

University of California

Land Stewardship Proposal for Bear River Planning Units

Proposed Fee Title Recipient: The University of California. The Center for Forestry that is an organizational research unit reporting to the Dean of the College of Natural Resources will be the management entity.

PART 1 - ORGANIZATIONAL INFORMATION

1. Contact Information

a. Primary SOQ contact:

Dr. William Stewart, Director of the Center for Forestry

b. Secondary SOQ contact:

Dr. Robert York, Research Forests Manager

c. Dean of the College of Natural Resources at the University of California Berkeley

Dr. J. Keith Gilless

2. Executive Summary

The forests of the Sierra Nevada rank among California's essential natural resources. Understanding this resource is the mission of the University of California's research forest stations. Since 1910, the University has conducted a successful basic and applied program that has materially contributed to the sustainable management of these lands. However, the forces of global change – climate warming, air pollution, and invasive species -- pose unprecedented threats. Society must develop better strategies for natural resource management in a world of ongoing global change. The Stewardship Council lands provide an exceptional opportunity to build the information infrastructure needed to address these challenges for California's working forests. We propose to extend and expand the scope of UC's research forests. By adding parcels in the Pit River/Tunnel and Yuba Bear/Lake Spaulding planning units to the current UC forests, we will have a suite of sites that spans the length of the Sierra Nevada from Shasta County (Pit River, 40° 55' 42" N) to Tulare County (Whitaker Forest, 36° 42' 10" N). By locating forests along the major north-south biophysical gradient, we ensure that insights gained are broadly applicable. More importantly, we will install a research and monitoring network specifically designed to measure emerging stressors and support the development of adaptive strategies. Our goal is a program of research, education, and outreach rooted in field-based empirical studies that are guided by good experimental design. This foundation of science will give us the chance to learn how to steward the Sierra Nevada forests now and in the future. The following sections highlight how our overall strategy would leverage the Bear River tracts along with other UC forests as part of a region-wide strategic effort.

The Center for Forestry (<http://forestry.berkeley.edu/>) reports directly to the Dean of the College of Natural Resources (<http://www.cnr.berkeley.edu>) at the University of California, Berkeley. The Center's primary responsibility is to manage the forests owned in fee title by the Regents of the University of California. They are an integral part of the system of wildlands maintained by the University of California (e.g., Natural Reserve System includes 36 sites over 135,000 acres, <http://nrs.ucop.edu/>). These forests provide unique opportunities for field experiments, applied science, and hands-on learning opportunities. In addition, the Center for Forestry's four research stations have an explicit focus on understanding the science and stewardship of **working** forests. Thus, these lands are managed to provide conditions to promote our research, teaching and public service mission. Our 4,270 acre Blodgett Forest Research Station (<http://forestry.berkeley.edu/blodgett.php>) is a Sierra Nevada Mixed Conifer forest similar to the PG&E planning units of interest. It is the largest forest and contains our headquarters, large public meeting spaces, housing for researchers, and heavy equipment. It supports a productive and diverse array of basic and applied research. The smaller forests have different specialties that complement the activities at Blodgett. Ongoing programs supported by the Center for Forestry facilities include the Forestry Institute for Teachers (<http://www.forestryinstitute.org/public/uc.htm>) the Sierra Nevada Adaptive Management Program (<http://snamp.cnr.berkeley.edu/>) and UC Forestry Camp

<http://espm.berkeley.edu/summercamp/>).

Our interest in acquiring Stewardship Council lands is to advance sustainable forestry appropriate to Sierra Nevada watersheds, to enhance the diversity of natural habitats, and to protect cultural values while accounting for the changes and uncertainty introduced by the forces of global change. From an operational perspective, we want to explore and develop a range of approaches that meet the common mixture of demands on working forests in California. For example, we hope to balance revenue generating forest management with non-motorized recreational opportunities as well as to protect open space through conservation easements. We foresee that many of these objectives will be achieved in partnership with the local groups as conservation partners, conservation easement holders, and participants in expanded demonstration and outreach programs.

The demonstration role will be invaluable to neighboring private forests as they weigh future choices that could involve selling the land that would then be further subdivided. While our research forests represent only a fraction of all the forested watersheds in the Sierra Nevada, managing them with a diversity of management approaches (including no-action control plots) within a research and demonstration framework will help us learn how to build forest resiliency across the range.

The University of California has the capacity in terms of financial, legal, real estate, and resource management staff to achieve these ambitious goals. Based on our assessment of the PG&E forest inventories (circa 2002) and existing timber harvest plans, we anticipate that it will be a number of years before we can implement another commercial harvest on many of the areas. Since the forests will continue to grow, this will represent a shift of sustainable harvests forward a number of years rather than any decline in the decadal levels of sustainable harvests. A comprehensive inventory of the properties and the establishment of a long term land-use plan are fundamental components of a research-led forest management approach that can generate answers to the key questions facing mixed conifer forests throughout the montane watersheds of the Sierra Nevada. While many of the expenses are related to enhanced management activities, the University recognizes that there will be lag before these new parcel can cover their costs. As noted by the letter from Dean J. Keith Gilles of the College of Natural Resources, we are committed to paying for some of those investments that are unique to the research forest enterprise by borrowing from other University resources and paying back those internal loans from future timber revenues.

The organizational capacity to accomplish the integration of new forest properties is rooted in our professional staff based out of Blodgett Forest. Currently we have three registered professional foresters who, in addition to implementing annual timber harvests that meet/exceed all of the California Forest Practice rules, are responsible for providing logistical and technical support to researchers, maintaining a comprehensive forest inventory and environmental monitoring

program, archiving data and geospatial information, conducting applied research, and reopening our other forest sites that have been snowed in all winter.

3. Organization information

The University of California is a state university.

4. Documentation of tax exempt status:

<http://controller.berkeley.edu/FINRPTS/index.htm>

5. Legal name: The Regents of the University of California

6. Common name: University of California

Note: The University of California is governed by The Regents under article IX, Section 9 of the California Constitution. They act as the legal agents of the University. However, the unit that will operate and manage the properties is the Center for Forestry in the College of Natural Resources at UC Berkeley.

7. Letter from the Dean of the College of Natural Resources at UC Berkeley

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May 13, 2011

Allene Zanger
Executive Director
Pacific Forest and Watershed Lands Stewardship Council
15 North Ellsworth Avenue, Suite 100
San Mateo, CA 94401

Re: The University of California Berkeley application for fee title ownership of Stewardship Council parcels in the Pit River, Tunnel Reservoir, Lake Spaulding and Bear River Planning Units

Dear Ms. Zanger,

The University of California, Berkeley, College of Natural Resources' Center for Forestry has identified parcels in four planning units (Pit River, Tunnel Reservoir, Lake Spaulding and Bear River) in the Stewardship's portfolio that, together with our existing research forests, would provide a north-to-south transect of working forests in the Sierra Nevada. Our goal is to test approaches to mitigate and adapt to the manifold effects of a changing climate across this gradient. It is essential to develop and test appropriate management strategies for forested watersheds that will flourish under different climate change scenarios. The strong relationship between the Center for Forestry, the broad array of scientists within the College of Natural Resources, and other colleagues in academia, cooperative extension and the private sector will be crucial in achieving the major advances necessary to maintain and enhance the full range of beneficial public values provide by the lands in the Stewardship Council planning units.

The greatest long-term benefits will follow from the establishment of a research quality resource inventory and planning system. As we have learned from all of the University's long-term land-based research facilities, such investments will provide considerable long-term benefits in terms of attracting major federal and state funding, increasing the sustainable revenue from utilizing best practices, and engaging broader support from philanthropic donors. However, the sustainable revenue potential from these parcels in the first five to ten years cannot be ascertained from the relatively old timber cruises and is strongly dependent on the actual activities of recently completed, currently approved, and applied for timber harvest plans. Therefore, we see it in the College's best interest to actively pursue the best long-term strategy even if it requires us to put in more resources in the initial years to develop a long-term asset that will be a lasting legacy of the Stewardship Council

Sincerely,

A handwritten signature in black ink, appearing to read "J. Keith Gilless".

J. Keith Gilless
Dean, College of Natural Resources

8. Rationale for Applying

The Center for Forestry has identified parcels in four planning units (Pit River, Tunnel Reservoir, Lake Spaulding and Bear River) in the Stewardship's portfolio that together with our existing research forests would provide a north - to - south transect of working forests in the Sierra Nevada. Our goal is to test approaches to mitigate and adapt to the manifold effects of a changing climate across this gradient.

Our proposal revolves around one key question: **How can California's working forests located in key watersheds above major water supply systems be managed to sustainably provide essential ecosystem and climate benefits over the next century?** Global change will have far reaching impacts on forest ecosystems. Warming temperatures have already altered the water balance of forested watersheds above major water supply systems and shifted the range of both invasive and native organisms. The Bear River tracts are also unique with respect to the strong interest of recreational partners to increase access for non-motorized recreation along the Bear River corridor through many of these parcels.

Simply reducing management intensity to preserve forests is a straightforward approach but ultimately short-sighted. Conservation in this era of change is confronted by the reality that no ecosystem, no matter how remote or wild, is protected. Both scientists and managers recognize that proven approaches to conservation (e.g., protecting sensitive species in parks and reserves) are insufficient and that novel strategies are needed. Ultimately, the solution lies in stabilizing the global environment, namely by drastically reducing inputs of greenhouse gases into the atmosphere. But even assuming adoption of the most aggressive mitigation scenarios, a century of directional environmental change is at hand. We know that the climate is changing and this change leads to new risks and opportunities. Therefore it is essential to develop and test appropriate management strategies for forested watersheds that will flourish under different climate change scenarios. It is in the public interest to address:

- Changing risk factors associated with altered fire regimes, air pollution, and invasive pests;
- Changing values for water runoff volume, timing, and quality;
- Changing stresses on rare species associated with stand composition and structure;
- Changing greenhouse gas fluxes from forest vegetation and soils;
- Changing stresses affecting growth and yields of timber species.

These questions must be conducted within a research framework where hypotheses are proposed and vetted followed by implementation as forest management trials. These installations must be guaranteed for the long-term along with unallocated lands to accommodate more short-term field experiments.

9. Organization's Mission

The forests of the Sierra Nevada rank among California's essential natural resources. Understanding this resource is the mission of the University of California's research forest stations. Since 1910, the University has conducted a successful basic and applied program that has materially contributed to the sustainable management of these lands. However, the forces of global change – climate warming, air pollution, and invasive species -- pose unprecedented threats. Society must develop better strategies for natural resource management in a world of ongoing global change.

The Center for Forestry (<http://forestry.berkeley.edu/>) reports directly to the Dean of the College of Natural Resources (<http://www.cnr.berkeley.edu>) at the University of California Berkeley. Its prime responsibility is to manage research forests owned in fee title by the Regents of the University of California. The Center for Forestry's four current research forests had historically been managed forest lands and are currently managed to represent a variety of conditions to promote our unique research, teaching, and public service mission.

The management strategy behind our existing research forest as well as Cooperative Extension projects are both consistent with the requirement that watershed lands be conserved and their public value enhanced. The protection of the natural habitat of fish, wildlife, and plants will be addressed through conservation easements that prohibit residential conversion as well as management practices that minimize short term impacts and maximize the long term ecological integrity while still producing high quality timber products. The most effective protection for the natural habitat of fish, wildlife, and plants is to minimize damage caused by vehicle use during management or recreational activities, to monitor forest processes and populations so that early warning signals are captured, and to increase the landscape level resiliency to catastrophic events (e.g., large, intense fires, invasive species introductions, natural and invasive pest infestations). In addition to working with conservation easement holders who would be responsible for ensuring most of the open space qualities of the parcels, the maintenance of a forest with a continuous canopy cover can provide socially desirable aesthetic qualities. Forest management approaches that include group selection to promote vibrant growth of younger trees as well as treatments to reduce the risks of catastrophic wildfire or infestations will be necessary to maintain the desirable open space values over the coming decades. The University of California's comparative advantage in this area includes the public education oriented outdoor recreation through 4-H programs of county-based cooperative extension advisors as well as existing partnerships with K-12 educational institutions. The University's forest parcels have had grazing leases over time and many of our forest neighbors also have grazing leases. Continuation of this type of historic agriculture use can be integrated with the other beneficial public values where appropriate.

10. Geographic Focus

The Stewardship Council lands provide an exceptional opportunity to build the information infrastructure needed to address the challenges facing California's working forests. We propose to extend and expand the scope of UC's research forests. By adding parcels in the Pit River/Tunnel and Yuba Bear/Lake Spaulding planning units to the three current UC forests, we will have a suite of sites that spans the length of the Sierra Nevada from Shasta County to Tulare County. By locating forests along the major north-south biophysical gradient, we ensure that insights gained are broadly applicable. Within the forests, we will implement a full array of forest stand structures that meet current diversity goals and provide the basis to learn what structures will be most resilient over the coming decades. We will install a research and monitoring network specifically designed to measure emerging stressors and support the development of adaptive strategies. Comprehensive measurements of the energy and water balances are critical for understanding the role of forested watersheds in the vital water supply systems of the Sierra Nevada. Monitoring air pollution and the effects on trees and plants is also important given the significant updraft of pollutants into upper watersheds. Finally, monitoring to detect new invasive species will also be undertaken. Our goal is a program of research, education, and outreach rooted in field-based empirical studies that are guided by good experimental design. This foundation of science will give us the chance to learn how to steward the Sierra Nevada forests now and in the future.

The Bear River tracts have close proximity to residents along the Highway 49 and I-80 corridors as well as recreational visitors from local and regional residential areas. This vastly increases the potential number of users and visitors that could be involved compared to many other managed forests in California that are harder to visit. In addition to the UC field days, demonstrations, workshops, and cooperative extension outreach programs, we foresee considerable interaction with the Nevada County Land Trust and the Placer Land Trust as conservation and recreation partners. The development of a recreational trail along the abandoned Boardman canal has been proposed through the central section of the Bear River unit and could also be linked with recreational resources to up and down the Bear River. The enthusiasm for a trail system along the Bear River may also evolve into a larger cooperative venture in the region with a focus on increasing and enhancing recreational opportunities along public lands in the Bear River valley. The tracts in the Lake Spaulding planning unit are adjacent to the Bear River planning unit and offer additional opportunities to interact with a larger set of users.

As mentioned in earlier applications, the Pit River and Tunnel Reservoir tracts of interest to UCB do not include the river front parcels that will presumably be retained by PG&E. These are the areas where most of the recreational use is centered. A number of camping and picnicking spots in the Tunnel Reservoir tracts will be retained by PG&E. The relatively low population density in this region leads to more of a demonstration focus for other private landowners rather than the

direct provision of recreational or educational opportunities from the donated lands themselves.

11. Organizational Experience and Capacity to manage lands and BPVs: examples

Forest management to enhance late season stream flow

Water is arguably the highest-value ecosystem service associated with the conifer forests of California's Sierra Nevada. The provision of this essential and valuable service is vulnerable to changes in the energy and water balance associated with climate warming. To date, we have observed more precipitation falling as rain versus snow, earlier snowmelt, and greater summer water deficits. The extensive system of reservoirs was designed for a much different precipitation pattern and is sub-optimally suited for continuing to produce water related benefits. Besides consuming more than half of the total precipitation falling on the Sierra Nevada, conifer forests are facing increasing risks of rapid losses from wildfires, insect outbreaks and diseases. However there is the potential to manage the water balance in forest ecosystems while also reducing the density-related risk factors (e.g. ladder fuels that increase fire spread, moisture stress that increase insect attacks). The dominant vegetation (i.e., trees) is highly productive, forms dense canopies, and consequently uses a great deal of water. The numerous branches on the trees also catch considerable amounts of snow that essentially evaporates (sublimates) without ever touching the ground. There is a strong positive correlation between annual net primary productivity (the ultimate measure of the photosynthetic capacity of the ecosystem) and evapotranspiration (the primary cause of water loss). Any manipulation that reduces the productivity (i.e., removes trees) also reduces evapotranspiration, shifts the balance of energy driving snowmelt, and thus may increase soil-water storage and streamflow. Reducing the total amount of evapotranspiration and sublimation from vegetation could potentially increase the amount of water flowing downstream. Reducing the current forest canopy cover and related evapotranspiration could also bring forest stands towards historic conditions where regular fires across the landscape resulted in much lower levels of forest canopy cover than we have today.

In collaboration with hydrologists at UC Merced, UC Berkeley researchers are beginning a program on sites in the American River to initiate field measurements of both forest evapotranspiration, snow and rain retention, and eventual stream flow so that we can put in a number of silvicultural trials with forest stands that are designed to increase stream flow and shift forest stand structure towards larger trees and low fire risk. Specific trials in other regions that involved forest thinning that resulted in stands that more resembled historic stands dominated by large trees have also produced increased stream flows from 10 to 25 percent. The particular end members of interest are recently burned areas and high-density forests that are candidates for significant thinning. Measurements will focus mainly on snowpack accumulation and melting, soil moisture, runoff, evapotranspiration (ET), and leaf area index (LAI). Ancillary measurements on meteorology, snowcover, soils and forest structure are available from other research programs. The meta-analysis and modeling will use available data from SNAMP, SWEEP, and other research programs such as the NSF-supported Southern Sierra Critical Zone

Observatory and the Blodgett Experimental Forest to integrate data and develop scenarios for experimental forest management. It will also involve a synthesis of information on ecosystem services around hydropower, water supply, carbon sequestration, fuels management, and wildlife. This information will determine the scenarios to be examined in the modeling and analysis. It has been our finding that detailed modeling requires a focused measurement program specific to the Sierra Nevada lands of interest. It must also be informed by forward-looking management approaches rather than historical practices or constraints, and use models that are sufficiently detailed to explicitly link the ecosystem and water processes using the rich data sets now available.

Fire and Fire Surrogates Treatments for Ecological Restoration

Following a century of fire suppression, western conifer forests are denser and more uniform than their pre-settlement counterparts. These changes in forest structure have interacted with recent warming to steadily increase the severity of wildfires during the past two decades. This trend threatens the sustainability of many resources (e.g. biodiversity, habitat, and commercial value) that forests provide. The need for restoration is clear. Less clear, however, is which restoration practices to use. Over a six year period, University of California scientists and staff collaborated with researchers at six other sites in western forests to compare treatment options (i.e. “fire surrogates”) involving both mechanical and prescribed fire components. The results published in scores of peer-reviewed journal articles have provided insights into how forest management can affect not only the risk of fires, but also treatment effects on other ecosystem processes such as carbon sequestration, wildlife population dynamics, soil compaction, soil chemistry, biodiversity, tree regeneration, insect populations, and economic value. These types of results were rare a decade ago, but now provide valuable guidance regarding the expected impacts on many different resources from both treatments and wildfires. The study site on UC’s Blodgett Forest was by far the most productive of all of the sites, both in terms of publications and in terms of the number and diversity of visitors. Key to the success was collaboration between scientists and managers. Managers assisted by preparing the necessary permits and planning documents and also by continuing to host numerous stakeholder tours of the study area. Members of these tours consisted of a full range of interested parties from the general public to scientists to resource professionals. While many of the other sites have been abandoned, the Blodgett site continues to be active. In the fall of 2011, another treatment is planned, with the focus on long-term evaluations of treatments and on changes in soil carbon following burning.

Group Selection Silviculture

In the mid-1990’s, managers at Blodgett Forest foresaw the need for new information regarding the “group selection” method of forest management. Group selection has the potential to satisfy a majority of stakeholders. It was seen as a compromise approach between those desiring the operational efficiency of large clearcuts and those desiring the ecological advantages of continuity in canopy cover, preservation of wildlife habitats, and maintenance of multi-aged trees at the

landscape scale. It has also been touted as a means to mimic the patchwork nature of pre-settlement mixed-conifer forests. Yet little information existed to guide managers with implementation. To address this information gap, the professional staff at Blodgett initiated a study involving group selection, with collaboration from UC faculty. This manager-scientist collaboration proved to be an ideal format for doing applied research. Managers identified the research question; scientists then helped hone a solid research design; both managers and scientists collaboratively wrote peer reviewed publications; and both managers and scientists continue to host field trips and workshops that extend insights to the public. The deliverables so far have been five published papers, two PhD dissertations, and several hundreds of lay persons and resource professionals visiting and discussing the research on site. Because professional staff had a personal stake in the research, they are now committed to continuing the project into the future. This way of doing research has become a model for several other applied studies on UC-owned forestland.

12. Information on current UC managed properties

The University currently owns four forest research stations. The Center for Forestry manages the University of California's research forests that are described below.

Blodgett Forest Research Station: **Location:** El Dorado County at ~4000' elevation in the mixed-conifer vegetation type. Size: approximately 4,270 acres. Owned since 1933. **Uses:** Research, Outreach, and Education. **Current Management:** Research and demonstration into sustainable forest management practices to produce forest products over the long term while minimizing impacts to water quality, wildlife habitat, fire risk, and other environmental benefits. Management is accomplished using a mix of even-aged (40% of area) and uneven-aged (40%) silvicultural systems, and 20% reserve stands for comparison. The basic land management designations have remained unchanged for the past 50 years allowing for true long term assessments of the different approaches. To date, 332 peer-reviewed journal publications and 76 dissertations/theses have included research at Blodgett in disciplines spanning silviculture, wildlife management, stream ecology, fire science, plant demography, carbon dynamics, insect and disease interactions, and air pollution.

Whitaker Forest Research Station: **Location:** Tulare County between Sequoia National Monument and King's Canyon National Park at approximately 5500' elevation in the mixed-conifer/giant sequoia vegetation type inside the boundaries of the Redwood Mountain Sequoia Grove. Size: 320 acres. Owned since 1910. **Uses:** Restoration, Research, and Outreach. **Current Management:** Research into restoration and conservation of giant sequoia ecosystems using mechanical and natural methods (fire, harvesting, seedling establishment) in a controlled environment.

Baker Forest/Summer Camp: **Location:** Plumas County near Meadow Valley at 4250' elevation in the mixed-conifer vegetation type east of the Pacific Crest. Size: 80 acres owned by the University and 40 acres Special Use Permit on USFS land. Owned since 1951 (80 acres), USFS Special Use Permit since 1920s. **Uses:** Education, Outreach, Demonstration, and Research. **Current Management:** The primary use of the facility is as an outdoor classroom with sleeping facilities for education and outreach used by UCN students, every 6th grader in Plumas County, the "Forest Institute for Teachers", the "Forestry for Lawyers Course", elder hostels and various other groups.

Russell Research Station: **Location:** East Contra Costa County at approximately 1000' elevation in the oak woodland vegetation type. Size 283 acres encompassing an entire small watershed. Owned Since: 1961. **Uses:** Education, Demonstration, and Research. **Current Management:** The valley floor is used primarily for forestry research using plantations of pure species and ecophysiology experiments in the rhizopod facility (plumbed and instrumented large pots where soil, water, and light can be manipulated). Various classes can use the site for outdoor education due to its close proximity to Berkeley.

13. Organizational finances

The University's financial statements can be reviewed at the link below:

<http://controller.berkeley.edu/FINRPTS/index.htm>.

We have attached the property budget for Center for Forestry's research forests for the last three years (FY0708, FY0809, FY0910) and the current operating budget (FY1011).

15. Pending source of grant funds or potential grant funds. Describe organization's strategy for securing additional sources of support.

The long-term plan of the University of California is to finance the core of the operations from the timber revenues from sustainable forestry that will also provide for other key beneficial public values. However, the sustainable revenue potential from these parcels in the first five to ten years cannot be ascertained from the relatively old timber cruises and is strongly dependent on the actual activities of recently completed, currently approved, and applied-for timber harvest plans. However, these relatively well-stocked forests appear to be making good use of the existing growing space and should continue to grow at historical rates even during a short period of limited harvesting and replanting. Therefore, we see it in the College's best interest to actively pursue the best long-term strategy even if it requires us to put in more resources in the initial years to develop a long-term asset that will be a lasting legacy of the Stewardship Council. In practice this will mean increased fund raising from public and private sources, integration of these units into future projects that are of similar size and magnitude to the Fire and Fire Surrogates (FFS) project, and sharing professional resources across our other forest properties.

As the budget documents from the Center for Forestry demonstrate, we have historically been able to use a variety of funding sources to maintain an active operational forestry program, a large research program, and considerable outreach activities.

16. Identify the department that would acquire fee title and whether use of timber revenue, lease revenue, or funding provided by the Stewardship Council for the specific land management objectives could and/or would be restricted to use on the donated lands.

The Regents of the University of California would hold fee title. Since the 1960s, when a positive revenue stream from forest management was created at Blodgett, it has been the continuous policy to keep those revenues within the Center for Forestry system. Over the past 50 years, revenues generated by the research forest have been used to finance expansions of the infrastructure including increasing the number of cabins to house researcher and guests, creating public meeting facilities, improving the transportation network to allow better year round access while reducing its environmental impacts and increasing the extent and effectiveness of monitoring procedures including meteorological and hydrological observation stations. It has been this re-investment of funds that has attracted externally funded research that has substantially increased the research and demonstration productivity of the sites. The new lands will be supported by existing facilities and staff until they are financially self-sufficient. Based on our analysis of the circa 2002 inventories and the knowledge of recent or ongoing timber harvests on the parcels in question, we do not believe that significant net revenue will be forthcoming on the new properties for a number of years. After the full inventories and forest management plans are completed, it would then be possible to sustain timber harvests at levels comparable or possibly higher than the long-term historical levels. If harvests are deferred during the development of a new research forest strategic and operational plan, the annual harvests over the next decade could be greater than the long term average since the forests continued to grow during the transition and planning phase.

17 Key personnel responsible for day to day management

The key personnel responsible for day to day management in the planning stages would be the current staff associated with the Center for Forestry. Bill Stewart is the Director of the Center for Forestry, Rob York is the Research Forest Manager, Frieder Schurr is the data manager/analyst for the forests, and Ken Somers is the operational forester. They are all registered professional foresters and will be responsible for hiring and supervising the additional foresters and forestry aides necessary to complete initial reinventory, permanent plot layout, and forest management plan. Russell Seifert is the equipment operator for the Center for Forestry. Depending on the work load, he will directly complete some of the equipment related tasks or will coordinate the hiring and supervision of local contractors. Amy Mason is the office manager at the Blodgett Forest Research Station and will assist in the management aspects in the early period. Professor John Battles will be a lead forest research advisor and will play a major role in the integration of the UC Sierran Forest Global Change Network. The CVs of the key personnel are attached.

18. Collaborative efforts for these projects

The team from the University of California has presented its overall plan for a few of the planning units to the Stewardship Council for years. Since the initiation of this planning cycle, we have attended all the public meetings and had additional follow-up meetings with other interested donee parties and a wide range of other interested stakeholders. For the Bear River planning units that straddle the Nevada County and Placer County boundary, we have had detailed conversations to develop collaborative approaches with the Nevada County Land Trust (NCLT) and the Placer Land Trust (PLT). In addition to potentially collaborating with NCLT and PLT if they are chosen as the conservation easement holders, NCLT and PLT will be recreational partners on this fee title application. For all of the potential sites across Northern California, our UC Cooperative Extension offices in Redding, Auburn, and South Lake Tahoe have resource professionals in forestry and range management that have decades of experience with local landowners, other citizens, and public agencies at the local, state, and federal levels. As the process rolls out, we will increasingly work with our local counterparts within the university to keep in contact with concerned organizations and stakeholders.

19. Most relevant experience soliciting stakeholder input on comparable projects

The most relevant experience would be our ongoing management at our Blodgett Forest Research Station in El Dorado County. We annually host field days for local residents and stakeholders as well a number of events focused at parties interested in specific issues such as wildlife management of forest-dependent species, wildfire management, stream zone management, silvicultural regimes that are most appropriate to family forests who have a mix of aesthetic, personal safety, and revenue producing goals. We have found that the most effective way to interact with interested stakeholders is a mix of field visits to sites and presentations of well-documented results across a range of sites in terms of location or time. At our Baker Forest location in Plumas County we annually host a weeklong program for school teachers (Forest Institute for Teachers) as well as programs oriented towards 6th graders from all elementary schools in Plumas County.

If more significant involvement with large numbers of interest groups and stakeholders is required, the experiences of our colleagues with the Sierra Nevada Adaptive Management Program (<http://snamp.cnr.berkeley.edu/>) could be a resource that we would draw upon.

20. Legal Compliance and Best Practices

We follow the guidelines and regulations enforced by the University of California. For details on these regulations, please refer to the link below:
<http://riskmanagement.berkeley.edu/>

21. Provisions for another organization to assume ownership

We have not made any provisions for other organizations to assume ownership. In the long history of the University's ownership of research properties in areas have not been surrounded by growing urbanization, we have been able to maintain ownership and effective management. If there were a need for another organization to assume ownership, we would have access to the relevant University legal and real estate professionals to execute the agreement that best maintains the intent of these proposed donations.

22. Current or past violations of law.

None.

23. Acceptance of property with conservation easements on them

The Regents of the University of California often accept lands with conservation easements on them or other limitations. Such limitations are quite common on gifts of land to the University.

24. Conflict of interest disclosure

John Battles is the principal investigator of contracts and research projects with the US Forest Service, a non-voting member of the Stewardship Council. The other principals on this project do not have any other personal or financial relationships with Stewardship Council board members.

PART 2 - LAND STEWARDSHIP INFORMATION

25. Land interest sought

The University of California is interested in receiving the following 16 parcels in fee title. Parcels 837,838, 839, 844, 845, 846, 848, 854, 855, and 857 are shaded to represent those parcels where the AECOM maps in the BIP highlight a variety of streams, canals, tunnels, reservoirs, and dams that are defined as part of the current license for FERC Project 2310 (Pacific Gas and Electric Company Drum-Spaulding Project FERC Project No. 2310, Current FERC License as of May 11, 2007). In addition there are a number of road segments, emergency water spillway routes, rock outcrops, and quarries that could be critical for maintaining standard and emergency access to the hydroelectric facilities to maintain operations. . It is impossible to predict which combinations of access roads would be necessary for all future maintenance and emergency access to the key FERC facilities. Continuous and unfettered access to the hydroelectric facilities by PG&E staff and contractors via the extensive road network will be a crucial component of the Drum-Spaulding Project. Our review of the FERC license documents, aerial photos, vegetation type maps, timber roads, Google Map imagery, and BIP maps suggests that a mix of PG&E fee title and easements could be a more cost-effective strategy to numerous lot splits.

Unit	Parcel #	Total Acres	Non-FERC acres	Approximate Acres after PGE allowance for access	Linear miles of PGE roads, FERC canals and streams
Bear River	836	82	82	82	0.0
Bear River	837	163	122	122	0.7
Bear River	838	167	93	63	0.9
Bear River	839	997	918	500	1.2
Bear River	844	97	2	92	0.1
Bear River	845	485	455	455	1.6
Bear River	846	2102	1644	1500	5.1
Bear River	847	79	76	76	
Bear River	848	160	144	144	0.7
Bear River	850	63	54	54	
Bear River	851	74	74	74	
Bear River	852	1	1	1	
Bear River	854	160	76	76	0.9
Bear River	855	80	76	76	0.1
Bear River	856	9	9	9	
Bear River	857	125	113	113	
Bear River	UCB fee title	4844	3939	3437	11.2

26. Please indicate if the transfer of the watershed lands identified above would require a lot line adjustment, boundary survey, or legal parcel split.

Please describe any proposed lot line adjustment, boundary survey, or parcel split and indicate why the proposed measure is necessary and how the proposed lot line adjustment or parcel split enhancement of the BPVs. Please include these costs in your organization's budget and funding plan and indicate if your organization would contribute funds for these costs. (one page or less)

The 10 parcels shaded in gray above have roads or other features that have been identified by PG&E as central to their continued operation of their hydroelectric properties. By our estimates, there are around 11.2 linear miles in total length of dirt roads, canal appurtenant roads, paved roads, tunnels, emergency release spillways, streams, and other features within the parcels. Minor portions of these roads are immediately adjacent to canals and other facilities while most of the roads and part of the larger access system. The University is committed to keeping these roads open for any and all PG&E access and can work with PG&E and the Stewardship Council to come up with the most cost effective and permanent solution for all parties. The parcels of interest to the University of California would require lot splits on 10 different parcels so that PG&E would have fee title to all canals, tunnels, appurtenant roads, and sections of land bounded by PG&E property. UC is proposing that on UC parcels, UC would provide PG&E an easement for their interests. The lots splits are necessary for the 10 parcels to allow PG&E to retain their interests in fee. We have proposed easements for certain parcels where the PG&E interests were linear and not easily addressed via a lot split. Due to the need for PG&E to keep fee title to their above ground canals and underground tunnels, it would appear that PG&E would need 12 legal parcels while the forested areas with UC fee title that are unrelated to the hydroelectric assets would require 21 separate parcels. This assumes that smaller areas of non-essential forest land would stay attached to the PG&E infrastructure network and that many of the roads that are not associated with canals or spillways could be addressed with easements or solutions other than fee title. Given that some of these units have numerous nearly parallel roads, there could be a range of solutions that will become more apparent during further discussions.

Please see budget and funding plan in a separate document.

27. Please provide an overview of your organization's internal process for approving the acquisition of, and completing the transaction associated with, real property. (two pages or less)

The University has completed transactions for forest lands on numerous occasions. All UC lands are held in the name of the UC Regents. However, based upon our preliminary estimate of value for this planning unit, the transaction would not have to go to the UC Regents for approval, but would be approved instead by the UC Office of the President. Additionally, the University of California is exempt from the Subdivision Map Act (Government Code Section 66428(a), thereby simplifying the lot split process. For example, we should be able to record a record of the surveys

that accomplishes the legal lot split, dividing the watershed property to be conveyed to The Regents from the portion to be retained by PG&E. The internal processing of the transaction would be coordinated by Connie Miller, Associate Real Estate Officer, UCOP (510-987-0802), Kevin Hufferd, Director of Property Development, UC Berkeley (510-643-5314), and Janet Norris, UC General Counsel.

28. Baseline and enhanced management & 29. Physical enhancements/capital improvements.

(These two categories are integrally linked during the establishment of a research forest and therefore will be addressed together)

Overview: The University of California will add the Stewardship Council lands to its existing network of research forest stations in the Sierra Nevada. The Center for Forestry, housed on the Berkeley campus, is responsible for operating “working” forests that provide both outdoor laboratories for research and examples of sustainable forestry practice for demonstration. Our goal is a program of research, education, and outreach based on field-based empirical studies that are guided by good experimental design. As part of our management plan, we will install a monitoring platform specifically designed to measure emerging stressors and support the development of adaptive strategies. This foundation of science will give us the chance to learn how to steward the Sierra Nevada forests now and in the future. Moreover, we have a track record of transferring our basic scientific insights into effective management actions (e.g., group selection silviculture, mechanical fuel treatments). Below we outline the key elements of the proposed UC Sierran Forest Global Change Network.

Temperatures are rising across the state and will continue to rise throughout the century. However the extent and timing of the warming varies greatly by location due to the interactions between California’s weather and the complex terrain of the Sierra Nevada. The response of precipitation is even more uncertain but no less important to the function of the forests. Thus an essential element of the forest network is the comprehensive measurement of the energy and water balance. At a minimum we need to install year-round weather stations at each site that measure air temperature, precipitation, relative humidity, wind speed and direction, and incoming radiation. Snow accumulation, snowmelt timing, and soil moisture would be priority additions. Today, forest managers and researchers must rely on spatially interpolated estimates of air temperature and precipitation. In mountainous terrain, these interpolations perform poorly. Given the centrality of climate, automated, on-site, year-round measurements are indispensable.

Air pollution, specifically ozone exposure, regularly surpasses national ambient air quality standards in the southern Sierra Nevada. Ozone levels at or above these standard can cause damage in sensitive species. Ponderosa pine, an important timber species in the Sierra, is particularly vulnerable. Ozone-related injury to ponderosa and Jeffrey pine trees in the southern Sierra, which includes yellowing needles and reduced growth, is extensive. Moreover, despite a half-century of

regulation, there is no evidence that ozone exposure is declining. Currently there exist coarse-scale ozone deposition models. To refine these first-approximations so they are useful to site-specific management decisions, we plan to install passive ozone monitors during the snow-free months at all the research forests in the network. Other sensor arrays for other pollutants (e.g., nitrogen) could be added as conditions warrant.

Invasive species have the potential to transform ecosystems. The transformation can be swift and irreversible. Yet detecting the arrival and establishment of these organisms is an extraordinarily challenging task. Invasive species are diverse. There are examples of exotic insects, diseases, plants, vertebrate animals, and invertebrate animals severely impacting the structure and function of forest ecosystems. Moreover successful invasions are rare and at the early stages, cryptic. At the same time, it is imperative to detect invasions early in the process to have any hope of management. Therefore we propose that a key intellectual task of the network will be to design and test protocols for invasive species monitoring. To monitor the dispersal of invasive plants or migrating native plants, we have begun to explore an approach that provides a gradient of disturbed, ready-to-be invaded plots distributed from the edge to the interior of the research forests. These plots would be maintained and measured annually to document the species and number of arriving seeds as well as their success at establishment.

The measurement of the primary stressors must be linked with a plan that tracks the response of forest communities and tree populations. Unlike the challenge of monitoring invasive species, we have proven sampling designs and measurement protocols to measure the structure and function of Sierran conifer forests. In 1973, we established a grid of permanent forest inventory plots at Blodgett Research Forest Station. Over time we have reviewed and revised the suite of measurements. This experience has resulted in a protocol that has demonstrated to be scientifically sound and versatile. The inventory at Blodgett serves forest management objectives such as, timber harvest planning, wildlife habitat classification, fire modeling, carbon sequestration as well as basic research in tree demography, forest-atmosphere trace gas exchange, species conservation, and stand dynamics. The approach at Blodgett has been replicated at our other research forests including Whitaker Research Forest in Tulare County and Baker Research Forest in Quincy. For any new forests added to the network, we would prioritize the establishment and maintenance of comparable forest inventories.

These measurement protocols would inform the creation of a broad mix of stand structures distributed across the landscape. These treatments would include all methods of silviculture (the science of growing and harvesting forests) allowed under the California Forest Practices Act in order to ensure relevance to working forests in the state. Other non-commercial regimes would be studied as well, such as different methods of site preparation to ensure regeneration, different levels of vegetation control to minimize competition and limit invasive species spread, and different intensities of thinning to promote wood production and the growth of big

trees. The performance of all of these management strategies would be evaluated under the rubric of global change with treatments replicated across latitudinal gradients. The wider geographical range gained with the addition of the Stewardship Council forests is indispensable to this vision.

Baseline Management Goals: Full establishment of a new research forest is a process that will take several years. Upon obtaining title to the lands, baseline management goals will be met through periodic site reconnaissance of the properties by Center staff. Roads will be surveyed in late summer to identify problem areas, if any, and allow sufficient time for mitigations before the onset of the winter (wet) season. Any illegal activities (e.g., dumping, unauthorized camping) will be addressed at this time. Any seasonal researchers and/or inventory crews will be instructed to report any unusual activity that they note during their normal activities. It is expected that research level inventories will commence during the first summer field season after transfer of title to UC. Relationships will be pursued with neighboring landowners who can help in patrolling the property as they conduct their own business in the area.

Enhanced Management Goals: As noted above, the measurement of the primary stressors must be linked with a plan that tracks the response of forest communities and tree populations. Enhanced management goals will begin with vegetation and wildlife inventories of the new holdings. These inventories would consist of establishing permanent fixed area plots across the property on which full vegetation surveys will be performed. Plots will be marked with a center pole and each tree living or dead greater than 4.5" diameter at breast height will be fully measured and tagged for future identification. Smaller trees, brush, forbs, and grasses will also be measured. Dead and downed material will be measured to determine fuel loading and presence by size class. A subset of the permanent vegetation plots (approximately 20%) will also be used for a property-wide wildlife inventory. The multi-level wildlife inventory used at current UC Center properties consists of bird surveys, herpetological time-area surveys, small mammal live trap survey, and infrared camera bait station surveys. The initial implementation of these inventories area is expected to take 2 to 5 years or more to complete, depending on available funding and area to be covered. Once established, the vegetation inventories will be remeasured before and after any major manipulation or at least once every 10 years in stands that receive no manipulation. Another series of plots will be established along perennial watercourses that include measurements designed to identify stream health, bank stability, and thermal inputs along stream reaches. Results from analyses of these various inventories help to give a better understanding of the benefits and impacts from the various management practices.

Archaeological and cultural resource inventories will be carried out across the property by archaeologically trained personnel or by professional archaeologists. Identified sites will receive appropriate protection from manipulation and will be recorded and reported to the appropriate regional Information Center associated with the California Historical Resources Information System (CHRIS).

A primary weather station will be established at each property. This station will contain the usual sensors (temp, relative humidity, wind, barometric pressure, and precipitation) along with additional sensors that measure climatic variables important to plant growth such as soil temperature and moisture, total and photosynthetic solar radiation, fuel moisture, and possibly others. When fully completed, the weather station would contain two sets of most instruments: one set at ground level and the second set at the top of a tower above the forest canopy. Satellite weather stations may also be established in particular research areas and along perennial streams to supplement the primary station's data. Stream stations would also include water temperature and stream depth gauges and possible stream turbidity samplers.

Research Forest Structure: The new research forest(s) will be split into operational areas that will be managed using one of several forest growth scenarios (primary silvicultural systems) outlined in the next section. The stands are described below in silvicultural terms, but they are often described by others variables that are most appropriate to different research goals or values. The operational areas will be larger blocks of land, ideally incorporating a small watershed where possible, but at least a ¼ section (160 ac) in size, that will receive the same basic silvicultural treatment (e.g., single tree selection, group selection, clearcut/plantation, shelterwood, and ecological reserve). These blocks will then be further split into “stands” of 20-100 acres each which will be treated using a specific set of constraints placed on the chosen silvicultural system (e.g., residual basal area, rotation age, fire return interval). This system of establishing larger areas of stands that will be treated similarly is a variation to the Blodgett Forest model. At Blodgett Forest, the basic land classification was established at the stand level. Over the past 50 years of timber management at Blodgett, it has been found that stand-level analysis is appropriate for determining trends at the plant level, but is not for determining impacts on larger and mobile wildlife species (e.g., birds, bears, and deer). Therefore, grouping similarly managed stands together into larger operational blocks will aid in determining the impacts or preferences of various management strategies on more mobile fauna. Ensuring the existence of “wildlife corridors” between older forest stands will be a primary consideration in determining the appropriate location of the operational areas.

Management Scenarios for the Bear River tracts: Following a Blodgett Forest model, a new forest would be split into 3 primary management categories (Reserves, Even-Aged, and Uneven-Aged) that are then further split into specific silvicultural systems. Given the high level of visibility of some of the Bear River tracts to travelers along Highway 20 and the potential recreational trails along the Bear River, it is probable that the area devoted to even aged stands would be lower than would be used on other research forests. The silvicultural systems may then be further refined by specific stand level targets such as residual basal area, re-entry interval, rotation age, group opening size, fire return interval, etc. Under this scenario the forest would be split up approximately as follows:

Style	% of Area	Options
Reserve	30-35%	No or very Specific and limited Management
Ecological	15-20%	No mechanical manipulation, Rx Fire possible
Administrative	5-10%	Admin, Arch, Rec areas: Fire safe Landscaping (large well spaced overstory canopy, clean understory)
Research Control	10-15%	Even-aged, establish regeneration, no further treatments
Uneven-aged (based on California Forest Practice Rules, CA FRP)	60-65%	Single Tree Selection, Group Selection, 2-story
Single Tree Selection	20-25%	All ages and All Sizes w/varying residual BA, openings less than 0.25 acres
Group Selection	30-40%	Varying Group sizes (0.25-2.5 acres) with varying Residual Basal Area levels in older groups/matrix
2or 3-Aged	10-20%	Very structured stand with specific age groups
Even-aged (CA FPR)	10-20%	Clearcut, Shelterwood, Seedtree
Clearcut	5-10%	Artificial Regeneration (planting) in openings 2.6-20 acres in size. (necessary for common garden trials)
Shelterwood, Seedtree	5-10%	Natural Regeneration possibly with inter-planting of desired species (2 or 3-aged system may comprise much of this style)

Specific ways the proposed research forest structure will achieve Stewardship Council’s land management objectives

a. The proposed activities and how proposed activities would achieve baseline and enhanced management of the watershed lands (e.g., the frequency and nature of on-the-ground site management activities, the anticipated duration or frequency of proposed site activities, and the staffing associated with such activities):

Baseline: The University plans to establish a seasonal presence on the properties shortly after title transfer. This presence will take the form of summer season inventory crews (2-4 two person crews with at least on supervisor) and periodic (at least twice, at the beginning and end of the field season), property wide reconnaissance conducted initially by a current staff employee to locate and correct situations that may lead to negative environmental impacts.

From a Baseline Management standpoint, “negative impacts” may include, but are not limited to road deterioration, damaged or impacted drainage facilities, trash dumping, and illegal camping. All potentially damaging situations found will be prioritized for treatment and the corrected to the extent that funds allow.

Enhanced: The intensive inventories of the lands are expected to commence immediately upon transfer of title. A portion of the land is expected to be measured or re-measured every field season from then on. Harvesting and cultural activities will commence as soon as enough of the initial property wide inventories have been completed to aid in the establishment of the desired mix of management areas. During the establishment years (initial inventory period) staffing at the new property is expected to be seasonal. Once active management of the property begins, it is anticipated that a full-time site manager will be hired and live in the area. As income is generated from the management activities, it is anticipated that on-site office and living facilities will be built and on-site staff levels will be increased to cover the expanding needs of the forest. Current staffing at Blodgett Forest Research Station is 5 full-time and 4 to 10 seasonal employees.

b) How the proposed enhanced management activities would contribute to the management objectives for the planning unit listed in Volume II of the Land Conservation Plan and the Recommended Priority Measures:

The objectives of the Center for Forestry in operating its research forests align very well with the objectives of the Stewardship Council as laid out in Volume II of the LCP. The surveys and inventories that will be conducted will give a solid baseline for determining management impacts on flora and fauna in the area. The primary objective of the research forests will be to establish sustainable forestry principles while establishing a wide range of forest structure conditions across the landscape. This varied landscape will provide for a wide range of habitat niches while at the same time providing sustainable forest products for society. As noted earlier, the prospects of significant global changes that are expected to continue for decades increases the need to install detailed inventory plots and research now so that we can guide science based adaption strategies as soon as possible. All areas will be surveyed for cultural and archaeological sites and these sites will be protected and preserved.

While motorized and overnight recreation will be discouraged on the research forests, non-motorized, day-use activities will be allowed. Hiking, cycling, horseback riding, and skiing on forest roads and trails will be allowed. Also, group tours and workshops will be encouraged to disseminate the information gained through the research done on the forests.

c) How the proposed enhanced management activities differ from current management by PG&E (to the extent such information is available):

UC will establish a permanent plot inventory system across the properties that will make it possible to detect changes over time and relate them to specific management activities. The diversity of stand structures across the landscape will increase through the use of many more silvicultural systems than those currently employed by PG&E. It is expected that average stocking will also increase slightly from the current level although this will occur slowly over the next couple harvest

entries. Our results at Blodgett have demonstrated that increased productivity of desired outputs such as timber yields, water runoff, and wildlife habitat can be increased when the results of research work is operationalized in the forest management practices.

Even-aged management: Many plantations that were observed on the PG&E properties seem to have been neglected after establishment. We will try to revitalize these abandoned plantations and use them as a template for an applied research project focused on the question: How to restore neglected plantations in the mixed conifer forests? Future plantations will be planted with the full complement of native conifers. Current and future plantations or naturally regenerated stands will receive timely cultural treatments to maintain growth rates over time and to limit competition.

Uneven-aged management: In single tree selection stands, greater efforts will be made to regenerate pine species. This work may include planting pines in purposefully created canopy gaps or intentionally lower stocking areas. Group openings in group selection areas will be prepared and planted to ensure proper regeneration and a good species mix. These groups will also receive cultural treatments such as competing vegetation control treatments and pre-commercial thinnings to maintain healthy growth rates.

d) How the proposed baseline and enhanced land management activities would potentially impact public use of the watershed lands and any existing economic uses:

National Forest lands around these parcels provide general recreation opportunities. However, there is a paucity of public information tied to observable and documented examples that show how forests have responded to historical practices and how future climate scenarios could affect forests and watersheds. All information gained from the research on the properties will be available to the public and efforts will be made through seminars, workshops, and tours to show the public what is happening on the forest. As facilities are developed on the forests over time, they will be available for use by community groups. Currently at Blodgett Forest there are sleeping facilities for 45 people and conference facilities for more than 100 guests. Non-motorized use will be allowed on roads and trails and will be promoted as the preferred recreational activity on the research forests. Motorized vehicle travel and camping will be restricted on most of the research forest properties. Such restrictions protect research projects and inventory areas from undesired and unregulated manipulations.

Economically, there will be little or no impact on the current conditions. Average annual harvest levels are anticipated to remain the same or increase over time. Contract loggers will conduct the harvests and the timber will be sold to the highest bidder. In practice, this means equal or greater levels of employment within the local timber industry. Also, as the forest gets established, staff positions will be

created, some of which may be filled by local residents and further add to the local payroll related to these forests.

e) The timeline for when your organization would incur costs associated with the proposed enhanced management activities:

The exact timing of future costs is difficult to predict. However, some levels of inventory costs are expected starting the first field season after title transfer to the University. A two-person inventory crew would cost approximately \$21,000 for a 3-month season and at least 2 crews would be employed at any one time. Supervisory costs would be additional, but would initially be covered by current staff. Costs associated with road closures and/or improvements depend on anticipated needs into the future and could only be determined at the end of the first field season at the earliest. Harvest plan development costs would be anticipated to be needed sometime during the first 5 years, but after the completion of initial inventory work and stand designation.

f) How the proposed enhanced management activities would reflect applicable land management best practices:

We believe that enhancing the full range of beneficial public values will be most effective when a range of well documented management approaches are undertaken. Therefore, we can measure the relevant benefits and costs of different approaches and use the full suite of approaches as a demonstration for the wide range of landowners and resource users that are interested in forested watersheds in the Sierra Nevada. The need to document a range of activities is becoming increasingly important in light of the changing climate, air pollution, and trends in invasive species dispersal.

Specific Capital Improvements

Structures

Upon initiation of the enhanced management objectives outlined above, the larger forest tracts such as the Bear River lands will require development of on-site facilities, or a headquarters area. Initial structures would include office space and accommodations for full time and/or seasonal staff and researchers. Initially, during the forest establishment phase, a single relatively small structure can serve a dual function. Additional housing may be provided through temporary and/or portable facilities (travel trailers and/or tent frame cabins). A storage structure/garage will also be required early on. Along with the structures, safe and reliable water and power connections will need to be established. As the properties begin to generate internal funds, the headquarters area will be expanded to include permanent, purpose built structures including work areas, housing units and conference/meeting facilities. Smaller forests/land tracts such as the Spaulding Lake and Tunnel Reservoir properties would not need any permanent facilities if a

larger forest with facilities exists nearby (e.g., Tunnel with Pit and Lake Spaulding with Bear River).

Other Capital Improvement

Each new forest property would also require:

1. A main weather/meteorological monitoring station and satellite stream monitoring stations.
2. Road gates to limit motorized vehicle travel in sensitive research areas.
3. Road improvements to minimize environmental impacts. This may include stream crossing upgrades, road surfacing where appropriate (i.e., gravel, pavement), road realignment to avoid wet areas, watercourse protection zones, or other sensitive areas.
4. Permanent plot markings.

30. Potential land conservation partners

In the Bear River Planning Unit we had discussions with the Placer Land Trust and the Nevada County Land Trust who could be potential land conservation partners depending on the development of proposals for recreational trails and sites in the Bear River Valley. Letters of support are attached.

31. Previous experience with proposed land conservation partner organizations

Representatives of both the Placer Land Trust and the Nevada County Land Trust have used our Blodgett Forest in neighboring El Dorado County to gain insights into how mixed conifer forests are developing based on different forms of current management overlain on historical harvests and fires.

32. Letters of support from Placer Land Trust and the Nevada County Land Trust



July 22, 2011

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AmeriCorps Member

Allene Zanger
Executive Director
Pacific Forest and Watershed Lands Stewardship Council
15 North Ellsworth Avenue, Suite 100
San Mateo, CA 94401

Re: Support for University of California, Berkeley application for PG&E parcels in the Bear River Planning Unit

Dear Ms Zanger,

Nevada County Land Trust (NCLT) is grateful that PG&E will protect the Yuba-Bear River Watershed by making lands available for donation to qualified conservation organizations. We are in favor of the conservation of lands for the benefit of our community and for Sierra watershed health.

Nevada County Land Trust is in support of the application by University of California, Berkeley, Department of Forestry to receive in fee title a donation of PG&E parcels in the Bear River Planning Unit. The intent is for UCB to manage these forested lands as a research forest, which will enhance forest health and teach us about the effects of climate change and species adaptation. We are highly confident that UCB will manage these parcels responsibly and in keeping with the Stewardship Council's BPVs.

For donated lands that UCB receives, Nevada County Land Trust would be grateful to participate as the Conservation Easement holder and Conservation Partner to develop recreational amenities, such as mixed-use trails.

Sincerely,

Marty Coleman-Hunt
Executive Director
Nevada County Land Trust



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Natural Wonders Forever

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Placer Land Trust works with willing landowners and conservation partners to permanently preserve natural and agricultural lands in Placer County for future generations.



Placer Land Trust is a private, nonprofit 501(c)(3) charitable organization incorporated in 1991, accredited by the national Land Trust Accreditation Commission. Federal Tax Identification Number: 68-0223143.

May 12, 2011

Allene Zanger
Executive Director
Pacific Forest and Watershed Lands Stewardship Council
15 North Ellsworth Avenue, Suite 100
San Mateo, CA 94401

Re: Support for the University of California Berkeley application for fee title ownership of Stewardship Council parcels in the Lake Spaulding and Bear River Planning Units

Dear Ms. Zanger,

The Placer Land Trust is very interested in ensuring that many of the parcels within Lake Spaulding and Bear River Planning Units go to entities that can provide lasting benefits to the communities and the lands.

We are very familiar with the land management, research and demonstration activities at the University of California's Blodgett Forest Research Station in the neighboring county of El Dorado. We believe that University of California Berkeley would be an excellent fee title holder of parcels in the Lake Spaulding and Bear River Planning Units. If the fee donations to the UC are completed, our board of directors would be interested in considering holding the conservation easements on some of the parcels.

Sincerely,

Jessica Pierce
Assistant Director
Placer Land Trust

33. How we have considered public input provided to the Stewardship Council to date in the development of our proposal

One of the major concerns that has been expressed time and time again to the Council is to maintain these productive timberlands under programs that continue sustainable forestry, maintain the required fish and wildlife habitats and ensure that historical and cultural artifacts are respected. We fully support these goals and have identified a number of opportunities to increase the long-term productivity as well as reduce the risk factors related to fires, insects, and disease. Although the current land management is quite dissimilar to the forest management practices of some of the large timberland owners, the use of methods other than large clear cut and regeneration blocks is common for family forest owners in the area. However, there is a tendency for uneven aged stands to shift towards a higher concentration of white fir and limited pine regeneration. This can increase the risk of future losses to wildfires. One of our main goals will be to demonstrate a range of forest

management approaches that are productive and applicable to the many family forest owners in the counties in the Central Sierra Nevada.

Attachments:

Financial Information: The audited accounts apply to the University of California Berkeley as a single entity.

Table2: Summary of Budgets for Forest Research Stations
Fiscal Year 10-11

Expenses

Blodgett	511,958
Baker	145,574
Whitaker	2,000
Russell	43,922
TOTAL EXPENSES	703,454

Revenue

Blodgett	358,670
Baker	30,000
Whitaker	600
Russell	3,000

Recharge

Blodgett	76,690
Baker	125,642
Whitaker	0
Russell	1,000

Allocation of Encumbered Funds and/or Carryforward

Blodgett	76,598
Baker	
Whitaker	
Russell	24000
TOTAL INCOME	696,200

PROPERTY BALANCE	-7,254
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Table2: Summary of Budgets for Forest Research Stations
Fiscal Year 9-10

Expenses

Blodgett	370,447
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Baker	161,725	
Whitaker	2,000	
Russell	51,1292	
TOTAL EXPENSES		585,302

Revenue

Blodgett	174,212
Baker	140,956
Whitaker	600
Russell	25,871

Allocation of Encumbered Funds
and/or

Carryforward	Blodgett	196,235	
	Baker	22,000	
	Whitaker	0	
	Russell	25,2580	
	TOTAL INCOME		585,133

PROPERTY BALANCE	169
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Table2: Summary of Budgets for Forest Research
Stations
Fiscal Year 08-09
Expenses

Blodgett	355,600	
Baker	179,000	
Whitaker	4,600	
Russell	45,800	
TOTAL EXPENSES		406,000

Revenue

Blodgett	333,600
Baker	150,000
Whitaker	600
Russell	8,000

Allocation of Encumbered Funds
and/or

Carryforward	Blodgett	22,000	
	Baker	29,000	
	Whitaker	4,000	
	Russell	34,800	

TOTAL INCOME	432,000
--------------	---------

PROPERTY BALANCE	26,000
---------------------	--------

CVs of Key Personnel

Stewart, William

Education and Training

Institution and Location	Degree	Year (s)	Field of Study
University of California Berkeley, Berkeley, CA	Ph.D.	1989-1993	Forest Economics and Policy
University of California Berkeley, Berkeley, CA	M.S.	1984-1986	Forest Economics and Policy
Stanford University, Palo Alto, CA	B.S.	1974-1978	Environmental Earth Sciences

Positions and Honors:

Positions

*Forestry Extension Specialist. University of California, Berkeley. 2007 to present

*Assistant Deputy Director, Fire and Resource Assessment Program. California Department of Forestry and Fire Protection. 1996 to 2007

*Senior Research Associate. The Pacific Institute. Oakland, California 1993- 1996.

*Assistant Program Officer for Forestry and Dryland Agriculture. The Ford Foundation. New Delhi , India 1986-1989

Honors

Superior Accomplishment Award 2009 from the California Department of Forestry and Fire Protection

Superior Service Award (2002) from the California Biodiversity Council for being the lead staff for the 4 years for this 30+ organization council that include all the major federal and state agencies

Recognition award from the US Forest Service (1996) for work on the Sierra Nevada Ecosystem Project.

Selected peer-reviewed publications:

Battles, John J., Timothy Robards, Adrian Das, William Stewart. 2009. Projecting climate change impacts on forest growth and yield for California's Sierran Mixed Conifer forests. California Energy Commission PIER. CEC-500-2009-047-F.

- Stewart, W., J. Spero, and S. Saving. 2008. The Economic Drivers Behind Residential Conversion in the Oak Woodlands, in Sixth California Oak Symposium: Today's Challenges, Tomorrow's Opportunities, USDA Forest Service Gen. Tech. Rep PSW-GTR-217.
- Stewart, W. 2007. The New Economies of the Redwood Region in the 21st Century in Redwood Science Symposium: What does the future hold?, USDA Forest Service Gen. Tech. Rep PSW-GTR-194.
- Stewart, W. and C. Savings. 2005. Linking Watershed Management and Ocean Management with Internet-Based Mapping Tools in California and the World Ocean '02. American Society of Civil Engineers.
- Stewart, W. et al. 2003. The Changing California: Forest and Range 2003 Assessment, California Department of Forestry and Fire Protection, Sacramento, CA.
<http://frap.cdf.ca.gov/>
- Stewart, W. et al. 1996. Sierra Nevada Wealth Index: Understanding and tracking our region's wealth. Sierra Business Council, San Francisco, CA.
- Stewart, W.C. 1996. Economic Assessment of the Ecosystem. In Sierra Nevada Ecosystem Project: Final Report to Congress, vol. II, Assessments and Scientific Basis for Management Options. Davis; UC Center for Water and Wildland Resources.
- Stewart, W.C. 1996. Economic Assessment of the Ecosystem. In Sierra Nevada Ecosystem Project: Final Report to Congress, vol. II, Assessments and Scientific Basis for Management Options. Davis; UC Center for Water and Wildland Resources.
- Baker, Mark and William Stewart. 1996. Ecosystems under four different public institutions: a comparative analysis. In Sierra Nevada Ecosystem Project: Final Report to Congress, vol. II, Assessments and Scientific Basis for Management Options. Davis; UC Center for Water and Wildland Resources.

FRIEDER GEORG SCHURR

California Registered Professional Forester #2410

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WORK EXPERIENCE

Current: July 2006 to Present **Data Manager/Analyst, Center for Forestry, UC Berkeley** – Manage and Maintain all Inventoriy and Meteorologic data for Center properties. Manage and Maintain property GIS', Central contact person for property data requests, Maintain field station IT infrastructures, General support for Environmental document preparation and review for Center properties.

Current: Summer 1996-2002 and Summer 2007 to present: **Instructor for UC Berkeley Forestry Field Courses in Forest Measurements, Forest Operations, and Forest Management:** Courses ESPM-101C, D and E. Taught one of these three 1 to 2 week sessions per year. Sections are part of an 8 week-40 hour/week summer field session required for Forestry and Resource Management Majors at UC Berkeley.

January 2005 to June 2006: **Interim Blodgett Forest Manager, Center for Forestry, UC Berkeley** – Primary duties included coordinating and implementing all aspects of running the research station including timber harvest operations, managing station staff, coordinating with researchers, coordinating with neighbors, forestry organizations, and other users. Develop/Maintain GIS, GPS, Database, and Computer systems. Work directly with Center Directors with coordination of management and personnel needs at other Center for Forestry managed field stations

January 1994 – December 2004: **Assistant Properties Manager, Center for Forestry, UC Berkeley** - Primary duties include Timber Harvest Planning, Maintenance and Development of GIS, Database, and GPS systems, Supervising and coordinating field crews and office work, and computer systems and network maintenance. Lead forester on Whitaker Forest management, development, and data inventory processing

1998 to 2001. **Appeals Grader for California Registered Professional Forester Exam.** Graded exams that have been appealed by applicants to the Professional Foresters Examining Committee. The exams include questions covering all

aspects of the forestry profession. Passing this exam is required to obtain a professional foresters license.

February 1992 - January 1994: Forester for Michigan-California Lumber

Company - Primary duties included: Pre-commercial and commercial thinning operations management. USFS Coop Road coordinator. Computer, GPS, and GIS data collection and management. Prescribed burning coordinator.

January 1990 - February 1992: Researcher at UC Berkeley - Worked on the North Coast Wildlife Pilot Study for the Calif. Dept. of Forestry analyzing wildlife habitat patterns over time for a 150,000 acre, multi-owner parcel using Linear Programming and GIS techniques. Worked on an evaluation of the 1990 California Forestry Ballot Initiatives by combining timber scheduling models with the Calif. Wildlife Habitat Relationship Database.

February 1989 - April 1989: Analyst for the New South Wales Forestry

Commission's Research Division in Sydney, Australia organizing and analyzing growth information for exotic softwood species trials in NSW.

January 1987 - August 1988: Graduate Researcher at UC Berkeley - Worked on various projects related to Forest Management and Timber Harvest Scheduling using Computer Techniques. Projects required working closely with State, Federal, and Private organizations.

FORMAL EDUCATION

Master of Forestry: Received in December 1988 from the Department of Forestry and Resource Management at the University of California at Berkeley. (Masters Project: developed a method for using existing micro computer software and linear programming techniques for timber harvest scheduling problems). Course emphasis in Forest Management with additional course work in Forest Economics, Forest Measurements and Operations Management.

Bachelor of Science: in Agricultural Engineering (Forest Engineering Emphasis): Received in June 1984 from the University of California at Davis. Course emphasis in Forestry, Mechanical Engineering, and Civil Engineering.

TEACHING EXPERIENCE

1996-2002 and 2007-2010 - ESPM 101C, ESPM101D or ESPM 101E: 40 and 80 hour summer field courses on forest measurements, operations, or management. Includes instruction on timber operations and measurements, road design and maintenance, forest management plan development, forest restoration projects, forest cultural treatments, archaeological and historic resources identification, California forest practice laws, and related topics.

1996-2001 – Co-taught ESPM 182 (Forest Operations). This is a regular semester course covering the topics introduced in ESPM 101D in more depth in a classroom setting with several weekend field exercises.

Various to PRESENT– Team taught professional forestry outreach courses at Blodgett Forest Research Station on a variety of topics related to forest management

1994 to PRESENT – Led field tours at Blodgett for groups interested in forest management issues, general natural resource topics, and small forest landowner issues. These groups include professional resource managers, graduate and undergraduate classes, members of the general public, and visiting foreign scholars among others.

Other Skills

Archeological Training Certificate: Received upon completion of a field and classroom course on how and where to perform Archeologic Surveys. Required to complete archeological surveys and fill out the Confidential Archeological Addendum that must be included in all California Timber Harvest Plan

GIS Training: - Completed self paced and classroom courses in Arc/Info and Arc View.

Small Office Networking – Completed training courses in developing and deploying local area networks (LANs) using the Windows operating systems.

Certificate of Completion: Training Course for Campbell Scientific CR10X data logger and PC208W software.

COMPUTER SKILLS: Microsoft Office (Excel, Word, Access, PowerPoint), GIS (ARC/Info), GPS (Trimble Pathfinder), PASCAL, Linear Programming, BASIC, FORTRAN, micro computer repair, maintenance and networking.

Published Research

Battles, John, Timothy Robards, Adrian Das, Kristen Waring, J. Keith Gilles, Gregory Biging, Frieder Schurr, 2008, “Climate change impacts on forest growth and treemortality: a data-driven modeling study in the mixed conifer forest of the Sierra Nevada, California” Springer Science + Business Media B.V. 2008

Battles, John J. and Frieder G. Schurr 2002. “A Contrast in Vital Rates: Life Table Projections for *Abies concolor* and *Pinus lambertiana* in a Sierran Mixed Conifer

- Forest”. Poster presented at the Sierra Nevada Science Symposium, Lake Tahoe, CA.
- Barrett, Tara B., Frieder G. Schurr and Kevin L. O’Hara. 2002. “Classifying Stand Structure: A Comparison of SVS Images With Plot Visits and FVS-Generated Metrics”. USDA Forest Service Proceedings RMRS-P-00. 2002
- Barrett, T.M., R.C. Heald and F.G. Schurr. 2000. “Resolution of small group selection in forest planning models”. P. 29-35 in [Proceedings of the 7th symposium on systems analysis in forest resources](#), Traverse City, MI, May 28-31, 1997. USDA For. Serv. GTR-NC-205.
- Barrett, Tara B., Lawrence S. Davis, and Frieder G. Schurr. 1994. Using Tree Growth and Yield Simulators To Create Ecological Yield Tables for Silvicultural Prescriptions. *Western Journal of Applied Forestry* 9(3) 1994.
- Davis, Lawrence S., Frieder Schurr, Roger Church, J. Keith Gilles, and P. J. Daugherty. 1990. “The Spreadsheet Connection for Forest Planning Analysis that Everyone Can Understand and Trust”. *Western Jnl of Applied Forestry* 5(3) July 1990.
- Forest Initiatives Study Group, UC Berkeley. 1990. “New Directions for Private Forests in California: Some Effects of Implementing Propositions 130 and 138 on California's Forests and Forest Owners” (Report #2).
- Daugherty, P. J., J. Keith Gilles, Frieder Schurr, Lawrence S. Davis. From “Growth Models to Short-Term Timber Sale Scheduling: Design for a Flexible Link Serving Multiple Clients”. *Proceedings from the 1988 Symposium on Systems Analysis in Forest Resources*. USFS Gen Tech Report RM-161.

References available on request

ROBERT A. YORK

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ryork@berkeley.edu

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY

PhD. in Dept. of Environmental Science, Policy, and Management, Dec., 2006

Dissertation title: Experimental insights into gap phase dynamics of mixed conifer tree species of the Sierra Nevada

M.S. in the Department of Environmental Science, Policy, and Management, May, 2003

Thesis title: The response of striped maple (*Acer pensylvanicum*) to disturbances on Whiteface Mountain, NY

B.S. in Forestry with a concentration in Forest Management, Department of Forestry, May, 1997

EXPERIENCE

UC Berkeley- Center for Forestry

Georgetown, CA

Adjunct Assistant Professor of Forestry December 2009 - Present

Research Stations Manager July 2006 – Present

Assistant Lands Manager April 2003 – July 2006

Duties: Supervise daily activity of research forests; manage forest structure and development to meet objectives of research, outreach, and education; hire and supervise 7 permanent and 6-10 seasonal staff; write environmental assessment documents and administer contracted projects such as timber harvesting and restoration treatments. Develop budgets for annual operations of research sites. Review proposed research projects to justify continued support and to assess scientific merit; apply for grants to conduct original research in natural resource management, ecology, and silviculture; present research in scientific journals and conferences.

Research: Direct the internal research program for UC Berkeley forest properties. Projects are mainly in the fields of restoration silviculture and ecology. Develop the research program by getting outside funding, installing maintenance/monitoring plans for long-term projects, and by installing new projects.

Teaching/Mentoring: Teach at least 2 units of coursework per year at undergraduate university level. Includes instruction of Forest Operations class at least once every other year. Lead instructional tours for university classes and natural resource professionals. Provide support for undergraduate honors' projects by helping to define research projects and mentoring students in carrying out studies. Advise graduate students and serve on committees for Masters and Ph.D students.

ACHIEVEMENTS AND AFFILIATIONS

- California Registered Professional Forester #2699
- Baker-Biswell Graduate Student Fellowship
- Xi Sigma Pi - Forestry Honor Society
- Project leader – Giant Sequoia Assessment for Sequoia Kings Canyon National Park Natural Resources Conditions Assessment
- George and Vi Craig Award in Forestry

RECENT PUBLICATIONS

- York, R.A., Battles, J.J., Eschtruth, A.E., and Schurr, F.G. 2011. Giant sequoia (*Sequoiadendron giganteum*) regeneration in experimental gaps. **Restoration Ecology** 19: 14-23.
- York, R.A., Fuchs, D., Battles, J.J., Stephens, S.L. 2010. Radial growth responses to gap creation in large, old *Sequoiadendron giganteum*. **Applied Vegetation Science** 13: 498-509.
- York, R.A., Thomas, Z. Restaino, J. 2009. Influence of ash substrate proximity on growth and survival of planted mixed-conifer seedlings. **Western Journal of Applied Forestry** 24:117-123.
- Moghaddas, J., York, R.A., and Stephens, S.L. 2008. Initial response of conifer and California black oak seedlings following fuel reduction activities in a Sierra Nevada mixed conifer forest. **Forest Ecology and Management** 255(8-9): 3141-3150.
- O'Hara, K.L., York, R.A., and Heald, R.C. 2008. Effect of pruning severity and timing of treatment on epicormic sprout development in giant sequoia. **Forestry** 81(1): 103-110.
- York, R.A. and Battles, J.J. 2008. Depth of positive growth response on mature trees surrounding Sierra Nevada group selections. **Western Journal of Applied Forestry** 23(2): 94-98.
- York, R.A., Battles, J.J., and Heald, R.C. 2006. Giant sequoia release potential: 20 year results. **Forest Ecology and Management** 234:136-142.
- York, R.A., Heald, R.C., Battles, J.J., and York, J.D. 2004. Group selection management in conifer forests: relationships between opening size and tree growth. **Canadian Journal of Forest Research** 34:630-641.
- York, R. A., Battles, J.J., and Heald, R.C. 2003. Edge effects in mixed conifer group selection openings: tree height response to resource gradients. **Forest Ecology & Management** 179:107-121.

SELECTED CONFERENCE ORAL PRESENTATIONS

- Pre- and Post-fire Treatments Workshop 2010. Forest dynamics prior to and following fire. Sacramento, CA
- Council of Forest Engineers International Convention 2009. Influence of regeneration method on soil strength in a Sierra Nevada mixed conifer forest. Kings Beach, CA.
- Society of America Foresters. 2007. Assessing sustainability in a Sierran mixed conifer forest. Portland, OR.
- North American Forest Ecology Workshop. 2007. Limited productivity and species composition change following repeated diameter limit cutting in a mixed conifer forest. Vancouver, Canada.
- The Art & Science of Multiaged Forest Management. 2007. Group selection: Research and Management examples from a California mixed conifer forest. Klamath Falls, OR.

- North American Forest Ecology Workshop. 2005. Early growth trends and stand level effects of experimental gaps in a mixed conifer forest. Ottawa, Canada.
- Forest Service National Silviculture Workshop. 2005. Early growth trends and stand level effects of experimental gaps in a mixed conifer forest. North Lake Tahoe, CA.
- North American Forest Ecology Workshop. 2003. Seedling and border tree growth in Sierran group selection openings. Corvallis, OR.

Kenneth Somers

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EXPERIENCE

UC Berkeley- Center for Forestry

Georgetown, CA

Operations Forester April 2006 - Present

Duties: Prepare Timber Harvest Plans for annual timber harvest. Oversee maintenance of roads to minimize adverse impacts. Administer contracts to harvest timber and conduct other restoration and research treatments. Coordinate regeneration efforts (collection of seed, seed storage, nursery contracts, and planting). Facilitate research by assisting with the planning and implementation of experimental treatments. Collaborate with researchers by suggesting areas for applied research. Supervise seasonal crews conducting vegetation control treatments to meet management objectives.

Sierra Pacific Industries

Camino, CA

***Regeneration Forester* 1994 - 2006**

Duties: Responsible for regeneration and vegetation control programs across thousands of forestland. Hire and administer contracts for planting, thinning, and vegetation control.

Fruit Growers

Auburn, CA

Forester 1982 – 1994

Duties: Conduct inventories of forestlands, prepare and administer silvicultural prescriptions, prepare environmental impact documents.

International Paper

Shasta, CA

Forester 1979 - 1982

Duties: Conduct inventories of forestlands, prepare and administer silvicultural prescriptions, prepare environmental impact documents.

ACHIEVEMENTS AND AFFILIATIONS

- California Registered Professional Forester #2381
- California Licensed Foresters Association
- California Invasive Plant Council

CURRICULUM VITAE

John J. Battles

University of California, Berkeley
Department of Environmental Science, Policy, and Management
<http://nature.berkeley.edu/battles/>

EDUCATION

Cornell University:

Ph.D. in forest science, May 1994.

Yale University:

B.S. in biology, May 1985.

Graduated summa cum laude with distinction in the major.

PROFESSIONAL EXPERIENCE

Professor of forest ecology, Department of Environmental Science, Policy, and Management,
UC Berkeley, July 2009 to present.

Chair, Ecosystem Science Division, Department of Environmental Science, Policy, and
Management, UC Berkeley, July 2010 to present.

Co-Director, Center for Forestry, College of Natural Resources, UC Berkeley,
December 2000 to June 2010.

Associate/Assistant professor of forest ecology, Department of Environmental Science, Policy,
and Management, UC Berkeley, January 1995 to June 2009.

Postdoctoral research associate, Department of Natural Resources, Cornell University,
January 1994 - December 1994.

Research staff scientist, University of Pennsylvania, May 1986 - August 1988.

HONORS AND AWARDS

Departmental Award for Undergraduate Teaching Excellence -- 2004

Hellman Family Junior Faculty Award -- 1998

Outstanding Graduate Teaching Assistant -- 1993.

Sage Academic Fellowship -- 1991.

Kieckhefer Research Fellowship -- 1991, 1990.

A.D. White Academic Fellowship -- 1989-1990.

Elected to Phi Beta Kappa -- 1985.

Besinger Award for Undergraduate Research in the Natural Sciences -- 1985.

**Pacific Forest and Watershed Lands Stewardship Council
Land Stewardship Proposal Budget and Funding Plan
Bear River Management Unit**

PROJECT BUDGET - TRANSACTION COSTS

A. Document Preparation Costs

Task	Unit of Measure	Number of Units	Cost/Unit	Total Cost	Funding Request	Comments
Phase 1 Env. Assessment	Manag. Unit	1	2,000	2,000	-	UC's expenses/recharge associated UC internal assessment
Title Commitment	Report	1	4,000	4,000	4,000	Assumes only one per Management Unit
		1		-		
Input Activity				-		
Input Activity				-		

To add a row: right click on the row above -> select copy -> right click again ->select insert copied cells

A. Total Document Preparation Costs				6,000	4,000	
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B. Closing Costs

Task	Unit of Measure	Number of Units	Cost/Unit	Total Cost	Funding Request	Comments
Title Insurance	Land Value			8,000	8,000	Subject to adjustment based upon refined estimate of value
Escrow	Transaction	1	10,000	10,000	10,000	Assumes one escrow for each management unit
Recordation	Transaction	1	-	-	-	UC is exempt from recording fees
Surveyer Review of Closing Docs		1	1,000	1,000	1,000	
Transfer Taxes				-	-	UC exempt, grantor would not be charged
Misc.		1	500	500	500	

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B. Total Closing Costs				19,500	19,500	
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C. Other

Task	Unit of Measure	Number of Units	Cost/Unit	Total Cost	Funding Request	Comments
Boundary Survey (non lot splits)	Parcel	6	3,000	18,000	18,000	ExpressMap (aerial survey) to be used for parcels w/o lot splits
Boundary Survey (lot splits)	Parcel	10	15,000	150,000	150,000	Land survey required; relatively difficult terrain
Easement Survey	Parcel	2	20,000	40,000	40,000	Assumes land survey required; difficult terrain
Contingency		1	10,000	10,000	10,000	
Input Activity				-		

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C. Total Other				218,000	218,000	
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TOTAL TRANSACTION COSTS				243,500	241,500	
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This preliminary budget is subject to revision based upon additional discussions with Stewardship Council, the county and title companies on the transaction approach. It assumes that new land surveys will be required to split 4 parcels and to provide new easements of 4 other parcels.

**Pacific Forest and Watershed Lands Stewardship Council
Land Stewardship Proposal Budget and Funding Plan
Bear River Management Unit**

PROJECT BUDGET - BASELINE LAND OWNERSHIP AND MANAGEMENT ACTIVITIES (SEE NOTE 1)

PROJECT REVENUES

Source	Description	Non- SC Sources of Funding		Comments
		One-Time Grants	Ongoing Funding	
Committed Funds (cash received or award made)				
Grant Awards				
Fundraising				
Matching Funds				
Lease Revenues				
Timber Revenues				
General Fund/Reserves				
Other (Describe)				
Total Committed Funds		-	-	
Pending Funds (no award made to date)				
Grant Awards				
Fundraising				
Matching Funds				
General Fund/Reserves				
Other (Describe)				
Total Pending or Potential Funds		-	-	
<i>To add a row: right click on the row above -> select copy -> right click again ->select insert copied cells</i>				
TOTAL PROJECT REVENUES		-	-	

PROJECT EXPENSES

A. Baseline Management Activities

Task	Description	Unit of Measure	Number of Units	Cost/Unit	SC Funding Request		Comments
					One-Time Costs	Ongoing Annual Costs	
Land Management	Oversight	Total Area	1	15,000		15,000	1/4 time manager/forester
Road Survey and drainage inspections	Reconnaissance	Total Area	1	3,000		3,000	Based on costs at Blodgett adjusted for Acreage
Road Maint/Repair Misc Cleanup	Minor Grading/Repair	Total Area	1	10,000		10,000	Based on costs at Blodgett adjusted for Acreage
Input Activity							
<i>To add a row: right click on the row above -> select copy -> right click again ->select insert copied cells</i>							
A. Total Baseline Management Activities					-	28,000	-

B. Baseline Land Ownership Costs

Task	Description	Unit of Measure	Number of Units	Cost/Unit	SC Funding Request		Comments
					One-Time Costs	Ongoing Annual Costs	
Taxes		year	1	30,000		30,000	Based on Average tax/acre times Requested Acres
Input Activity							
Input Activity							
<i>To add a row: right click on the row above -> select copy -> right click again ->select insert copied cells</i>							
B. Total Baseline Land Ownership Costs					-	30,000	-

C. Other

Task	Description	Unit of Measure	Number of Units	Cost/Unit	SC Funding Request		Comments
					One-Time Costs	Ongoing Annual Costs	
Input Activity							
Input Activity							
Input Activity							
<i>To add a row: right click on the row above -> select copy -> right click again ->select insert copied cells</i>							
C. Total Other					-	-	-

TOTAL PROJECT EXPENSES (ASSUME PROP TAXES FROM STEWARDSHIP COUNCIL)					-	28,000	-
NET REVENUE/(EXPENSE) - BASELINE LAND OWNERSHIP AND MANAGEMENT ACTIVITIES					-	(28,000)	-

Additional Notes:

Costs are for baseline monitoring and minor repairs/maintenance of road and drainage structures based on similar costs at Blodgett Forest REsearch Station, a 42

Note 1: According to the Stewardship Council's Land Conservation Program Funding Policy, the Stewardship Council will require future land owners to demonstrate that they have the funding and other capacity to maintain that property interest so as to preserve and/or enhance the beneficial values on the Watershed Lands. Exceptions to this guideline will be rare and considered only in circumstances where,

- 1) The funding of baseline land ownership and management activities will clearly lead to enhancement of the beneficial public values on the lands; and/or,
- 2) The funding of baseline land ownership and management activities is only temporary (<5 years).

**Pacific Forest and Watershed Lands Stewardship Council
Land Stewardship Proposal Budget and Funding Plan
Bear River Management Unit**

PROJECT BUDGET - ENHANCEMENTS TO BENEFICIAL PUBLIC VALUES

PROJECT REVENUES

Source	Description	Non- SC Sources of Funding One-Time Grants	Ongoing Funding	Comments
Committed Funds (cash received or award made)				
Grant Awards				
Fundraising				
Matching Funds				
Lease Revenues				
Timber Revenues				
General Fund/Reserves				
Other (Describe)				
Total Committed Funds		-	-	
Pending Funds (no award made to date)				
Grant Awards				
Fundraising				
Matching Funds				
General Fund/Reserves				
Other (Describe)				
Total Pending or Potential Funds		-	-	

To add a row: right click on the row above -> select copy -> right click again -> select insert copied cells

TOTAL PROJECT REVENUES

PROJECT EXPENSES

A. Enhanced Land Management Activities

Task	Description	Unit of Measure	Number of Units	Cost/Unit	One-Time Costs	Ongoing Annual Costs	SC Funding Request		Comments
							One-Time Costs	Ongoing Annual Costs	
Forest Manager	Remaining 3/4 time RPF with management experience for Supervising crews and developing Land Management Plan	Forest	1	45,000		45,000			Full time Manager is Required to get the forest going in a timely manner
Vegetation inventory	Research Level Inventory. One plot per 3.6 acres of area	Plot	1,000	136	5,000	27,200			All trees live and dead, understorey veg, dead material. annualized 5 yr installation period. Remeasured before and after disturbance or at least once every 10 years. One time cost is for equipment purchase and plot tags/posts
Wildlife Inventory	Multi-level wildlife survey. One plot per ~18 acres of area	Plot	480	525	5,000	50,400			Birds, herps, sm mammal, camera stations. Annualized over a 5-year install period. Periodic remeasurements thereafter. One time costs are for equipment purchase
Stream Inventory	Stream condition survey. One plot per 200 meters of class 1 (fish) stream length	Plot	Depends	350	2,000	3,000			Depends on number and length of streams/ one plot per 200 meters of stream length for fish bearing streams. One time costs are for equipment purchase. Costs estimated using stream lengths at Blodgett and 5 yr implementation
Stream Station	Flow/Rain Monitoring	1/Stream	Depends	10,000	60,000	1,000			One per fish bearing Stream. Cost assumes 6 streams
Weather Station	Full Meteorologic Instrumentation		1	75,000	75,000	1,000			Above and Below canopy and soil measurements. ~150 ft tall tower
Initial Timber Harvest Plan Development		Plan	1	20,000					
Archaeological Survey		Forest	1	30,000	30,000				Property wide Survey
Data Manager	Data/IT person with environmental background	Forest	1	20,000		20,000			Needed to develop/maintain databases, GIS, technical infrastructure, wearther stations
GIS	Land Management Grade GIS and Software	Forest	1	10,000	10,000	350			Unit Cost and \$350/yr maintenance Agreement
Input Activity									
<i>To add a row: right click on the row above -> select copy -> right click again -> select insert copied cells</i>									
A. Total Enhanced Land Management Activities					187,000	147,950	-	-	

B. Capital Improvements

Task	Description	Unit of Measure	Number of Units	Cost/Unit	One-Time Costs	Ongoing Annual Costs	SC Funding Request		Comments
							One-Time Costs	Ongoing Annual Costs	
Office/Residence	2000 sq ft building	building	1	200,000	200,000	5,000			Initial infrastructure/ first 5 yrs
Garage	1000 sq ft	building	1	30,000	30,000	500			Vehicle/Equipment Storage
Vehicles	1 Pickups, 1 SUV	Vehicle	2	25,000	50,000	2,500			Annual maintenance/Fuel costs
Road Gates	Gates to restrict motorized vehicle use.	Gate	Depends	5,000	5,000				This is a per unit cost including installation. No estimate has been made as to how many gates will be needed
<i>To add a row: right click on the row above -> select copy -> right click again -> select insert copied cells</i>									
B. Total Capital Improvements					285,000	8,000	-	-	

C. Other

Task	Description	Unit of Measure	Number of Units	Cost/Unit	One-Time Costs	Ongoing Annual Costs	SC Funding Request		Comments
							One-Time Costs	Ongoing Annual Costs	
<i>To add a row: right click on the row above -> select copy -> right click again -> select insert copied cells</i>									
C. Total Other					-	-	-	-	
TOTAL PROJECT EXPENSES					472,000	155,950	-	-	

Estimated total costs = \$2,167,000 for baseline and enhanced management activities for the first 5 years.
This is approximately \$250/acre/yr

NET REVENUE/(EXPENSE) - ENHANCEMENT OF BENEFICIAL PUBLIC VALUES

(472,000) (155,950)

Additional Notes:

All the above costs are based on current available information at other Center for Forestry properties and are likely MINIMUM costs since these are all current actively managed lands and the new forest lands will be at a less developed state. Results from the various inventories will be required to establish management areas and estimate future management costs and revenues. The above costs are ESTABLISHMENT costs prior to any timber income. All future costs, after the initial 5 year establishment period will be assumed to be covered by timber receipts and other internal and external funds generated by the forest and its users.