

**PARTICIPATING AGREEMENT
BETWEEN THE
USDA FOREST SERVICE
PACIFIC SOUTHWEST RESEARCH STATION
PSW-4202
AND THE
CALIFORNIA COOPERATIVE ECOSYSTEMS STUDIES UNIT
UNIVERSITY OF CALIFORNIA - BERKELEY**

This PARTICIPATING AGREEMENT is hereby made and entered into by and between the USDA Forest Service Pacific Southwest Research Station, hereinafter referred to as the Forest Service, and the California Cooperative Ecosystems studies Unit, University of California – Berkeley hereinafter referred to as the Cooperator, under the authority of the Cooperative Funds and Deposits Act of December 12, 1975, Pub.L. 94-148, 16 U.S.C. 565a1-a-3.

Project Title: Sierra Nevada Adaptive Management and Monitoring Program

A. PURPOSE

Region 5 and the Pacific Southwest Research Station of the Forest Service, the California Resources Agency, and the Fish and Wildlife Service have agreed through a Memorandum of Understanding to work with the University of California to collaborate on further development of an Adaptive Management Strategy for the Sierra Nevada. The initial phase of this effort is intended to be the development of a work and implementation plan for an initial set of key research and management activities at strategic locations to address scientific uncertainties associated with current land management policies and direction in the Sierra; referred to as “Learning how to apply adaptive management to land management in the Sierra Nevada.” This work plan will describe how to collect and integrate information across scales, disciplines, and stakeholders in order to 1) create a synthetic understanding of forest ecosystem responses to the proposed treatments, and 2) generate an inclusive appreciation of the inevitable trade-offs involved in forest management decisions.

See attached Plan of Work for details.

B. STATEMENT OF MUTUAL BENEFIT AND INTERESTS

The Forest Service’s focus is to develop a thorough and defensible adaptive management and monitoring program for the Sierra Nevada.

The Cooperator has a long record of research in the Sierra Nevada. Research and extension work on natural resource management is strength of the University of California. The faculty has much to offer and they would like to be involved in continuing to learn more about natural resources in the Sierra Nevada and to contribute to solutions on controversial land management issues.

The Forest Service’s and the Cooperator’s mutual benefit and interest in this agreement is to develop a more thorough and defensible program. The Cooperator will be a partner in

both the development of the program as well as the public outreach necessary to explain the program to stakeholders.

In consideration of the above premises, the parties agree as follows:

C. THE FOREST SERVICE SHALL:

1. Assign Dr. Peter Stine as Authorized Departmental Officer's Designated Representative (ADODR) for this agreement.
2. Provide guidance, advice, consultation, and co-leadership essential to the satisfactory accomplishment for this agreement.
3. Reimburse the Cooperator \$200,000, in actual expenses towards project costs in accordance with the attached Financial Plan, within the project period from September 1, 2005 through June 30, 2006.

D. THE COOPERATOR SHALL:

Comment: Insert the Cooperator's legal name.

1. Assign Dr. John Battles, Department of Statistics, as Principal Investigator.
2. Perform the tasks outlined in the attached Plan of Work in accord with the provisions of this agreement.
3. Send required reports, per the attached Plan of Work, to the Forest Service Project Contact listed in Provision E.16, with a copy of the final report sent to the Forest Service Administrative Contact as well.

E. IT IS MUTUALLY AGREED AND UNDERSTOOD BY ALL PARTIES:

1. FOREST SERVICE ACKNOWLEDGED IN PUBLICATIONS AND AUDIOVISUALS. Forest Service support shall be acknowledged in any publications and audiovisuals developed as a result of this instrument.
2. COLLECTION OF AMOUNTS DUE THE FEDERAL GOVERNMENT. Any funds paid to a cooperator in excess of the amount to which the cooperator is finally determined to be entitled under the terms and conditions of the award constitute a debt to the Federal Government. If not paid within a reasonable period after the demand for payment, the Federal awarding agency may reduce the debt by:
 - (1) Making an administrative offset against other requests for reimbursements.
 - (2) Withholding advance payments otherwise due to the cooperator
 - (3) Taking other action permitted by statute.

Except as otherwise provided by law, the Federal awarding agency shall charge interest on an overdue debt.

3. TAXPAYER IDENTIFICATION NUMBER. The cooperator shall furnish their tax identification number upon execution of this instrument.

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4. FUNDING EQUIPMENT. Federal funding under this instrument is not available for reimbursement of cooperator purchase of equipment.

5. FREEDOM OF INFORMATION ACT (FOIA). Any information furnished to the Forest Service under this instrument is subject to the Freedom of Information Act (5 U.S.C. 552).

6. RETENTION AND ACCESS REQUIREMENTS FOR RECORDS. The Forest Service, Inspector General, or Comptroller General, through any authorized representative, shall have access to and the right to examine all records related to this instrument. As used in the provision, "records" includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form. All records pertinent to the award shall be retained for a period of 3 years.

7. MODIFICATION. Modifications within the scope of the instrument shall be made by mutual consent of the parties, by the issuance of a written modification, signed and dated by all parties, prior to any changes being performed. The Forest Service is not obligated to fund ay changes not properly approved in advance.

8. ALTERNATE DISPUTE RESOLUTION. In the event of any issue of controversy under this Agreement, the parties may pursue Alternate Dispute Resolution procedures to voluntarily resolve those issues. These procedures may include, but are not limited to conciliation, facilitation, mediation, and fact finding.

9. NONDISCRIMINATION. The cooperator shall comply with all Federal statutes relating to nondiscrimination and all applicable requirements of all other Federal laws, Executive orders, regulations, and policies. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d, 2000e-16), which prohibits discrimination on the basis of race, color, disability, or national origin; (b) Title IX of the Education amendments of 1972, as amended (20 U.S.C. 1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; and Section 504 of the Rehabilitation Act of 1973 as amended (29 U.S.C. 794) which prohibits discrimination on the basis of disabilities. The nondiscrimination statement which follows shall be posted in primary and secondary cooperator offices, at the pubic service delivery contact point and included, in full, on all materials regarding such recipients'/cooperators' programs that are produced by the cooperators for public information, public education, or public distribution:

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“In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. (Not all prohibited bases apply to all programs.)

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.”

If the material is too small to permit the full statement to be included, the material will at minimum include the statement, in print size no smaller than the text that “This institution is an equal opportunity provider.”

10. PROPERTY IMPROVEMENTS. Improvements placed on National Forest System land at the direction of either of the parties, shall thereupon become property of the United States, and shall be subject to the same regulations and administration of the Forest Service as other National Forest improvements of a similar nature. No part of this instrument shall entitle the cooperator to any share or interest in the project other than the right to use and enjoy the same under the existing regulations of the Forest Service.

11. LEGAL AUTHORITY. The cooperator has the legal authority to enter into this instrument, and the institutional, managerial and financial capability (including funds sufficient to pay nonfederal share of project costs) to ensure proper planning, management, and completion of the project.

12. PARTICIPATION IN SIMILAR ACTIVITIES. This instrument in no way restricts the Forest Service or the Cooperator from participating in similar activities with other public or private agencies, organizations, and individuals.

13. COMMENCEMENT/EXPIRATION DATE. The instrument is executed as of the date of the last signature and is effective through June 30, 2006 at which time it will expire unless extended.

14. EXTENSION OF PERFORMANCE PERIOD. The Forest Service, by written modification may extend the performance period of this instrument for a total duration not to exceed 5 years from its original date of execution.

15. TERMINATION. Any of the parties, in writing, may terminate the instrument in whole, or in part, at any time before the date of expiration. Neither party shall incur any new obligations for the terminated portion of the instrument after the effective date and shall cancel as many obligations as possible. Full credit shall be allowed for each Party’s expenses and all non-cancelable obligations properly incurred up to the effective date of termination.

16. PRINCIPAL CONTACT. The principal contacts for this instrument are:

Forest Service Project Contact	Cooperator Project Contact
Peter Stine	John Battles
Sierra Nevada Research Ctr. (4202) Pacific Southwest Research Station	Environmental Science & Policy University of California – Berkeley
2121 Second Street, Suite A-101 Davis, CA 95616	328 Hilgard Hall Berkeley, CA 94720
Phone: (530) 759-1703	Phone: (510) 643-0684
FAX: (530) 747-0241	FAX: (510) 643-5098
E-Mail: pstine@fs.fed.us	E-Mail: jbattles@nature.berkeley.edu

Forest Service Administrative Contact	Cooperator Administrative Contact
Grants and Agreements Specialist	Linda Crisostoma
Budget and Financial Management Pacific Southwest Research Station	Sponsored Projects Office University of California – Berkeley
P.O. Box 245 Berkeley, CA 94701-0245	336 Sproul Hall Berkeley, CA 94720-3114
Phone: (510) 559-6306	Phone: (510) 643-6114
FAX: (510) 559-6455	FAX: (510) 642-8236
E-Mail: psw_ga@fs.fed.us	E-Mail: lindac@berkeley.edu

The cooperator must name any contact representative change in writing to the Forest Service administrative office.

17. DAVIS-BACON OR SERVICE CONTRACT ACT. Federal wage provisions (Davis-Bacon or Service Contract Act) are applicable to any contract developed and awarded under this instrument where all or part of the funding is provided with Federal funds. Davis-Bacon wage rates apply on all public works contracts in excess of \$2,000 and Service Contract Act wage provisions apply to service contracts in excess of \$2,500. The Forest Service will award contracts in all situations where their contribution exceeds 50 percent of the costs of the contract. If a cooperator is approved to issue a contract it shall be awarded on a competitive basis.

18. PUBLICATION SALE. The cooperator may sell any publication resulting from the project. The publication may initially be sold at fair market value, which is defined in this instrument to cover costs of development, production, marketing, and distribution. After the costs of development and production have been recovered, fair market value is defined in this instrument to cover the costs of marketing, printing, and distribution only. Fair market value must exclude any in-kind or Federal government contribution to the total costs of the project.

19. ELECTRONIC FUNDS TRANSFER. The cooperator shall designate a financial institution or an authorized payment agent through which a Federal payment may be made in accordance with U.S. Treasury Regulations, Money and Finance at 31 CFR 208, which requires that Federal payments are to be made by electronic funds transfer (EFT)

to the maximum extent possible. A waiver may be requested and payment received by check by certifying in writing that one of the following situations apply:

1. The payment cooperator does not have an account at a financial institution.
2. EFT creates a financial hardship because direct deposit will cost the payment recipient more than receiving check.
3. The payment recipient/cooperator has a physical or mental disability, or a geographic, language, or literacy barrier.

To initiate receiving your payment(s) by electronic transfer, contact the National Finance Center (NFC) on the worldwide web at www.nfc.usda.gov or call the NFC at 1-800-421-0323, or (504) 255-4647. Upon enrollment in the program you may begin to receive payment by electronic funds transfer directly into your account.

20. PAYMENT /REIMBURSEMENT. Reimburse the cooperator for the Forest Service's proportionate share 63.04 percent of actual expenses incurred, not to exceed \$200,000. The cooperator is approved to submit monthly billings. The Forest Service will make payment for its proportionate share of project costs upon receipt of an invoice. Each invoice shall display the cooperator's actual expenditures to date of the invoice (not just the Forest Service share of actual expenditures), display by separate cost elements as documented in the Financial Plan, less program income and other Federal and nonfederal cash contributions and previous Forest Service payments. The invoice should be forwarded as follows:

- | | |
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| a. Send the original to:
Albuquerque Service Center
Payments – Grants and Agreements
101B Sun Avenue, N.E.
Albuquerque, NM 87109 | b. Send a copy to:
USDA Forest Service
Pacific Southwest Research Station
Attn: G&A, B&FM
P.O. Box 245
Berkeley, CA 94701 |
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Final payment will be made after a final invoice and a copy of the final report are received at our Station.

21. ENDORSEMENT. Any cooperator contributions made under this instrument do not by direct reference or implication convey Forest Service endorsement of the cooperator's products or activities.

IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the last written date below.

 JAMES R. SEDELL, Station Director
 USDA Forest Service
 Pacific Southwest Research Station

 Date

Comment: Insert the FS, authorized representative's name, title, and Region/Station/Area/Institute.

 SUSAN HEDLEY
 Acting Assistant Director
 Federal Projects
 University of California - Berkeley

 Date

Comment: Insert the Cooperator's authorized representative's Name, Title (if known), and legal name of the Cooperator.

Attachments:
 Plan of Work
 Financial Plan

For Forest Service Use

Job Codes:

NFIM64	119,500
NFTM64	21,000
NFRW64	19,500
WFHF64	40,000
TOTAL:	\$200,000

Cc:
 P. Stine, ADODR
 J. Battles, UC Berkeley
 S. Hicks, SNRC, PSW
 Budget

PLAN OF WORK

Sierra Nevada Adaptive Management and Monitoring Program

Plan of Work

Region 5 and the Pacific Southwest Research Station of the Forest Service, the California Resources Agency, and the Fish and Wildlife Service have agreed through a Memorandum of Understanding to work with the University of California to collaborate on further development of an Adaptive Management Strategy for the Sierra Nevada. The initial phase of this effort is intended to be the development of a work and implementation plan for an initial set of key research and management activities at strategic locations to address scientific uncertainties associated with current land management policies and direction in the Sierra; referred to as “Learning how to apply adaptive management to land management in the Sierra Nevada.” This work plan will describe how to collect and integrate information across scales, disciplines, and stakeholders in order to 1) create a synthetic understanding of forest ecosystem responses to the proposed treatments and 2) generate an inclusive appreciation of the inevitable trade-offs involved in forest management decisions.

We expect that the overall strategy will be shaped in an iterative process with the MOU partners. In refining the questions and tasks listed below, we will also need to collaborate closely with the USFS land managers at the Forest and District level as well as other land managers to determine what is feasible and effective. Indeed, a major portion of our initial effort is to understand the specific challenges and opportunities at candidate sites across the Sierra Nevada.

Although the work and implementation plans are developed around four resource management themes (forest ecosystem health, wildlife response, water resources, and participatory processes), the work to be carried out at each location will involve disciplinary integration of the research team. This approach is essential in order for results to integrate into an overall adaptive management strategy. Identification of the four themes identifies specific responsibilities within the UC Science team and may help facilitate communication and possibly multiple funding sources. While some tasks may receive more emphasis in selected firesheds than others, this simply recognizes that forest, water, wildlife, and stakeholder issues vary significantly across the Sierra Nevada. The project is being designed to integrate all studies in one location. All theme areas will go forward as an integrated approach in the various selected study areas. Thus the overall workplan should:

- 1) Design informative but feasible strategies to analyze the impact of the treatments on key social processes and ecosystem metrics.
- 2) Evaluate the effectiveness of the proposed case-control research design at three levels of inference: fireshed, forest and bioregion (i.e., the mixed conifer forests of the Sierra Nevada). This middle scale is important because of the large gradients and differences within the Sierra Nevada.

3) Assess the scientific, administrative, and logistical suitability of proposed research sites across the Sierra Nevada.

4) Devise an effective organizational structure for the UC Science Team and its collaboration with the Forest Service, the Fish and Wildlife Service, and the State Resources Agency.

5) The work plan will be displayed in such a way that questions and associated costs by location can be considered and prioritized by the MOU parties. The relationships between questions and implementation of the SNFPA should be made evident to the MOU parties.

It is expected that each task area (i.e. resource management theme) will contribute the following shared components to the overall plan:

- a. Develop work and implementation plan details.
- b. Collect and analyze baseline data and make it available to team members.
- c. Integrate plans for measurement and analysis.

The key questions and specific goals identified for each resource management theme are described below.

FOREST ECOSYSTEM HEALTH

Question: How do the planned treatments to modify landscape-level fire behavior impact the dynamics of fire and other disturbance agents in these forests and what are the consequences of these changes in terms of forest structure and composition.

Specific study goals:

1. Review of previous fire-based adaptive management efforts in the USA to learn what has worked.
2. Identify methods for assessment of fire hazard and estimate of forest vigor at the stand and landscape scales.
 - a. Contribute to the development of a rapid fuel assessment protocol that could be integrated into our landscape assessments.
 - b. Review strategies for the tree vigor assessment at landscape level.
3. Assemble and organize existing information on forest composition and fuel loading in candidate firesheds.
 - a. Compile available FIA data and stand exams data in candidate firesheds.
 - b. Make a preliminary assessment of fire risk in candidate firesheds.
 - c. Make a preliminary assessment of fire risk reduction after planned treatment.
 - d. Make a preliminary assessment of forest health concerns in the candidate firesheds.

WILDLIFE RESPONSE

Question: What is the response of selected wildlife species, individual and population level response, to changes in habitat structure and composition at multiple geographic scales? Selected species may include identified sensitive species, old-forest dependent species, or other species indicative of different forest seral stages.

Specific study goals:

1. Integration with existing research and monitoring on the selected species of interest.
2. Review of relevant existing literature on response of wildlife to forest management in western coniferous forests.
3. Identify methods for assessment of wildlife response to habitat changes at the stand and landscape scales.
4. Consideration of appropriate experimental design and sampling methods; include assessment of statistical power necessary to address specific questions.

WATER RESOURCES

Question: How do different treatment strategies affect water quality (e.g. stream temperature, turbidity, sediment transport) and the water budget (e.g. infiltration and soil moisture) across different hydroclimatic and forest regimes?

Specific study goals:

1. Assemble and assess existing data for the candidate study areas.
 - a. Compile the most detailed spatial data for elevation, vegetation, watersheds, streams, and other resources together with those for treatments.
 - b. Identify and evaluate existing point data that are relevant for the candidate study areas, including precipitation, snowpack, temperature, streamflow, stream water quality and soil moisture.
 - c. Make data available for team use through a web-based digital library, which will involve adapting an existing system for the data and areas of interest.
2. Review use of hydrologic indicators in forests of the Western U.S. and assess their suitability for application in the current project.
 - a. Meet with forest managers, researchers and other scientists who have piloted or applied related measurement and feedback strategies.
 - b. Based on meetings and published information, establish working hypotheses linking hydrologic response to aquatic and forest health.
3. Design both short- and long-term measurement and assessment approaches for the candidate forests and study areas.
 - a. Develop measurement strategies appropriate for the three distinct hydroclimatic and forest types, i.e. El Dorado, Tahoe and Sierra National Forests.
 - b. Develop measurement and data plans in sufficient detail to enable implementation beginning in spring/summer 2006.

PARTICIPATORY PROCESSES

Question: How can we engage stakeholders in the adaptive management process in a way that provides for mutual learning and feedback, and leads to collaboration in research, monitoring, and management?

Specific study goals:

1. Develop local histories for proposed study areas, using archives and interviews.
2. Analyze where there is flexibility in management decisions--in other words, which decisions are already final, and which can be influenced by stakeholder participation.
3. Conduct interviews to find out perceptions of past efforts and current state of affairs, what local priorities are for USFS management, and to develop draft "best practices" for adaptive management participatory processes.
4. Initiate development of interactive web-GIS infrastructure for public participation and monitoring, linked with digital library.
5. Develop and review list of who should be involved in participatory process in each potential study area (managers, scientists, public, state, etc.)

Background/Problem Statement

The goal of this Cooperative Ecosystem Study is to learn how to make adaptive management a practical means to understanding ecosystem behavior given the current plans to manage Forest Service and other 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 2004), the threat posed by catastrophic fire requires the modification of wildland fire behavior across broad landscapes (1,000's of ha). An important scientific uncertainty is how this focus on mitigating potential wildfire through treatments will impact other forest resources such as wildlife habitat, water quality, and overall forest health. To date there is not enough information available to definitively assess the trade-offs implicit in this plan. Thus there is a need to develop "a refined and active multiparty adaptive management and monitoring system consistent with the Sierra Nevada Forest Plan Amendment."

In the course of our discussions, we identified five key elements that we believe are crucial to achieve this goal:

- 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 fireheds, 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.

Objectives

The specific objective of this first phase is development of a work plan and attending implementation plan, including estimated budgetary requirements, for a 3-5 year program of work to perform research and monitoring in an adaptive management context that examines current land management direction/implementation. This is the plan

development phase, a necessary precursor to subsequent implementation. Later phases of work will determine exactly what is implemented.

Five specific objectives to a successful adaptive management and monitoring plan:

- 1) Building public understanding and trust.
- 2) Measuring physical and natural processes at relevant management scales.
- 3) Integrating competing public interests.
- 4) Identifying conflicting outcomes.
- 5) Building an academic/management partnership where information needs and information products are appropriately matched and disseminated to interested parties and the public.

These elements will be addresses in the plan development phase.

Methodology and Geographical Location

The location(s) for actual implementation of the research and monitoring have not yet been determined. A set of three potential case-control study sites have been identified dispersed across the Sierra Nevada gradient (north-south) in order to capture the differences in biophysical and societal parameters. A set of criteria have been established for site selection. These criteria address the conditions deemed necessary to accomplish the underlying objectives of adaptive management and the scientific uncertainties associated with land management; the criteria include:

- 1) Old forest habitat for species at risk
- 2) Potential for recruiting large tree structure
- 3) Wildland Urban Interface
 - a. Fixed traditional communities
 - b. Growing communities
- 4) Adjacent to significant amounts of private land eligible for State grants, cost sharing, and regulatory streamlining for fuels management
- 5) Fireshed/watershed;
 - a. ~CalWater planning watersheds about 10,000 acres nested inside
 - b. larger watersheds ~50,000 to 100,000 acres
- 6) Representative of typical Sierran landscape (e.g. including large drainage, forest type, include large elevational gradient, precipitation regime, topographic diversity subject to frequent fire and thus fuels management attention)
- 7) Organizational capacity of National Forest
- 8) Presence of existing data/studies/infrastructure
- 9) History of land and resource management agencies involving community interest in forest management
- 10) Potential for positive and detectable changes leading to desired forest conditions
- 11) Costs of development and implementation of treatments

A major task in developing this work plan is to evaluate potential locations according to these criteria.

Staging Intervals / Required Reports and Due Dates

This study will be completed within 12 months.

Begin Date: September 1, 2005 Ending Date: June 30, 2006

Tasks and Timeline with staging, with percentages (budget) to each task

Stage 1 (September 1 – October 31): Individual sections organize and begin information discovery. Refine specific questions; Identify metrics to measure; Collaborate among sections.

Stage 2 (early November): Meet as a group with the goal of integrating research goals and plans among sections. Share insights gained from information discovery; Discuss research design and inevitable trade-offs.

Stage 3 (November 15 – January 15): Refine individual sections. Finalize overall research design. Develop implementation schedule with budget estimates.

Stage 4 (by the end of January): Produce a rough draft of the entire work and implementation plan.

Stage 5 (February 28): Complete proposal for submission to MOU partners.

Reports and Due Dates:

- 1) November 15: Preliminary section plans (i.e. modules)
- 2) January 31: Draft work and implementation plan for all components
- 3) February 28: Final work and implementation plan for all components
- 4) June 30: Summaries of specific preliminary reviews and studies (from relevant modules) e.g., Forest Ecosystem Health
 - review of fire-based adaptive management efforts in the USA
 - prototype of rapid fuel assessment protocol
 - summary of strategies for measuring tree vigor