLES

We will provide all raw and derived data to the management staff at each of the study areas. Risk-benefit analyses and related maps will be produced for each study area, including one delineating WFU zones. A report evaluating the availability of natural ignitions for accomplishing management objectives in wilderness will be delivered to each study area at the end of the two-year project. Two published journal articles will result from this work and will be complete at the end of the project. One will report on the availability of natural ignitions for restoring fire regimes and will be submitted to a peer-reviewed journal. The second will be submitted to Fire Management Today and will discuss the development of FMPs. We will present our research progress and results at 3 national professional conferences. Finally, although we will not write FMPs ourselves, we expect that the risk-benefit analysis we provide and the feasibility analysis for WFU will result in the revision and evaluation of current FMPs.

TECHNOLOGY TRANSFER

Effective technology transfer includes both the transfer of information to the user and feedback from the user to the research. The Leopold Institute has a Research Application staff to facilitate this two-way transfer of information between researchers and managers on a variety of wilderness issues. The program includes making scientific information available to agency managers, educators, and policy-makers, as well as communicating scientific needs of federal land managers to the Institute researchers and recent funding from the National Fire Plan will allow us to build upon our existing program.

In addition to the in-house technology transfer support that our Research Applications staff will provide, the proposed project will capitalize on an iterative two-way feedback process between research and management. During the first round of site visits, we will collect valuable expert knowledge and use this knowledge to refine and improve the data before any analysis is performed. After we have developed the risk-benefit maps, we will revisit with fire management staff and they will use these analyses directly to establish WFU zones. This is information that can feed directly into a Fire Management Plan. After identifying the WFU zones, we will assess the availability of natural ignitions for restoring historical fire regimes and propose management options for those areas where natural ignitions are insufficient for accomplishing management objectives. The results of these final analyses will be provided to the fire management staff at each of the study areas in the form of a written report, maps, and electronic GIS data layers.

QUALIFICATIONS OF INVESTIGATORS

Dr. Carol Miller has more than 9 years of experience modeling fire regimes at landscape scales and investigating the options for restoration of fire. She has studied the role of wildland fire in wilderness ecosystems in the Sierra Nevada of California and the northern Rockies. As a postdoctoral scholar with the University of Montana, she developed a GIS-based model to quantify the risks and benefits of fire. She has more than 3 years experience working with spatial fire and fuels data and has developed methods to estimate the probability of burning at landscape scales.

Dr. David J. Parsons has 21 years experience as a Research Biologist with the National Park Service and National Biological Survey and 7 years experience as Director of the Aldo Leopold Wilderness Research Institute, the only research group in the U.S. dedicated to developing the knowledge needed to improve management of wilderness and other natural areas. He has been closely involved with wildland fire and fuels management issues as a research scientist and policy reviewer. He has coordinated development and oversight of interdisciplinary research teams to address the effects of fire and fuels management and their implications for ecosystem restoration and sustainability.

CAROL MILLER
ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE
P.O. BOX 8089, MISSOULA, MONTANA 59807
(406) 542-4198, Fax (406) 542-4196
Email: cmiller04@fs.fed.us

CURRENT POSITION

Research Fire Ecologist, Aldo Leopold Wilderness Research Institute, Rocky Mountain Research Station, USDA Forest Service, Missoula, MT; May 2001

RELATED EMPLOYMENT HISTORY

1998-2001: Postdoctoral Research Associate, University of Montana, School of Forestry, Missoula, MT.

1991-98: Graduate Research Assistant; Department of Forest Sciences and Graduate Degree Program in Ecology, Colorado State University, Fort Collins, CO.

EDUCATION

B.S., Electrical Engineering, 1985. Penn State University
M.S., Forest Sciences, 1994. Colorado State University
Ph.D., Ecology. 1998. Colorado State University

RECENT PROFESSIONAL ACTIVITIES

Organizer and host, Workshop on Managing the Risks and Benefits of Wildland Fire, April 5-6, 2000, Missoula, MT.

Invited participant, Conference on the Social Acceptability of Fuel Treatments on Western Public Lands, October 22-25, 2000, Missoula, MT.

Invited participant and presenter, Southern Sierra Geographic Information Cooperative Workshop, May 23-24, 2000. Presentation title: Evaluating risks and benefits for wildland fire and fuels management.

Invited presenter, Fire Sciences Laboratory Seminar Series, April 7, 1999. Presentation title: Modeling fire regimes at landscape scales.

Invited participant and presenter, Sequoia-Kings Canyon National Park Fire Program Review, March 17, 1998. Presentation title: Fire and forest dynamics modeling.

Invited participant, Workshop to Assess the Effects of Fire Disturbance on Ecosystems, April 17-19, 1996, Seattle, WA.

Membership: U.S. International Association for Landscape Ecology, Ecological Society of America, Association for Fire Ecology.

Peer-reviewer: Ecological Modelling, Ecological Applications, National Science Foundation.

SELECTED PUBLICATIONS

Miller, C., P. B. Landres, and P. B. Alaback. 2000. Evaluating risks and benefits of wildland fire at landscape scales. Pages 78-87 in Proceedings of the Joint Fire Science Conference and Workshop, Volume I, June 15-17 1999, Boise, ID.

Miller, C. and D. L. Urban. 2000a. Connectivity of forest fuels and surface fire regimes. *Landscape Ecology* 15: 145-154.

Miller, C. and D. L. Urban. 2000b. Modeling the effects of fire management alternatives on mixed-conifer forests in the Sierra Nevada. *Ecological Applications* 10:85-94.

Urban, D.L., C. Miller, P.N. Halpin, and N.L. Stephenson. 2000. Forest gradient response in Sierran landscapes: the physical template. *Landscape Ecology* 15: 603-620.

Miller, C. and D.L. Urban. 1999a. A model of surface fire, climate and forest pattern in the Sierra Nevada, California. *Ecological Modelling* 114:113-135.

Miller, C. and D. L. Urban. 1999b. Forest pattern, fire, and climatic change in the Sierra Nevada. *Ecosystems* 2:76-87.

Miller, C. and D. L. Urban. 1999c. Interactions between forest heterogeneity and surface fire regimes. *Canadian Journal of Forest Research* 29: 202-212.

Urban, D.L. and C. Miller. 1996. Modeling Sierran forests: capabilities and prospectus for gap models. Pages 733-744 in Sierra Nevada Ecosystem Project (SNEP) Final Report, Vol. III.

DAVID J. PARSONS
ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE
P.O. BOX 8089, MISSOULA, MONTANA 59807
(406) 542-4193, Fax (406) 542-4196
Email: djparsons@fs.fed.us

CURRENT POSITION

Director, GS-401-15, Aldo Leopold Wilderness Research Institute, Rocky Mountain Research Station, USDA Forest Service, Missoula, MT; 1994-present

EMPLOYMENT HISTORY

1993-94: Research Biologist and Field Station Leader, GM-15. National Biological Survey, Sequoia and Kings Canyon National Parks Field Station, Three Rivers, CA

1973-93: Research Scientist, GS-11/12/14. National Park Service, CPSU, University of California, Davis (Duty stationed at Sequoia and Kings Canyon NPs)

1969-72: Teaching Assistant and NIH Research Associate; Depart. Biological Sciences, Stanford University

EDUCATION

B.S. with Highest Honors, Biological Sciences, 1969. UC, Davis, (Jack Major, Advisor).

Ph.D. in Population Biology - Plants. 1973. Stanford University, Dissertation: (Harold A. Mooney, Major Professor)

RESEARCH INTERESTS

Fire Ecology and Management
Wilderness Management
Ecosystem and Park Management Policy

RECENT PROFESSIONAL ACTIVITIES

- 2001-present: Member, Board of Directors, George Wright Society
- 2001: Invited speaker at Ecological Society of America (ESA) symposium on Science in Parks, Madison, WI
- 2000: Member, Ecological Society of America's Committee to Provide Peer Review for the National Park Foundation's National Parks Ecological Research Fellowship Program.
- 1998-present: Member, Ecological Society of America's Sustainable Biosphere Initiative Advisory Committee
- 1992-present: Member, Editorial Board, *Ecological Applications*
- 1993-96: Member of Science Team, Sierra Nevada Ecosystem Project
- 2001: Organizer and Moderator for plenary panel on the Pinchot Institute's Wilderness Management Review Committee, George Wright Society Meeting, Denver, CO
- 1999: Invited speaker at Old Forest Workshop for Sierra Nevada Framework, Davis, CA

-1999: Organizer and moderator for ESA symposium on Paradigms of Forest Restoration: Managing for Structure and Process, Spokane, WA

SELECTED PUBLICATIONS

Parsons, D. J. and S. H. DeBenedetti. 1979. Impact of fire suppression on a mixed-conifer forest. *Forest Ecology and Management* 2:21-33.

Parsons, D. J., D. M. Graber, J. K. Agee and J. W. van Wagtendonk. 1986. Natural fire management in national parks. *Environmental Management* 10(1):21-24.

Parsons, D. J. 1991. Restoring fire to the Sierra Nevada mixed conifer forest: reconciling policy, science and practicality. Pp. 271-279 in H. G. Hughes and T. M. Bonnicksen, eds. *Proc. 1st Ann. Mtg Society for Ecological Restoration*. Society for Ecological Restoration, Madison, WI.

Stephenson, N. L., Parsons, D. J., and T. W. Swetnam. 1991. Restoring natural fire to the sequoia-mixed conifer forest: should intense fire play a role? Pp. 321-337 in *Proceedings 17th Tall Timbers Fire Ecology Conference*. Tall Timbers Research Stn, Tallahassee, FL

Parsons, D. J. 1995. 25 years of restoring fire to giant sequoia groves: what have we learned? Pp. 256-258 in Brown, J.K., R.W. Mutch, C.W. Spon, and R.H. Wakimoto, *Proc: Symposium on Fire in Wilderness & Park Management*. USDA Forest Service Gen. Tech. Report INT-GTR-320.

Parsons, D. J. and J. W. vanWagtendonk. 1996. Fire research and management in the Sierra Nevada national parks. Pp. 25-48 In Halvorson, W.L. and G.E. Davis, eds. *Science and Ecosystem Management in the National Parks*. Univ. of Arizona Press, Tucson, AZ.

Parsons, D. J. and S. J. Botti. 1996. Restoration of fire in national parks. Pp. 28-31 in Hardy, C.C. and S.F. Arno, eds. *The Use of Fire in Forest Restoration*. USDA Forest Service Gen. Tech. Report INT-GTR-341.

Parsons, D. J. and P. B. Landres. 1998. Restoring natural fire to wilderness: how are we doing? Pp. 366-373 in T.L. Pruden and L.A. Brennan (eds.). *Fire in ecosystem management: shifting the paradigm from suppression to prescription*. Tall Timbers Fire Ecology Conference Proceedings, No. 20. Tall Timbers Research Stn., Tallahassee, FL.

Parsons, D.J. 2000. The challenge of restoring natural fire to wilderness. Pp. 276-282 in Cole, D.N., S.F. McCool, W.T. Borrie, and J. O'Loughlin. *Proc: Wilderness Science in a Time of Change Conference*, RMRS-P-15-VOL-5. Ogden, UT: USDA, Forest Service.

Arno, S.F., D.J. Parsons and R.E. Keane. 2000. Mixed-severity fire regimes in the northern Rocky Mountains: consequences of fire exclusion and options for the future. Pp. 225-232 in Cole, D.N., S.F. McCool, W.T. Borrie, and J. O'Loughlin. *Proc: Wilderness Science in a Time of Change Conference*, RMRS-P-15-VOL-5. Ogden, UT: USDA Forest Service.