



**Dept of Environmental Science, Policy, and Management**

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April 15, 2005

Dr. Richard Standiford  
Associate Vice President of Agriculture and Natural Resources  
University of California  
1111 Franklin St.  
Oakland, CA 94607-5200

Dear Rick:

On behalf of my colleagues at the University of California, I submit the attached proposal in response to the Memorandum of Understanding regarding the University's participation as an independent and neutral third party in the adaptive management and monitoring plan mandated by the Sierra Nevada Forest Plan Amendment. The planning team consists of 16 members that include faculty from UC Berkeley and Merced as well as UC Cooperative Extension Specialists and Advisors. This team represents an impressive collection of expertise of sufficient diversity to address the complex issues raised by the question of management of Sierran forests.

The goal of this research proposal is to learn how to make adaptive management a practical means to understanding ecosystem behavior given the current plans to manage Forest Service lands in the Sierra Nevada. In the course of our discussions, we identified five key elements that we believe are crucial to achieve "a refined and active multiparty adaptive management and monitoring system consistent with the SNFPA."

- 1) Adaptive management should be implemented as a careful testing of hypotheses where the "experiment" is the management treatments.
- 2) The process must include substantive and sustained participation of all interested parties.
- 3) Any monitoring plan should address multiple aspects of ecosystem response.
- 4) The spatial and temporal scale of the monitoring regime must match that of the management regime. Thus firesheds, landscapes on the order of 1,000 ha in size, are considered the experimental unit in this proposal.

5) A case study approach is the best strategy to encompass the complex physical, biological, and social gradients that exist along the Sierra Nevada.

We have elaborated on these elements in the proposal and outlined an agenda for developing a well-informed and well-formulated workplan. We are eager to work with the Forest Service, the Fish and Wildlife Service, and the State Resources Agency to define and implement this plan.

Sincerely yours,

John J. Battles

Assoc. Professor of Forest Ecology

Co-Director, Center for Forestry

Learning how to apply adaptive management in the Sierra Nevada Forest Plan Amendment: A research proposal by the University of California Science Team.

Adaptive management has been more influential, so far, as an idea than as a practical means of gaining insight into the behavior of ecosystems utilized and inhabited by humans.

Lee 1999

## MISSION STATEMENT

The fundamental mission of the University of California (UC) is to conduct basic research, educate University students, and provide public outreach. Given this mission and the importance of the questions posed, we accept the challenge to help design an adaptive management plan consistent with the Sierra Nevada Forest Plan Amendment (SNFPA). While we offer our expertise in research, teaching, and outreach, we have no authority to implement management decisions or to make public policy. Any successes will depend on building effective and lasting collaborations among land managers, university researchers, policy makers, and interested citizens.

## INTRODUCTION

The goal of this research proposal is to learn how to make adaptive management a practical means to understanding ecosystem behavior given the current plans to manage Forest Service lands in the Sierra Nevada. We will explore strategies to integrate public involvement into this adaptive management framework and design field methods to capture ecosystem responses to landscape prescriptions. As noted in the Record of Decision (SNFPA 2005), the threat posed by catastrophic fire requires the modification of wildland fire behavior across broad landscapes (1,000's of ha). The concern is how this focus on wildfire will impact other forest resources such as wildlife habitat and water quality. To date there is not enough information available to definitively assess the trade-offs implicit in this plan. Thus there is a need to use an adaptive management framework.

**Conceptual framework.** Incorporating experimentation into the design and implementation of resource management is the basis for adaptive management. This process makes adaptive management responsive to new information, changing conditions, and natural complexity (McLain and Lee 1996). At its core, adaptive management explicitly recognizes that non-equilibrium dynamics commonly govern natural ecosystems. In other words, since nature is constantly changing, our management must change along with it.

In this framework, adaptive management is not a process of trial and error but rather the careful testing of hypotheses, monitoring of results, and feedback into further refinement of ecosystem structure and function (Walters 1997). We acknowledge the scientific and institutional challenges to this approach (Grumbine 1997, McLain and Lee 1996, Walters 1997, Carpenter 1998). Nevertheless management experiments need controls and replicates in order to provide scientific information to feed back into a model, conceptual or otherwise, of ecosystem functioning. This model can then be used to inform further experiments or management initiatives and policies (Lee 1999). Adaptive management brings monitoring into the experimental process, using monitoring of outcomes to refine ecosystem understanding in a systematic way. Experimental design becomes a part of management and monitoring. For this reason, expertise in experimental design is crucial to the process so that outcomes are meaningful and provide feedback on a rigorous basis.

**Research opportunity.** The implementation of the SNFPA offers an opportunity to research the use of collaborative planning and participation processes in adaptive management. Adaptive management is often held to be an alternative to “command and control” natural resource management, in that it is associated with meaningful stakeholder participation. Adaptive management, designed to be “adaptive” to changes in ecosystem conditions, can also be responsive to changes in social values and environmental conditions, while maintaining experimental rigor. Defining existing conditions --the status, characteristics, and processes to date of decisionmaking and participation in the Sierra plan – is an important early step. Information gathered about these initial conditions and the assessment of other participatory initiatives is then used to develop and test strategies for public and stakeholder involvement in plan implementation.

At the same time, we posit that the implementation of ecological or biological initiatives must integrate with stakeholder processes. The decisions, values, and responses of stakeholders to plan implementation must feedback into ecological initiatives, and the monitoring and feedback of ecological information must be transmitted to stakeholder groups in ways that allow for effective responses from these groups. These processes, public involvement and ecological management, must operate in congruence and mutually inform one another. Our research program will focus on how to effect this mutually informative process. The anticipated product will be an adaptive management program that draws on the best ecological and social forms of information. Below we highlight specific objectives that we view as crucial to the success of this project.

## SPECIFIC OBJECTIVES

**Building public understanding and trust.** Adaptive management in the context of Forest Service aspirations for collaboration and participation inherently requires gathering information and incorporating it into an integrated model of how the ecosystem works. If the model is to effectively illustrate ecosystem function, it must be both understandable and accessible to all participants.

**Measuring physical and natural processes at relevant management scales.** In this case the most salient management unit is a fireshed -- landscapes spanning thousands of hectares that will be managed on the basis of their historical fire regime and current fire risk (USFS PSW 2004). For such landscapes, the interconnectedness of natural systems at different spatial and temporal scales requires identification of key functional indices and a commitment to long-term monitoring. Monitoring must emphasize processes as well as patterns and provide information in ways useful to participatory and collaborative processes. An exclusive focus on physical structure is not sufficient to protect natural processes and species dependent on them, including humans, but instead will require an integrated approach using fine-scale, on-the-ground measures of ecosystem processes with remotely-sensed data at the landscape scale.

**Integrating competing public interests.** Environmental conflicts are frequently as much about competing human objectives as they are about resource allocation and ecosystem health (Huntsinger and Hopkinson 1996). A process of adaptive management can be used, through cooperation and collaboration among a wide range of stakeholders, to foster common values and an appreciation for other people's interests (Ludwig et al. 1993, McLain and Lee 1996, Grumbine, 1997). As the model or understanding of the ecosystem unfolds and is refined, the intended result is that diverse segments of the public and managers will find increasing areas of commonality and agreement.

**Identifying conflicting outcomes.** One of the most challenging aspects of an adaptive management plan is what to do when results indicate that two or more management objectives conflict when a management decision is implemented. For example, fuels management objectives call for reducing forest fire hazards with little regard for the potential detrimental effects of these treatments on other ecosystem conditions, such as the spread of noxious weeds or impacts to rare and endangered species habitat (Stephens and Ruth 2005).

**Improving on the "strategy of hope."** Rogers (1998) rightly criticizes scientists who often operate under the "strategy of hope" -- the hope, or even expectation, that managers will find their work useful. At the same time, it often seems to scientists that managers ignore reliable scientific information. To succeed, organizational infrastructure must be built that supports a scientific/management partnership where information needs and information products are appropriately matched.

## RESEARCH PROSPECTUS

**Study design.** In order to sample the social and biophysical heterogeneity encompassed by the 4.7 million ha of public land in the Sierra Nevada managed by the USFS, we propose a case study approach. This approach recognizes the idiosyncratic nature of forest communities where the response of social institutions and forest ecosystems to human intervention is strongly dependent on environmental and social context. However as noted by Simberloff (2004), a collection of carefully chosen case studies can serve two purposes: 1) Individually, they will

provide relevant information to help manage specific landscapes; 2) Collectively, they can point to rough generalizations that can guide further case studies. Additionally, by approaching ecosystem processes at multiple spatial scales, we can leverage the detailed information collected to similar landscapes throughout the Sierra Nevada, even though these may not be contiguous with our case study areas. In an adaptive management framework, these “rough generalizations” would guide revisions in the management plan and facilitate the planning of other projects in the Sierra Nevada.

A major task in developing the work plan would be choosing appropriate case studies representative of the range of issues and challenges that currently exist. These sites would be selected in close collaboration with managers and scientists from the USFS, the Fish and Wildlife Service, and the California Resources Agency. Ideally they would build on existing projects and capitalize on available information. At the same time, we must select sites and design studies that are relevant to the management plan as described in the current Sierra Nevada Forest Plan (SNFPA 2005). Namely, the case studies must address the landscape-scale modification strategy adopted in the Record of Decision.

Research questions will be tailored to the specifics of each site, yet all investigations will contribute to developing the rough generalizations regarding the application of adaptive management plans. It makes sense for each case study to coincide with an ongoing firehatched assessment with project planning well underway. Under this design, the management plans in effect would be the experimental treatments. One task of the UC science team would be to devise and implement research strategies to quantify the impact of the treatments on key ecosystem metrics. We are convinced of the necessity for a multi-metric approach. This approach is essential because a focus on a single ecological or physical parameter, no matter how compelling, will inevitably provide an incomplete evaluation. At the same time, as a practical matter, we would need to limit the number of parameters addressed.

The determination of which aspects of ecosystem function are important is a societal question informed by scientific investigation and overarching management objectives. This determination is an essential phase of adaptive management (Rogers 1998) because it is here where public standards (*sensu* FDA 2004) are defined. We expect these standards to vary across the Sierran gradient. Different communities have different relationships to their natural resources. For example, residents of Kings Beach on the shore of Lake Tahoe may have different

priorities compared to citizens of the small northern California town of Downieville. Moreover, the ecological communities of the Tahoe Basin and the roadless areas near Downieville are as different as the human communities. Understanding these differences, and taking them into account in order to outline coherent plans for adaptive management and scientific research is an important objective of this proposal.

Despite the demand for flexibility across the case studies, we expect to consistently address themes pertinent to the Record of Decision. As noted in Adaptive Management Strategy (SNFPA E. 2004), the priorities include: 1) fuel management and fire behavior, 2) habitat of sensitive species, 3) water quality and yield, and 4) forest health and timber yield. Once site-specific priorities are set, the UC science team will work with federal, state, and local partners to implement innovative research designs to measure management impact on forest resources and ecosystem attributes. To do so, we will have to solve a series of difficult problems, including: 1) Results obtained at one spatio-temporal scale may not reflect processes at another scale; 2) Experimental control, replication, and reference needed for the evaluation of treated effects will be difficult to find; and 3) The potential complexity of the responses (e.g., threshold or hysteresis effects) muddied by stochastic influences will restrict cause-effect inferences.

**Site implementation.** As noted above, the development of a landscape-level, multi-metric measurement plan poses substantial scientific challenges. Given the impracticality of a comprehensive scheme, variable selection is a critical decision. These metrics must be responsive to treatments at the appropriate temporal and spatial scales and we must be able to quantify changes in these variables. To be successful we will have to rely on techniques from landscape ecology and remote sensing to efficiently allocate our sampling efforts. We will also make use of recent theoretical and methodological innovations in hydrology, conservation biology, and fire science to implement the field measurements and interpret the results.

For example, we have noted the need to work at spatial scales relevant to the management regime. In this instance, the size of the unit is a fireshed, forested areas on the order of 4,000 ha in size. This spatial scale precludes sole reliance on gauged watersheds to assess the hydrological impact. However it is our hypothesis that soil moisture response to precipitation and snowmelt will be a good indicator of the terrestrial water cycle in forests across the Sierra Nevada, and that it will be sensitive to the planned landscape prescriptions. Thus a dispersed



network of soil moisture probes in coordination with smaller but more detailed catchment data may provide a means to diagnose any perturbations in the water-cycle.

Other discussions have focused on wildlife conservation goals. A good case can be made for the Pacific fisher (*Martes pennanti*) as a sensitive species that would respond to fire management. The home range of male fisher approximately coincides in extent with fire management units. Moreover, the fisher appears to require mature phase mixed-conifer forests and is unable to disperse across open habitats (Zielinski et. al. 2004). Extant populations can be monitored using remotely triggered cameras. We also have explored a direct test of forest management impact on the fisher via a reintroduction study. Fisher have been reintroduced many times in North America so there are proven protocols for such a project (e.g., Lewis and Hayes 2004). While only a successful reintroduction would provide an unequivocal answer, the chances for success appear good enough to consider such a test, especially if the location was determined to be the best available habitat in the region.

Fire and fuels management is one of the central issues of the SNFPA. Thus we require quantitative information on the fire performance of landscape fuel treatments that will be implemented using the SNFPA. This requires assessments at multiple spatial scales, from stand to landscapes (fire management units). Replicated, controlled field experiments at the landscape scale are impossible when considering fire hazard. Simulations are the only way to proactively address the question of effectiveness. One strategy we have considered is to build field-parameterized versions of the fire behavior models, such as FlamMap and FARSITE, and then use them to evaluate the efficacy of the treatments. We would also add fire effects modules to FlamMap and FARSITE to allow us to predict tree mortality and erosion potential after simulated wildfires.

**Participatory processes.** An explicit goal of the SNFPA implementation is citizen participation. The adaptive management framework will need to support development of ecological information in ways that enable the ongoing participation of interested citizens. At the same time, processes must be in place that enable citizens to provide feedback to scientific researchers and resource managers. Just as ecosystems change over time, community values and priorities also change, so the adaptive management framework must enable continual participation and adjustment to a changing social context. We propose an approach that researches the “initial starting conditions,” socially and ecologically, for each case study that

defines, tests, and monitors implementation of “best practices” in citizen participatory programs. Our hope is to help build durable processes that foster participation and feedback that results in a constantly improving and broadly shared understanding of ecosystem structure and function.

Citizens, whether helping in the field or attending a public meeting, need a common understanding of the dynamic behavior of ecosystems and sense of the dramatic changes that Sierran ecosystems have undergone. Our experience suggest that grounding collaborative and participatory processes in a common body of knowledge that encompasses the ecological history of the area to be managed supports more effective decision-making. Therefore we propose that in each case study area, an ecological history be done to contribute to the collaborative process. Scientifically an ecological history serves as an invaluable guidepost to the parameters of ecosystem variability. Additionally, the development and use of a history will serve to build a mutual understanding among members of the public and other affected interests.

The public and stakeholders have already had experience with the development of the SNFPA and various attempts have been made to engage the public in the development of the plan. An important early task is to assess the past experience of the public with the plan development and the characteristics of that experience. Questions that might be addressed include the scope and inclusiveness of public involvement; level of satisfaction with plan development processes and the goals and priorities of the plan; values and concerns of residents, concerned citizens, and other public and stakeholders, and the priorities of such groups and individuals for the future. As part of this work, ideas about what kind of processes would enable broad public participation would be reviewed.

In addition, a more generalized review of factors that have contributed or detracted from effective public involvement and participation in Forest Service and other public agency planning efforts would be useful. Placing the specific experience of the case study watersheds within the research context on the topic and the broader experience with participatory groups will help to develop best practices for case study landscapes. Of particular importance to this project would be looking at other adaptive management programs and how citizen participation has integrated with the development, collection, and utilization of scientific information. It is important to understand, for the purposes of collaboration between UC and the Forest Service, what constitutes successful collaboration from the agency perspective. During the workplan

development, we hope to arrive at a mutual understanding of what the goals of the participatory process should be.

As part of the review of participatory processes, factors linked with success can be identified for testing as part of this effort. These posited “best practices”, one of which we have already suggested is a shared historical background, will be tested, monitored, and refined as part of an “adaptive” participatory program. As with ecological studies this will require collection and organization of knowledge. Of particular interest will be the ability of public groups to use the ecological information generated by the adaptive management initiatives that are part of the Sierra plan, and to use this information to have input into the process, goals, and methods of ecological research, management, and monitoring.

## RESEARCH AGENDA AND WORKPLAN

The proposal outlined above assumes a minimum of three years of research with an approximate total budget of \$3-5 million. Initial discussion have considered three case studies implemented across the Sierra Nevada. The potential for synergistic coordination with other research efforts already underway or planned for the future could greatly add to the return on this investment. We expect the UC science team consisting of researchers from several UC campuses to function as a research council where results are critically evaluated. Conclusions and recommendations would be based on consensus opinion. On issues where there was no consensus, the competing arguments and their evidence would be summarized.

As described in the Memorandum of Understanding (MOU), the next task is to develop this proposal into a concrete work plan. The immediate priority relevant to all aspects of this research would be selecting appropriate case studies. These decisions would be made in full collaboration with all signatories to the MOU. Thus this effort would require considerable logistical and technical support. After identifying a short list of candidate sites, we envision a series of field visits to make the final selections. In addition, during the course of preparing this proposal, we have identified a series of initial tasks that are essential to crafting a well-informed and well-formulated work plan.

**Task 1: Participatory process.** During the workplan development phase we will conduct preliminary investigation into the history and characteristics of selected sites, and fit that into a larger history of resource use in the area within the scope of the Sierra plan. Assessment of available archival and other historical information will allow us to make informed decisions about appropriate sites and their comparability. Once case study sites are determined, development of ecological histories can begin. In the case of the Van Duzen Watershed of Northern California, for example, a narrative history comprised of oral histories from long term residents in the area was invaluable to the development of the collaborative watershed program. This aspect of the project will require summer full time funding for a Graduate Research Assistant specializing in environmental history. This student will research site characteristics and histories, largely using archival sources, to enable site selection and assess the possibility of developing case study site histories. Methods, scope, and approach for these histories, whether narrative, archival, or both, will be developed in the workplan phase

As part of this work, ideas about what kind of processes would enable broad public participation would be reviewed. During the workplan phase, the specific questions to be addresses, methods, and approach would be developed for this aspect of the project. A more generalized review of factors that have contributed or detracted from effective public involvement and participation in Forest Service and other public agency planning efforts would also be undertaken. Our focus for this task would be to look at other adaptive management programs and how citizen participation has integrated with the development, collection, and utilization of scientific information. During the workplan phase of this study, archival resources will be the focus, as well as interviews with Forest Service and other agency personnel working with citizen groups to understand their experience and goals. Some preliminary interviews with citizen leaders should also be conducted on an informal basis to develop more specific objectives and questions at the case study level. Finally, interviews with scientists who have conducted science in a participatory and/or collaborative setting will also be conducted, to get their views on how the scientific process can integrate with citizen participation and knowledge.

**Task 2: Fire science.** It is recognized that USFS management goals will not solely be increases in fire performance of forested landscapes. Management will seek to attain some set of “desired future conditions” for fire and fuels at landscape scales. These target conditions should

incorporate fire behavior, wildlife habitats, water and air quality, and protection of human lives and structures. However, there are inherent challenges, uncertainties, and contradictions in pursuing fire management goals. In addition to lacking good scientific information on natural ranges of variation in fire regimes of different Sierra Nevada ecosystems, fire management activities themselves have unknown effects on habitats and important natural processes. These conflicts and knowledge gaps are stated in the SNFPA and will be a major influence on the success of any adaptive management effort.

The work that would be done this summer would include a review and summarization of previous fire-based adaptive management efforts in the USA to learn what has worked. This would include visitation to a few sites including the ponderosa pine restoration efforts near Flagstaff AZ., the multiple decadal prescribed fire experiments in the southern USA, and possibly forest management and restoration activities near Missoula, MT. This would allow us to incorporate relevant information into our effort.

We would also identify methods for fire hazard assessments at the stand and landscape scales. This would require the development of stratified sampling methods with remote sensing. We would also begin to develop a rapid assessment protocol that would be used to measure plot level data in an efficient manner that would be integrated into our landscape assessments. The development of the rapid assessment protocol will be critical in this project.

Finally we would test methods and response variables that will be used to evaluate the fire performance of the landscape fuel treatments. We can use existing models (FlamMap and FARSITE) to simulate landscape fire behavior but no existing model allows for landscape fire effects estimations. We will concentrate on the amount and spatial arrangement of tree mortality and bare mineral soil after wildfire. These fire effects variables will be used to predict changes in wildlife habitat and erosion after treatment and simulated wildfire. Efforts to predict vegetation dynamics after fire will also be explored.

**Task 3: Forest management and ecosystem impact.** We will oversee a scientific, educational and outreach oriented project focused on synthesizing information on the impacts of forest management on ecosystem function. We envision creating a data product whereby our data synthesis and links to all of the original literature will be made available via a web-based graphical user interface in a Geographical Information System (GIS) framework. GISs present

not only a way of visualizing and analyzing spatial data (Burrough and McDonnell 1998), but also a way of organizing information based on the location the data was gathered, providing a common field for database records (Theseira 2002). Combining the power of GIS and the Internet, webGIS can store data, and help users to access data without expensive GIS software, using any web browser at virtually any time of the day or night (Kowal 2002). This increased ease of access to information about forest resources and ecosystem function will further enhance public involvement in forest management (Kearns et al. 2003). In our system, a user will be able to “click” on a web-enabled map and on an associated forest stand or water body, providing instant access to studies that have been done in that area. We plan to make PDF versions of the full text or abstracts (depending on what is allowable via copyright regulations, which will vary as a function of each data source), and a summary of the data and results at each site. A user could also query the database to investigate locations where controlled studies quantifying the effects of a particular forest management treatment has been conducted. In addition, we will facilitate user interaction with forest and hydrological data, by posting relevant spatial data layers such as current vegetation (from Cal GAP and CalVeg datasets), forest change through time (provided by CDF-FRAP), historic forest data (from the Wieslander dataset), fire perimeter information (from CDF), potential fire risk, and current hydrological data (from USGS and USDA databases). Users will also be able to perform several spatial queries that link the data layers listed above.

**Task 4: Water-cycle perturbations.** We will work with the managers and scientists from the USFS, the Fish and Wildlife Service and the California Resource Agency to determine appropriate transects for water cycle and water quality perturbation case studies. This interaction would include harvesting existing published and nonpublished information, as well as their insights into representative indicator locations. Included in this are the presence of surface water bodies with different residence times and sources (e.g., groundwater, precipitation, snow melt). These transects would include high elevation headwater catchments, existence of 1<sup>st</sup> to 3<sup>rd</sup> order streams, meadows, both perennial and ephemeral springs, and lakes. Besides the presence of these water bodies, factors that would be considered are: site access, feasibility of setting up and leaving equipment for measurements, existing infrastructure, existing data and availability of support personal. In coordination with efforts to synthesize information on the impacts of forest

management on ecosystem function (Task 3), we would compile the available data and information about the sites. Given our dependence on geospatial information, we would provide a framework for data compilation and build a geospatial database for the whole project. We consider this data and information system absolutely necessary to make informed comparison between the sites.

We envision a monitoring system to look at perturbations to the water cycle and water quality at the study sites. Proposed measurements are water levels in meadows (installation of peizometers), distributed soil moisture measurements, monitors for the time of flow of ephemeral springs, snow distribution, stream flow, water quality, sediment load, lake clarity, flux towers in meadows, and precipitation gauges. The planning process would examine the spatial and temporal distributions of measurements. We will also test sampling schemes and instruments using equipment that we have on hand.

#### WORKPLAN: BUDGET OUTLINE (May 2 to September 23, 2005)

Faculty salaries	\$62,000
Graduate/Post-doc support	\$56,000
Staff research support	\$40,000
Administration support	\$18,000
<b>Total salary</b>	<b>\$176,000</b>
Fringe Benefits	\$33,000
<b>Total salary and fringe</b>	<b>\$209,000</b>
Supplies	\$15,000
Travel	\$10,000
<b>Total Direct Costs</b>	<b>\$234,000</b>

## UC Science Team

Roger C. Bales	Professor, Engineering	UC Merced
Reginald Haughton Barrett	Professor of Wildlife Management	UC Berkeley
John J. Battles	Assoc. Professor of Forest Ecology	UC Berkeley
Elizabeth W. Boyer	Asst. Professor, ESPM	UC Berkeley
Martha H. Conklin	Professor, Engineering	UC Merced
Lucy Diekmann	Ph.D. student	UC Berkeley
Thomas C. Harmon	Assoc. Professor, Engineering	UC Merced
Lynn Huntsinger	Assoc. Professor, ESPM	UC Berkeley
Nina Maggi Kelly	UCCE Specialist & Adj. Assoc. Professor	UC Berkeley
Max A. Moritz	UCCE Specialist & Adj. Asst. Professor	UC Berkeley
Peggy A. O'Day	Assoc. Professor of Natural Sciences	UC Merced
Dara J. O'Rourke	Asst. Professor, ESPM	UC Berkeley
Kimberly A. Rodrigues	Regional Director, North Coast	UC ANR
Larry Ruth	Academic Coordinator	UC Berkeley
Scott Lewis Stephens	Asst. Professor of Wildland Fire	UC Berkeley
Samuel Justin Traina	Professor of Natural Science	UC Merced



## LITERATURE CITED

- Boyer, E.W. and C.L. Dent, 2000. Towards an integration of hydrology and ecosystem ecology at regional scales. *Hydrological Processes*, 14, 2613-2615.
- Burrough, P.A. and McDonnell, R., 1998. Principles of Geographical Information Systems. Spatial Information Systems. Oxford University Press, Oxford, New York, xiii, 333 pp.
- Carpenter, S.R. 1998. Keystone species and academic-agency collaboration. *Conservation Ecology* [online] 2(1): R2. Available from the Internet. URL: <http://www.consecol.org/vol2/iss1/resp2/>
- FDA. 2004. Innovation/Stagnation: Challenge and opportunity on the critical path to new medical products. US Department of Health and Human Services, Food and Drug Administration.  
URL: <http://www.geospiza.com/media-v4/white-papers/fda-innovation-whitepaper.pdf>
- Grumbine, E.R. 1997. Reflections on “What is Ecosystem Management”? *Conservation Biology* 11(1): 41-47.
- Huntsinger, L. and P. Hopkinson. 1996. Sustaining rangeland landscapes: a social and ecological process. *Journal of Range Management* 49:167-173.
- Kearns, F.R., Kelly, M. and Tuxen, K.A. 2003. Everything happens somewhere: using webGIS as a tool for sustainable natural resource management. *Frontiers in Ecology and the Environment*, 1(10): 541-548.
- Kowal, K.C. 2002. Tapping the web for GIS and mapping technologies: For all levels of libraries and users. *Information Technology and Libraries*, September 2002: 109-114.
- Lee, K.N. 1999. Appraising Adaptive Management. *Conservation Ecology* 3(2):3. [online] URL: <http://www.consecol.org/vol3/iss2/art3>
- Lewis, J. C., and G. E. Hayes. 2004. Feasibility assessment for reintroducing fishers to Washington. Washington Department of Fish and Wildlife, Wildlife Program. 60pp
- Ludwig, D.R., R. Hilborn, and C.J. Walters. 1993. Uncertainty, Resource Exploitation, and Conservation: Lessons from History. *Science* 260 (2 April): 17, 36.
- McLain, R.J. and R.G. Lee. 1996. Adaptive Management: Promises and Pitfalls. *Environmental Management* 20(4): 437-448.

- Rogers, K. 1998. "Managing science/management partnerships: a challenge of adaptive management". *Conservation Ecology* [online] **2**(2): R1. Available from the Internet. URL: <http://www.consecol.org/vol2/iss2/resp1/>
- Simberloff, D. 2004. Community ecology: Is it time to move on? *The American Naturalist* 163:787-799.
- Stephens, S.L., and L.W. Ruth. 2005. Federal forest fire policy in the United States. *Ecological Applications* 15(2):532-542.
- SNFPA. 2005. Sierra Nevada Forest Plan Amendment. Website with Record of Decision, Supplemental Environmental Impact Assessments, appendices, and errata. URL: <http://www.fs.fed.us/r5/snfpa/>
- SNFPA E. 2004. US Forest Service Sierra Nevada Forest Plan Amendment: Appendix E – Adaptive Management Strategy. Mare Island, California. 134 p.
- Theseira, M. 2002. Using Internet GIS technology for sharing health and health related data for the West Midlands Region. *Health and Place*, 8: 37-46.
- USFS PSW. 2004. Fireshed assessment: An integrative approach to landscape planning. RS-TP-017. URL: [www.fs.fed.us/r5/](http://www.fs.fed.us/r5/).
- Walters, C.1997. Challenges in adaptive management of riparian and coastal ecosystems. *Conservation Ecology* 1(2):1. [online] URL: <http://www.consecol.org/vol1/iss2/art1>.
- Zielinski, W. J., Truex R. L., Schmidt, G. A., Schlexer F.V., Schmidt, K.N. & Barrett, R. H. 2004. Home range characteristics of fishers in California. *Journal of Mammalogy*, 85: 649-657.

**Roger C. Bales**  
**University of California, Merced**

**RESEARCH INTERESTS**

Mountain hydrology and biogeochemistry, polar snow and ice, climate impacts and water resources.

**EDUCATION**

Ph.D. 1985 Environmental Engineering Science,  
California Institute of Technology  
M.S. 1984 Social Science, California Institute of  
Technology  
M.S. 1975 Civil Engineering, University of California,  
Berkeley  
B.S. 1974 Civil Engineering, Purdue University

**EMPLOYMENT**

2003-present: School of Engineering, University of  
California, Merced (Professor and founding faculty  
member).  
1984-2003: Department of Hydrology and Water  
Resources, University of Arizona, (Assistant  
Professor 1984-1989, Associate Professor 1989-  
1995, Professor 1995-2004).  
1980-84: Graduate Research Assistant, California  
Institute of Technology.  
1975-80: Project Manager and Project Engineer, Brown  
and Caldwell, Pasadena, California

**REGISTRATION**

Civil Engineer 27677, California

**OTHER RECENT APPOINTMENTS**

2004-present. Member, Hydrology Graduate Group,  
University of California, Davis.  
2000-2003: Deputy Director NSF, Center for the  
Sustainability of Semi-Arid Hydrology and Riparian  
Areas, University of Arizona  
2000-2003: Member, Committee on Remote Sensing  
and Spatial Analysis, University of Arizona.  
1999-2003: Director, Regional Earth Science  
Applications Center, University of Arizona  
1997-1999: Director, Institute for the Study of Planet  
Earth, University of Arizona  
1994-2003: Member, Interdisciplinary Committee for  
Global Change, University of Arizona. Chair, 1994-  
1997.

**PROFESSIONAL SOCIETIES**

American Geophysical Union (Fellow), American Society  
for the Advancement of Science (Fellow), American  
Meteorological Society (Fellow), American Society of  
Civil Engineers, American Chemical Society, Association  
of Environmental Engineering Professors.

**CURRENT PROFESSIONAL ACTIVITIES**

2004-present. Member, Committee on Integrated  
Hydrologic Observations, Water Science and  
Technology Board, National Research Council.

2003-present: Member, Committee on Metrics for  
Global Change Research, National Research  
Council.

2002-2004: Member, Committee on Geophysical and  
Environmental Data, National Research Council.

2001-present: Member Representative, Consortium of  
Universities for the Advancement of Hydrologic  
Science, Inc. 2001-2004 Member, Board of Directors.  
2001-2003 Member, Executive Committee. 2000-2001  
Chair, steering committee

2000-present: Steering Committee Chair and Science  
Coordination Office Director, Summit Greenland  
Environmental Observatory.

**RECENT JOURNAL PUBLICATIONS**

N.P. Molotch, M. Colee, R.C. Bales, J. Dozier, Estimating  
the spatial distribution of snow water equivalent in an  
alpine basin using binary regression tree models: the  
impact of digital elevation data and independent  
variable selection, *Hydrol. Proc.*, 19: 1459-1479,  
2005.

J.C. Morrill, R.C. Bales, M.H. Conklin, Estimating stream  
temperature from air temperature: implications for  
future water quality. *J. Environ. Engr.*, 131:139-146,  
2005.

C. Brown-Mitic, W. J. Shuttleworth, C. R. Harlow, J.  
Petti, E. Burke, R.C. Bales, Water, heat and CO<sub>2</sub>  
exchange for a sky island, subalpine forest in the  
Southwestern U.S. *Agricultural & Forest  
Meteorology*, in press.

R.C. Bales, D.M. Liverman, B.J. Morehouse. Integrated  
assessment as a step toward reducing climate  
vulnerability in the southwestern United States, *Bull.  
Am. Met. Society*, 85: 1727-1734, 2004.

T. Meixner, J.R. Shaw, R.C. Bales, Temporal and spatial  
variability of cation and silica export in an alpine  
watershed, Emerald Lake, California. *Hydrol. Proc.*  
18(10): 1759-1776, 2004.

N.P. Molotch, S.R. Fassnacht, R.C. Bales, S.R. Helfrich,  
Estimating the distribution of snow water equivalent  
and snow extent beneath cloud cover in the Salt-  
Verde River basin, Arizona. *Hydrol. Proc.* 18(9):  
1595-1611, 2004.

A.K. Huth, A. Leydecker, J.O. Sickman, R.C. Bales, A  
two-component hydrograph separation for three  
high-elevation catchments in the Sierra Nevada,  
California, *Hydrol. Proc.* 18 (9):1721-1733, 2004.

N.P. Molotch, T.H. Painter, R. C. Bales, J. Dozier,  
Incorporating remotely-sensed snow albedo into a  
spatially-distributed snowmelt model, *Geophys. Res.  
Lett.* 31(3): Art. No. L03501, 2004.

K.J. Franz, H.C. Hartmann, S. Sorooshian, R.C. Bales,  
Verification of National Weather Service Ensemble  
Streamflow Predictions for Water Supply Forecasting  
in the Colorado River Basin, *J. Hydrometeorology*,  
4(6): 1105-1118, 2003.

T. Meixner, C. Gutmann, R.C. Bales, A. Leydecker, J.  
Sickman, J. Melack, J. McConnell, Multidecadal  
hydrochemical response of a Sierra Nevada  
watershed: sensitivity to weathering rate and  
changes in deposition, *J. Hydrology*, 272-285, 2003.

## REGINALD HAUGHTON BARRETT

BORN: June 11, 1942 in San Francisco, California, U.S.A.

### OCCUPATION:

Goertz Distinguished Professor of Wildlife Management  
Department of Environmental Science, Policy, and Management  
151 Hilgard Hall, University of California  
Berkeley, CA 94720-3110 voice: (510) 642-7261 FAX: (510) 643-5098  
e-mail: rbarrett@nature.berkeley.edu  
Instructor for: ESPM 106 American Wildlife; ESPM 187 Advanced Wildlife  
Management; ESPM 188 Case Histories in Wildlife Management; and ESPM 283  
Wildlife Management Planning

### EDUCATION:

B.S. Game Management, Humboldt State College, Arcata CA (1965)  
M.S. Wildlife Management, University of Michigan, Ann Arbor MI (1966)  
Ph.D. Zoology, University of California, Berkeley CA (1971)

### RECENT PUBLICATIONS:

124. Zielinski, W. J., N. P. Duncan, E. C. Farmer, R. L. Truex, A. P. Clevenger, and R. H. Barrett. 1999. Diet of fishers (*Martes pennanti*) at the southernmost extent of their range. *Journal of Mammalogy* 80(3):961-971.
125. Boroski, B. B., R. H. Barrett, and J. G. Kie. 1999. Movement patterns and survivorship of black-tailed deer migrating across Trinity Reservoir, California. *California Fish and Game* 85(2):63-69.
136. Gogan, P. J. P., R. H. Barrett, W. W. Shook, and T. E. Kucera. 2001. Control of ungulate numbers in a protected area. *Wildlife Society Bulletin* 29(4):1075-1088.
141. Greco, S. E., R. E. Plant, and R. H. Barrett. 2002. Geographic modeling of temporal variability in habitat quality of the yellow-billed cuckoo on the Sacramento River, miles 196-219, California. Pages 183-195 in J. M. Scott, P. J. Heglund, M. L. Morrison, J. B. Haufler, M. G. Raphael, W. A. Wall, and F. Samson (eds.). *Predicting Species Occurrences: Issues of Accuracy and Scale*. Island Press, Covelo, CA.
144. Casher, L., R. Lane, R.H. Barrett, and L. Eisen. 2002. Relative importance of lizards and mammals as hosts for ixodid ticks in northern California. *Experimental and Applied Acarology* 26:127-143.
145. Jordan, M. J., K. L. Purcell, and R. H. Barrett. 2003. Fisher population monitoring in the southern Sierra Nevada. *Martes Working Group Newsletter* 11(1):6-7.
146. Sequin, E. S., M. M. Jaeger, P. F. Brussard, and R. H. Barrett. 2003. Wariness of coyotes to camera traps relative to social status and territory boundaries. *Canadian Journal of Zoology* 81( ):2015-2025.
147. Zielinski, W. J., R. L. Truex, G. A. Schmidt, R. V. Schlexer, K. N Schmidt, and R. H. Barrett. 2004. Resting habitat selection by fishers in California. *Journal of Wildlife Management* 68(3):475-492.
148. Zielinski, W. J., R. L. Truex, G. A. Schmidt, F. V. Schlexer, K. N. Schmidt, and R. H. Barrett. 2004. Home range characteristics of fishers in California. *Journal of Mammalogy* 85(4):649-657.

## **CURRICULUM VITAE**

John J. Battles

### **EDUCATION**

Cornell University: Ph.D. in forest science, May 1994.

Yale University: B.S. in biology, May 1985.

### **PROFESSIONAL APPOINTMENTS**

Co-Director, Center for Forestry, College of Natural Resources, UC Berkeley, December 2000 to present

Associate professor of forest community ecology, Department of Environmental Science, Policy, and Management, UC Berkeley, July 2000 to present.

### **REFEREED PUBLICATIONS (five most relevant)**

Gersonde, R., J.J. BATTLES, and K. L. O'Hara. 2004. Characterizing the light environment in Sierra Nevada mixed-conifer forests using a spatially explicit light model. *Canadian Journal of Forest Research* 34: 1332-1342.

York, R.A., J.J. BATTLES, and R.C. Heald. 2003. Edge effects in mixed conifer group selection openings: Tree height response to resource gradients. *Forest Ecology and Management* 179: 107-121.

BATTLES, J.J., T. J. Fahey, T. G. Siccama, and A. H. Johnson. 2003. Community and population dynamics of spruce-fir forests on Whiteface Mountain, New York: Recent trends, 1985-2000. *Canadian Journal of Forest Research* 33: 54-63.

BATTLES, J.J. and T.J. Fahey. 2000. Gap dynamics following forest decline: A case study of red spruce forests. *Ecological Applications* 10: 760-774.

Sherman, R.E., T.J. Fahey, and J.J. BATTLES. 2000. Small-scale disturbance and regeneration dynamics in a neotropical mangrove forest. *Journal of Ecology* 88: 165-178.

### **SYNERGISTIC ACTIVITIES**

Maintain and share databases containing long-term vegetation and environmental measurements from Sierran mixed conifer forests (see <http://ecology.cnr.berkeley.edu/>)

One of the principal faculty members who developed and launched the Global Environment Theme House (GETH) on the UC Berkeley campus. GETH is an academic-based program designed to promote faculty-student interaction as they explore the social, economic and scientific issues affecting the environment.

Research mentor to undergraduate students participating in the College's Undergraduate Research Opportunity Program.

**Elizabeth W. Boyer, Ph.D.**  
boyer@nature.berkeley.edu

**Current Appointments:**

- University of California, Department of Environmental Science, Policy, and Management, Berkeley, CA. Division of Ecosystem Sciences. Assistant Professor.
- Syracuse University, Department of Geography, Syracuse, NY. Adjunct Assistant Professor.

**Professional Preparation:**

- Cornell University, Department of Ecology & Evolutionary Biology, Program in Biogeochemistry & Environmental Change. Post-doctoral associate, 1988-9.
- University of Virginia, Ph.D. 1998, M.S. 1994. Department of Environmental Sciences, College of Arts & Sciences, Concentration in hydrology.
- Penn State University. B.S. 1990. Department of Geography, College of Earth and Mineral Sciences, Concentration in remote sensing & geographic information systems..
- Penn State University. Minor certificate 1990, in cross-campus multidisciplinary program of Science, Technology, & Society.

**Selected Publications (of 36):**

- Boyer EW, RW Howarth, JN Galloway, FJ Dentener, P Green, C Vörösmarty, C Cleveland, & GP Asner (2004). Nitrogen inputs to world regions. In AR Mosier, K Syers & JR Freney (eds), *Agriculture and the nitrogen cycle: assessing the impact of fertilizer use on food production and the environment*. Washington, D.C. Island Press.
- Boyer EW, CL Goodale, NA Jaworski & RW Howarth (2002). Anthropogenic nitrogen sources and relationships to riverine nitrogen export in the northeastern USA. *Biogeochemistry*, 57:137-169.
- Boyer EW, GM Hornberger, KE Bencala, and DM McKnight (2000). Effects of asynchronous snowmelt on flushing of dissolved organic carbon: a mixing model approach. *Hydrological Processes*, 14, 3291-3308.
- Boyer EW and CL Dent (2000). Towards an integration of hydrology and ecosystem ecology at regional scales. *Hydrological Processes*, 14, 2613-2615.

**Selected Honors & Synergistic Activities:**

1) Vice-Chair (2005) and Co-Chair (2007) for upcoming Gordon Research Conferences on Catchment Science: Interactions of Hydrology, Biology, & Geochemistry. 2) New York Academy of Sciences, inducted 1999. 3) Maury Environmental Sciences Prize, University of Virginia (highest departmental honor), 1997. 4) Penns Valley Area High School valedictorian, 1986. 5) Invited participant, workshop on Hydrologic modeling to support riverine ecosystem needs for fresh water, of the Global River Sustainability Project sponsored by the National Science Foundation, Fort Collins, CO, June 9-11 2005. 6) Steering Committee Member, Denitrification: integration across landscapes and waterscapes, a Research Coordination Network, Sponsored by the National Science Foundation, 2005-present. 7) Member, EPA Science Advisory Board Sub-Committee, US Environmental Protection Agency, Advisory council on clean air compliance analysis, sub-committee on ecological effects, 2004-present.

**Martha H. Conklin**  
School of Engineering  
University of California, Merced

**RESEARCH INTERESTS**

Metal transport in natural waters, surface water/shallow groundwater interactions, biogeochemistry, organic chemical distribution in soil and ground water, chemical processes in snow, K-12 environmental education.

**EDUCATION**

**Ph.D. 1986** Environmental Engineering Science

California Institute of Technology

**M.S. 1980** Environmental Engineering Science

California Institute of Technology

**B.A. 1976** Physics Mount Holyoke College

**EMPLOYMENT**

**2003-present:** Professor, School of Engineering, University of California, Merced

**1987-2003:** Department of Hydrology and Water Resources, University of Arizona (Assistant Research Hydrologist 1987-89, Research Assistant Professor 1989-90, Assistant Professor 1990-1996, Associate Professor 1996-2002, Professor 2002-2003).

**1986-87:** Associate Engineer, Environ Corp., Washington, D.C.

**1979-86:** Graduate Research Assistant, California Institute of Technology.

**1976-79:** Air Quality Scientist, Environmental Research & Technology, Concord, MA

**PROFESSIONAL ACTIVITIES**

**1994-2003:** Member, Interdisciplinary Committee for Global Change, University of Arizona.

**1997-2001:** Horton Research Grant Committee and Publications Committee, Hydrology Section, American Geophysical Union

**1999-2002:** Associate Editor, *Water Resources Research*.

**1998-1999:** Fellow, Udall Center for Studies in Public Policy, University of Arizona.

**2003- present:** Science advisor to the Mariposa Watershed Council

**2004:** Member, NRC Committee on USGS Water Resources Research

**2004:** Member, NRC Committee on River Science at the USGS

**SELECTED PUBLICATIONS**

J.W. Harvey, M.H. Conklin and R.S. Koelsch.

Predicting changes in hydrologic retention in an evolving semi-arid alluvial stream, *Advances in Water Resources*, **26**, 939-950, 2003.

J.E. Villinski, J.E. Saiers and M.H. Conklin, The effects of reaction-product formation on the reductive dissolution of MnO<sub>2</sub> by Fe(II). *Environmental Science and Technology*, **37**, 5589-5596.

N. Melitas, M. Conklin and J. Farrell. Electrochemical study of arsenate and water reduction on iron media used for arsenic removal from potable water. *Environmental Science and Technology*, **36**, 3188-3193, 2002.

J.A.K. Silva, R. G. Bruant and M.H. Conklin. Equilibrium partitioning of chlorinated solvents in vadose zone: Low *f<sub>oc</sub>* geomediation, *Environmental Science and Technology*, **36**, 1613-1619, 2002.

J. Villinski, P.A. O'Day, T.L. Corley and M.H. Conklin. In situ spectroscopic and solution analyses of the reductive dissolution of MnO<sub>2</sub> by Fe(II). *Environmental Science Technology*, **35**, 1157-1163, 2001.

J.T. Kay, M. H. Conklin, C.C. Fuller and P.A. O'Day. Processes of nickel and cobalt uptake by a manganese oxide forming sediment in Pinal Creek, Globe Mining District, Arizona. *Environmental Science and Technology*, **35**, 4719-4725, 2001.

J. Villinski, P.A. O'Day, T.L. Corley and M.H. Conklin. In situ spectroscopic and solution analyses of the reductive dissolution of MnO<sub>2</sub> by Fe(II). *Environmental Science Technology*, **35**, 1157-1163, 2001.

R.G. Bruant, Jr., and M.H. Conklin. Adsorption of trichloroethene at the air/water interface. *Environmental Science & Technology*, **35**(2), 362-364, 2001.

J. Choi, M.H. Conklin, R.C. Bales, R.A. Sommerfeld. Experimental investigation of SO<sub>2</sub> uptake in snow. *Atmospheric Environment*, **34**: 793-801, 2000

**Lucy Diekmann**

137 Mulford Hall #3114  
UC Berkeley, 94720-3114  
(510) 643-7243  
diekmann@nature.berkeley.edu

**EDUCATION:**

- 2004-Present **University of California, Berkeley**  
PhD Student, Environmental Science, Policy, & Management
- May 2004 **University of Virginia**  
MS, Environmental Sciences
- May 2001 **Brown University**  
AB, History, with Honors

**PRESENTATIONS AND THESES:**

- 2004 "The Spatial Pattern of Soil Nutrients in a Dry Tropical Forest Following Shifting Cultivation," Poster presented at the Fall 2004 American Geophysical Union Meeting (with D. Lawrence).
- 2004 "Changes in Soil Phosphorus Under Shifting Cultivation in Campeche, Mexico," Paper presented at the 89<sup>th</sup> Annual Meeting of the Ecological Society of America (with D. Lawrence).
- 2004 "Soil Nutrient Dynamics During Shifting Cultivation in Campeche, Mexico," unpublished Masters thesis, University of Virginia, Charlottesville, VA.
- 2001 "Troubled Waters: The Pyramid Lake Paiutes and National Reclamation, 1905-1944," unpublished honors thesis, Brown University, Providence, RI.

**FELLOWSHIPS AND AWARDS:**

- 2004-Present Berkeley Fellowship for Graduate Study
- 2002-2004 Jefferson Scholars Graduate Fellowship
- 2000 Research at Brown Grant for Undergraduate Research

**RESEARCH AND FIELD EXPERIENCE:**

- 2002-2003 Land-Cover and Land-Use Change (LCLU) in the Southern Yucatan Peninsular Region (SYPR), University of Virginia  
*Student Researcher:*
- Designed and implemented a study of the effects of historical land use on soil nutrients in a farming community in Campeche, Mexico.
  - Interviewed local farmers about their land-use practices.
- 2000-2001 History Department, Brown University  
*Student Researcher:*
- Researched the environmental history of the Pyramid Lake Paiute Reservation.
  - Conducted archival research at the National Archives, Washington, D.C., and in the Special Collections Departments of the University of Nevada, Reno and Yale University.



**Thomas C. Harmon, Associate Professor**  
School of Engineering  
University of California, Merced, CA  
Phone: (209) 724-4337; Fax: (209) 724-4356  
Email: tharmon@ucmerced.edu

## EDUCATION

The Johns Hopkins University	B.S. Civil Engineering	1985
Stanford University	M.S. Civil & Environ. Engineering	1986
Stanford University	Ph.D. Civil & Environ. Engineering	1992

## APPOINTMENTS

July 2003-Present	Associate Professor and Founding Faculty Member School of Engineering, University of California, Merced
July 1999- 2003	Associate Professor, Department of Civil & Environmental Engineering, University of California, Los Angeles
July 1992- 1999	Assistant Professor, Department of Civil & Environmental Engineering, University of California, Los Angeles

## PROFESSIONAL AFFILIATIONS:

Association of Environmental Engineering Scientists & Professors (AEESP), American Geophysical Union (AGU), American Chemical Society (ACS), American Society of Civil Engineers (ASCE)

## RECENT PUBLICATIONS

Bendikov, T.A., and T.C. Harmon. 2005. A Sensitive Nitrate Ion Selective Electrode from a Pencil Lead, *J. Chem. Educ.*, Vol. 82 No. 3, 339-441.

Kim, J., Park, Y. and Harmon, T.C. 2005. Real-Time Model Parameter Estimation for Analyzing Transport in Porous Media, *Groundwater Monitoring and Remediation*, in press.

Bendikov, T.A., Kim, J. and Harmon, T.C. 2005. Development and Environmental Application of a Nitrate Selective Microsensor Based on Doped Polypyrrole Films, *Sensors and Actuators B: Chemical*, in press.

Shih, T., Y. Rong, T. Harmon and M. Suffet. Evaluation of the Impact of Fuel Hydrocarbons and Oxygenates on Groundwater Resources, *Environmental Science and Technology*, 38(1), 42-48, 2004.

Sciortino, A., T.C. Harmon and Yeh W. W-G., Experimental Design and Model Parameter Estimation for Locating a Dissolving DNAPL Pool in Groundwater, *Water Resources Research*, 38(5), U290-U298, 2002.

Khachikian, C S. and Harmon, T.C., Long-Term Studies of the Effects of NVOCs on the Surface Areas of Porous Media, *Journal of Environmental Quality*, 31(4), 1309-1315, 2002.

Burks, G.A. and Harmon, T.C., Volatilization of Solid Phase PAH Mixtures, *Journal of Chemical & Engineering Data*, 46, 944-949, 2001.

Harmon, T.C., Burks, G.A., Aycaguer, A-C., and Jackson, K. Thermally Enhanced Vapor Extraction for Removing PAHs from Lampblack-Contaminated Soil, *Journal of Environmental Engineering*, 127(11), 986-993, 2001.

## Curriculum Vitae

LYNN HUNTSINGER  
Environmental Science, Policy, and Management,  
151 Hilgard Hall #3110  
University of California  
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### Education

Ph.D. 1989. University of California at Berkeley. Wildland Resource Science, specializing in range ecology and management.  
M.S. 1983. University of California at Berkeley. Range Management.  
B.A. 1979. University of California at San Diego. Major in Chinese Studies: Modern History; Minors in Literature and Biology.  
Dissertation Title: Grazing in California's Mixed Conifer Forests: Studies in the Central Sierra Nevada.

### Professional Experience

*November 15, 2002 to present: Associate Dean, Instruction and Student Affairs, College of Natural Resources, UC Berkeley.*

*July 1, 1996 to present: Associate Professor, Department of Environmental Science, Policy, and Management, University of California, Berkeley.*

*July 1, 1989 to July 1, 1996. Assistant Professor, University of California, Berkeley, Department of Forestry and Resource Management.*

*September 1987 to June 30, 1989. Research Program Specialist for the Forest and Rangeland Resources Assessment Program, California Department of Forestry and Fire Protection, 1416 9th St., Sacramento, CA 94244-2460.*

Licensed Certified Rangeland Manager, State of California

### Selected Publications (out of 80+ papers and reports)

Ballard, H. and Huntsinger, L. *accepted*. Salal harvester local ecological knowledge, harvest practices, and understory management on the Olympic Peninsula, Washington. *Human Ecology*.

Huntsinger, L. Sulak, A., Gwin, L. and Plieninger, T. 2004. Oak woodland ranchers in California and Spain: conservation and diversification. In: Schnabel, S. and Ferreira, A. (eds). *Sustainability of Agrosilvopastoral Systems: Dehesas, Montados*. Chapter 6. *Advances in Geocology* 37:309-326.

Sulak, A., Huntsinger, L., Standiford R., Merenlender, A., Fairfax S. 2004. The agricultural conservation easement: a strategy for oak woodland conservation. In: Schnabel, S. and Goncalves, A. (eds). *Sustainability of Agrosilvopastoral Systems: Dehesas, Montados*. Chapter 6. *Advances in Geocology* 37:353-364.

Fairfax, S.K., Gwin, L. and Huntsinger, L. 2004. Presidio and Valles Caldera: A Preliminary Assessment of Their Meaning for Public Resource Management. *Natural Resources Journal* 44(2): 445-473.

Merenlender, A., Huntsinger, L., Guthy, G. and Fairfax, S. 2004. Land Trusts & Conservation Easements: Who is Conserving What for Whom. *Conservation Biology* 18(1): 65-75.

Standiford, R.B., L. Huntsinger, P. Campos, D. Martin, P. Mariscal. 2003. The bioeconomics of Mediterranean oak woodlands: issues in conservation policy. XII World Forestry Congress Proceedings, Quebec City Canada, September 21 to 28, 2003. Session A Forests for People. pages 111 to 120 (Awarded "distinguished paper" notation).

Ballard, H., Kraetch, R., and Huntsinger, L. 2001. How collaboration can improve a monitoring program. In: Standiford, Richard B.; McCreary, Douglas; Purcell, Kathryn L., technical coordinators. 2002. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape, pgs.617-624. 2001 October 22-25; San Diego, CA. Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 846 p.

Sulak, A., and Huntsinger, L. 2002. Central Sierra Grazing in Transition. South Lake Tahoe, California: Sierra Nevada Alliance, California Cattlemen's Association, and California Rangeland Trust. 35 pgs.

L. Huntsinger and M. Fernandez-Gimenez. 2001. Spiritual pilgrimage at Mt. Shasta. *Geographical Review* 90(4):536-558

Sally Fairfax and Lynn Huntsinger. 1999. Lessons from the past. *Forum for Applied Research and Public Policy (Summer)*: 85-89.

S.K. Fairfax, L.P. Fortmann, A. Hawkins, L. Huntsinger, N.L. Peluso, and S. A. Wolf. 1999. The federal forests are not what they seem: formal and informal claims to federal lands. *Ecology Law Quarterly*: 101-115.

Lynn Huntsinger. 1997. Managing nature: stories of dynamic equilibrium. Proceedings of the Sixth Biennial Watershed Management Conference, Watershed Management Council, October 23-25, Lake Tahoe, California/Nevada. University of California Water Resources Center Report No. 92: 3-8. ISBN 1-887192-06-9.

Lynn Huntsinger and P. Hopkinson. 1996. Sustaining rangeland landscapes: a social and ecological process. *Journal of Range Management* 49:167-173.

### Relevant other experience:

Resource Advisory Council, Northeastern Nevada  
Science Advisory Board, U.S. Dept. of Interior-BLM  
Science Advisory Board, Malpai Borderlands Group

# Nina Maggi Kelly

Associate Cooperative Extension Specialist and Adjunct Associate Professor

University of California – Berkeley  
Ecosystem Sciences Division  
Department of Environmental Sciences,  
Policy & Management  
College of Natural Resources

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<b>EDUCATION</b>	1998	National Research Council Postdoctoral Associate. NOAA-NMFS Lab, Beaufort, NC
	1996	Ph.D. Department of Geography. University of Colorado, Boulder, Colorado
	1991	M.A. Department of Geography. University of North Carolina, Chapel Hill, North Carolina
	1988	Cartography Certificate. California State University, Hayward, California
	1988	B.A. Department of Geography, University of California, Berkeley, California
	1986	Junior Year Abroad. Department of Geography, University of Wales, Aberystwyth

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## PUBLICATIONS

- Kearns, F. R., N. M. Kelly, J. L. Carter, and V. Resh. In Press. A method for the use of landscape metrics in freshwater research and management. *Landscape Ecology*
- Kelly, M., B. Allen-Diaz, and N. Kobzina. Digitization of a historic dataset: the Wieslander California vegetation type mapping project. Accepted in *Madrono*
- McPherson, B. A. D. L. Wood, P. Švihra, A. J. Storer, N. M. Kelly and R. B. Standiford. Sudden oak death in California: Disease progression in oaks and tanoaks. Accepted in *Journal of Forest Ecology and Management*
- Pu, R., M. Kelly, G. L. Anderson and P. Gong. Considerations for use of CASI hyperspectral imagery to detect mortality and vegetation stress associated with a new hardwood forest disease. Accepted in *International Journal of Remote Sensing*
- Opperman, J. J., K. Lohse, A. M. Merenlender, C. Brooks, and N. M. Kelly. Influence of watershed-scale land use on salmonid spawning habitat in a Mediterranean-climate basin, California. Accepted in *Canadian Journal of Fisheries and Aquatic Science*
- Guo, Q., M. Kelly, and C. Graham. 2005. Support vector machines for predicting distribution of Sudden Oak Death in California. *Ecological Modeling* 182(1): 75-90
- Byrd, K. B., M. Kelly, and E. Van Dyke. 2004. Decadal changes in a Pacific estuary: a multi-source remote sensing approach for historical ecology. *GIScience and Remote Sensing* 41(4): 347-370
- Kelly, M., D. Shaari, Q. Guo, and D. Liu. 2004. A comparison of standard and hybrid classifier methods for mapping hardwood mortality in areas affected by sudden oak death. *Photogrammetric Engineering and Remote Sensing* 70(11): 1229-1239
- Guo, Q. C., and M. Kelly. 2004. Interpretation of scale in paired quadrat variance methods. *Journal of Vegetation Science* 15: 763-770
- Wacker, M. and N. M. Kelly. 2004. Changes in vernal pool edaphic settings through mitigation at the project and landscape scale. *Wetlands Ecology and Management* 12(3): 165-178
- Kelly, M., K. A. Tuxen, and F. R. Kearns. 2004. Geospatial informatics for management of a new forest disease: Sudden Oak Death. *Photogrammetric Engineering and Remote Sensing* 70(9): 1001-1004
- Wacker, M. and N. M. Kelly. 2004. Ranchers vs. ranchettes in California's oak rangelands. *Rangelands* 26(1): 17-22
- Kelly, M. and D. Liu. 2004. Mapping diseased oak trees using ADAR imagery. *Geocarto International* 19(1): 57-64
- Kearns, F. R., M. Kelly, and K. A. Tuxen. 2003. Everything happens somewhere: using webGIS as a tool for sustainable natural resource management. *Frontiers in Ecology and the Environment* 1(10): 541-548
- Kelly, N. M., and K. Tuxen. 2003. WebGIS for monitoring "sudden oak death" in coastal California. *Computers, Environment and Urban Systems* 27(5): 527-547

**Name: Max A. Moritz**

<u>Institution and location</u>	<u>DEGREE</u>	<u>YEAR</u>	<u>FIELD OF STUDY</u>
University of California, San Diego	B.A.	1987	Management Science
Boston University	M.A.	1993	Energy & Envir. Studies
University of California, Santa Barbara	Ph.D.	1999	Geography

### **Appointments in Last Five Years**

---

Jan. 2004 - U.C. Cooperative Extension Specialist, Adjunct Asst. Prof., U.C.B.  
Sept. 2002 - Dec. 2003 Research Scientist; Physics Dept., U.C.S.B.  
1999 - 2002 Assistant Prof. of Geography; Cal Poly State University, SLO  
1993 - 1999 Graduate Researcher; Biogeography Lab, U.C.S.B.

### **Selected Publications**

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- Moritz, M.A. and D.C. Odion. 2005. Examining the strength and possible causes of the relationship between fire history and sudden oak death. *Oecologia* (in press).
- Keeley, J.E., C.J. Fotheringham, and M.A. Moritz. 2004. Lessons from the October 2003 wildfires in southern California. *Journal of Forestry* 102: 26-31.
- Moritz M.A. and D.C. Odion. 2004. Prescribed fire and natural disturbance. *Science* 306: 1680.
- Moritz, M.A., J.E. Keeley, E.A. Johnson, and A.A. Schaffner. 2004. Testing a basic assumption of shrubland fire management: how important is fuel age? *Frontiers in Ecology and the Environment* 2: 67-72.
- Odion, D.C., J.R. Strittholt, H. Jiang, E.J. Frost, D.A. DellaSala, and M.A. Moritz. 2004. Patterns of fire severity and forest conditions in the Klamath Mountains, Northwestern California, U.S.A. *Conservation Biology* 18: 927-936.
- Moritz, M.A. 2003. Spatio-temporal analysis of controls of shrubland fire regimes: Age dependency and fire hazard. *Ecology* 84: 351-361.
- Davis, F.W. and M.A. Moritz. 2001. Mechanisms of disturbance, in *Encyclopedia of Biodiversity*, S. Levin editor, Academic Press.
- Odion, D.C., C.M. Tyler, D. Meade, and M.A. Moritz. 2000. Factors affecting regeneration of Morro Manzanita (*Arctostaphylos morroensis*). For California Department of Fish and Game; 43pp.
- Goldstein, N., J. Candau & M.A. Moritz. 2000. Burning Santa Barbara at both ends: a study of fire history and urban growth predictions. *Proceedings of 4th International Conference on Integrating GIS and Environmental Modeling (GIS/EM4)*. Banff, Alberta, Canada, September 2-8, 2000.
- Romme, W.H., E.G. Everham, L.E. Frelich, M.A. Moritz, and R.E. Sparks. 1998. Are large, infrequent disturbances qualitatively different from small, frequent disturbances? *Ecosystems* 1:524-534.
- Stoms, D.M., M.I. Borchert, M.A. Moritz, and F.W. Davis. 1998. GIS-based characterization and siting of USDA Forest Service Research Natural Areas. *Natural Areas Journal* 18:338-349.
- Moritz, M.A. 1997. Analyzing extreme disturbance events: fire in Los Padres National Forest. *Ecological Applications* 7:1252-1262.

**Peggy A. O'Day**  
**Associate Professor, School of Natural Sciences, University of California, Merced**

**Education**      1992      Ph.D., Stanford University, Stanford, CA, Applied Earth Sciences  
                         1984      M.S., Cornell University, Ithaca, NY, Geological Sciences  
                         1981      B.S., University of California, Davis, CA, Geology, *with Honors*

**Professional Experience**

2003-present: Associate Professor & Founding Faculty, University of California, Merced  
2002-2003: Department of Chemistry & Biochemistry, Arizona State University, joint position  
2000-2003: Associate Professor, Department of Geological Sciences, Arizona State University  
2000-2001: Visiting Scholar, Lawrence Livermore National Laboratory, Livermore, CA  
1994-2000: Assistant Professor, Geology Department, Arizona State University  
1992-1994: Post-Doctoral Research Fellow, University of California, Berkeley  
1987-1992: Ph.D. Candidate, Applied Earth Sciences, Stanford University

**Professional Activities and Awards**

Guest Lecturer, Goldschmidt Conference, Geochemical Society, Copenhagen DK, 2004  
Panel Review Member, NSF EAR Instrumentation and Facilities Program, 2003-2005  
Associate Editor, *Geochimica et Cosmochimica Acta*, 2001-2004  
American Chemical Society, Geochemistry Division, Program Chair, 2001; Chair, 2002  
Mineral & Rock Physics Committee Member, American Geophysical Union, 2000-2002  
GeoSync Society, American Geophysical Union, Chair, 2000-2001  
National Science Foundation, Faculty Early Career Award, 1996-2000  
Mineralogical Society of America, National Visiting Lecturer, 1995-1996  
National Science Foundation, Post-Doctoral Research Fellow, Earth Sciences, 1992-1994

**Experience and Research Interests**

Mineral-aqueous interface geochemistry; chemistry and mobility of contaminants in the environment; geochemical and biogeochemical applications of spectroscopy and microscopy, in particular synchrotron X-ray methods.

**Selected Publications**

- O'Day, P. A., Vlassopoulos, D., Root, R., and Rivera, N. (2004) The influence of sulfur and iron on dissolved arsenic concentrations in the shallow subsurface under changing redox conditions, *Proc. Nat. Acad. Sciences* **101**, 13703-13708.
- O'Day, P. A., Rivera, N., Root, R., and Carroll, S. A. (2004) X-ray absorption spectroscopic study of iron reference compounds for the analysis of natural sediments, *Am. Miner.* **89**, 572-585.
- O'Day, P. A., Carroll, S. A., Randall, S., Martinelli, R. E., Anderson, S. L., Knezovich, J. P., and Jelinski, J. (2000) Metal speciation and toxicity in contaminated estuary sediments, Alameda Naval Air Station, California, *Environmental Science & Technology* **34**, 3665-3673.
- O'Day, P. A., Newville, M., Neuhoff, P. S., Sahai, N., and Carroll, S. A. (2000) X-ray absorption spectroscopy of strontium(II) coordination. I. Static and thermal disorder in crystalline, hydrated, and precipitated solids and in aqueous solution, *J. Colloid Inter. Sci.* **222**, 184-197.
- O'Day, P. A. (1999) Molecular environmental geochemistry, *Rev. Geophys.* **37**, 249-274.

**Active Research Grants**

- National Science Foundation, Hydrologic Sciences Program (P.I.: O'Day): "Spatial and temporal changes in arsenic, iron, and sulfur speciation in a shallow aquifer," 08/15/04-8/14/07.
- National Science Foundation, Major Research Instrumentation (P.I.: O'Day; co-P.I.'s S. Traina, V. Leppert): "Acquisition of a scanning electron microscope for environmental, biological, and materials research and education at UC Merced," 8/01/04-7/31/07.
- National Science Foundation, Environmental Engineering (P.I.: O'Day): "Collaborative Research: Biogeochemical controls on arsenic remobilization from sediments," 8/1/02-7/31/05.
- Department of Energy, Environmental Management Science Program (P.I.: J. Chorover, Univ. of Arizona; O'Day one of 3 co-P.I.'s): "Caustic waste-soil weathering reactions and their impacts on trace contaminant migration and sequestration," 9/15/02-9/14/05.

# Dara J. O'Rourke, Ph.D.

Assistant Professor  
Dept. of Environmental Science, Policy, and Management  
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## RESEARCH AND TEACHING INTERESTS

Research the environmental, labor, and equity impacts of global production systems and new strategies of democratic governance. Research political economy and policy aspects of global supply chains, from resource extraction, to manufacturing, to use and disposal. Evaluate models of public participation in environmental and labor policy issues and innovative regulatory strategies.

## EDUCATION

University of California at Berkeley	December 1999
Ph.D. in the Energy and Resources Program	
University of California at Berkeley	May 1995
Master of Science in the Energy and Resources Program	
Massachusetts Institute of Technology	June 1989
Bachelor of Science in Mechanical Engineering and Political Science	

## FELLOWSHIPS, HONORS, AND AWARDS

2003-04	UC Berkeley American Cultures Fellow
2001-03	Mitsui Career Development Professorship, M.I.T.
1998-99	Switzer Environmental Fellowship
1998-99	Simpson Memorial Research Fellowship
1998	Voted One of the "Male Sports Figures of 1997" by the <i>Village Voice</i>
1995	Foreign Language and Area Studies Fellowship (Vietnamese)
1994-98	National Science Foundation Graduate Fellowship
1989	Pi Tau Sigma National Mechanical Engineering Honor Society
1988	John Burchard Humanities Scholar, M.I.T.

## RELATED PUBLICATIONS

O'Rourke, Dara (2005), "Market Movements: Advocacy Strategies to Influence Global Production and Consumption" *Journal of Industrial Ecology*, vol. 9, no. 1-2.

O'Rourke, Dara (2004), *Community-Driven Regulation: Balancing Development and the Environment in Vietnam*, Cambridge, MA: MIT Press.

O'Rourke, Dara and Eungkyoon Lee (2004), "Mandatory Planning for Environmental Innovation," *Journal of Environmental Planning and Management*, vol. 47, no. 2, March.

O'Rourke, Dara and Gregg Macey (2003), "Community Environmental Policing: Assessing New Strategies of Public Participation in Environmental Regulation," *Journal of Policy Analysis and Management*, vol. 22, no. 3, summer, pp. 383-414.

Fung, Archon, Dara O'Rourke, and Charles Sabel (2001), *Can We Put an End To Sweatshops?*, Boston: Beacon Press.

Fung, Archon and Dara O'Rourke, (2000) "Reinventing Environmental Regulation from the Grassroots Up: Explaining and Expanding the Success of the Toxics Release Inventory," *Environmental Management*, vol. 25, no. 2, pp. 115-127.

## **BRIEF "BIO"**

### **KIMBERLY A. RODRIGUES REGIONAL DIRECTOR DANR – NORTH COAST AND MOUNTAIN REGION**

#### **EDUCATION**

1984 M.S. Forest Genetics. Colorado State University, Fort Collins, CO.  
1981 B.S. Forest Management. University of California, Berkeley, CA.

#### **WORK EXPERIENCE**

1984 – 1985 Chief Forester, Applied Forest Genetics  
1985 – 1991 Tree Improvement Specialist, Simpson Timber Company  
1991 – 1999 Forest Advisor, University of California Cooperative Extension  
1999 – Present Regional Director, DANR – North Coast and Mountain Region

Kim's diverse work experiences, combined with her technical training, have allowed her to develop innovative research and educational programs in forestry. While working for Simpson Timber Company, she participated in numerous educational activities including teacher tours, a Japanese television documentary and the development of a Nature Trail.

Kim's commitment to education as a tool to resolve conflicts related to forest management resulted in her career change to the University of California Cooperative Extension. Through applied research, innovative workshops and other educational activities, Kim began to build partnerships among diverse segments of the forest communities.

As Regional Director, Kim is responsible for the Cooperative Extension programs in 23 Northern California counties. Kim continues to facilitate meetings and workshops designed to share knowledge and reach agreements, as well as develop research and educational projects addressing forest resource management issues.

While on sabbatical leave, Kim is pursuing a PhD in Environmental Science and Management, integrating participatory research methods supportive of community forestry goals.

Dr. Larry Ruth  
Center for Forestry

Larry Ruth works for the College of Natural Resources and the CNR Center For Forestry Policy at the University of California, Berkeley as a policy analyst, researcher, and academic coordinator.

After completing a Ph.D. in Jurisprudence and Social Policy at the University of California, he served as environmental policy specialist for a number of projects, including the Sierra Nevada Ecosystem Project (SNEP), an independent scientific assessment of the status of region's ecosystems, prepared at the request of the United States Congress. As special consultant to the Science Team, among other responsibilities, he wrote and collaborated in writing sections of SNEP's final report. He is also author and co-author of various journal articles and reports pertaining to environmental policy, with particular emphasis on the conservation, management and sustainability of natural resources and ecosystems. . An article on forest fire policy in the United States, written with Professor Scott Stephens, was published in April 2005 in the journal *Ecological Applications*.

As a lecturer, Larry Ruth has taught courses in environmental policy and in natural resource law, policy and institutions. He has also been a S.V. Ciriacy-Wantrup Postdoctoral Research Fellow at Boalt Hall School of Law, University of California. Research interests include development and analysis of ecologically sensitive approaches to resource management, sustainability, wildland fire policy, adaptive management, and the effectiveness of administrative regulation.



**Name: Scott Lewis Stephens**  
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### **Education**

Ph.D. Wildland Resource Science, *University of California, Berkeley*, 1995.  
Graduate study, Departments of Land, Air and Water Resources and Biological and Agricultural Engineering, *University of California, Davis*, 1988-1991. (hydrology, soil science, plant sciences)  
M.S. Bio-Engineering, *California State University, Sacramento*, 1988.  
B.S. Electrical Engineering, *California State University, Sacramento*, 1985.

### **Positions held**

Assistant Professor of Fire Science, University of California, Berkeley. 1997 – present.  
Assistant Professor of Quantitative Plant Ecology, California Polytechnic State University, San Luis Obispo. 1997-2000  
Research Forester, United States Forest Service Pacific Southwest Research Station, Albany, CA. 1995-1997  
Graduate Research Assistant, University of California, Berkeley, 1991-1995.

### **Selected Publications**

Stephens, S.L. and Ruth, L.W. 2005.. Federal forest fire policy in the United States. *Ecological Applications*, 15(2):532-542.

Stephens, S.L., Meixner, T., Poth, M., McGurk, B, Payne, D. 2004. Prescribed fire, soils, and stream water chemistry in a watershed in the Lake Tahoe Basin. *International Journal of Wildland Fire* 13: 27-35.

Stephens S.L., C.N. Skinner, and S.J. Gill, 2003. Dendrochronology-based fire history of Jeffrey pine-mixed conifer forests in the Sierra San Pedro Martir, Mexico. *Canadian Journal of Forest Research* 33:1090-1101.

Stephens, S.L., and M.A. Finney, 2002. Prescribed Fire Mortality of Sierra Nevada Mixed Conifer Tree Species: Effects of Crown Damage and Forest Floor Combustion. *Forest Ecology and Management* 162 (2): 265-275.

Stephens, S.L. 2001, Fire History of Adjacent Jeffrey pine and Upper Montane Forests in the Eastern Sierra Nevada. *International Journal of Wildland Fire* 10: 161-176.

Stephens, S.L. 2000. Mixed Conifer and Upper Montane Forest Structure and Uses in 1899 from the Central and Northern Sierra Nevada, CA. *Madrono* Vol. 47, No. 1:43-52.

Stephens, S.L, D. Dulitz, and R.E. Martin, 1999. Giant Sequoia Regeneration in Group Selection Openings in the Southern Sierra Nevada. *Forest Ecology and Management* vol. 120, no. 1-3, pp. 89-95.

Stephens, S.L. 1998. Effects of Fuels and Silvicultural Treatments on Potential Fire Behavior in Mixed Conifer Forests of the Sierra Nevada, CA. *Forest Ecology and Management* vol 105, no. 1-3, pp.21-34.

**DR. SAMUEL JUSTIN TRAINA**

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**EDUCATION**

- University of California, Berkeley (Soil Resource Management) 1978
- Ph.D. University of California, Berkeley (Soil Chemistry) 1983

**FIELD OF SPECIALIZATION**

- Surface, colloidal, and complexation chemistry in soils, sediments, and natural waters, remediation of contaminated soils and sediments.

**PROFESSIONAL EXPERIENCE**

- Director of the Sierra Nevada Research Institute, July 1, 2002-present  
Professor of Natural Science, University of California, Merced, July 1, 2002-present
- Professor of Soil Physical Chemistry, School of Natural Resources, Professor of Environmental Science, Professor of Geological Science. The Ohio State University. July 1, 1997 – June 30, 2002.
- Associate Professor of Soil Physical Chemistry, School of Natural Resources, Associate Professor of Environmental Science, Associate Professor of Geological Science. The Ohio State University. July 1, 1994 – June 30, 1997.
- Director of the Graduate Program in Environmental Sciences, The Ohio State University. July 1, 1995 - 1998.
- Associate Professor of Soil Physical Chemistry, Department of Agronomy, and Associate Professor of Environmental Science. The Ohio State University. July 1, 1991 - June 30, 1994
- Assistant Professor of Soil Physical Chemistry, Department of Agronomy, and Assistant Professor of Environmental Biology. The Ohio State University. 1985-June 30, 1991.
- Assistant Research Soil Chemist Department of Soil and Environmental Sciences. University of California, Riverside. 1984-1985

**RECENT REFEREED PUBLICATIONS (115 TOTAL)**

Z. He, S. J. Traina, J. J. Bigham, and L. K. Weavers. 2005. Sonolytic Desorption of Mercury from Aluminum Oxide, *Environmental Science and Technology* 39(4), 1037-1044.

Kost, D.A., J.M. Bigham, R.C. Stehouwer, J.H. Beeghly, R. Fowler, S.J. Traina, W.E. Wolfe and W.A. Dick. 2005. Chemical and physical properties of dry flue gas desulfurization products. *J. Environ. Qual.* 34:676-685.

He, Y.T. and S.J. Traina. *In Press*. Cr(VI) reduction and immobilization by magnetite under alkaline pH conditions: The role of passivation. *Environmental Science and Technology*.