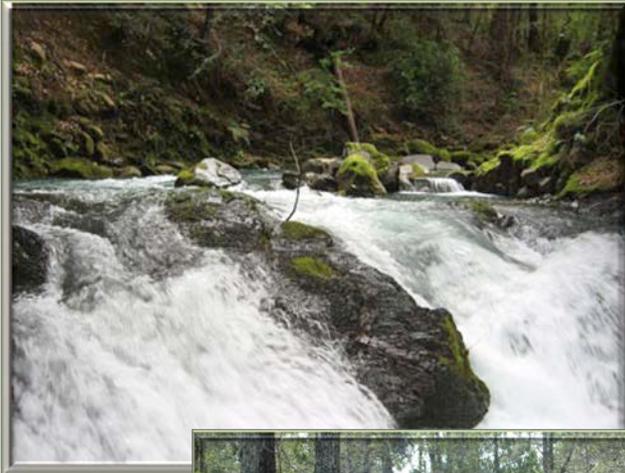


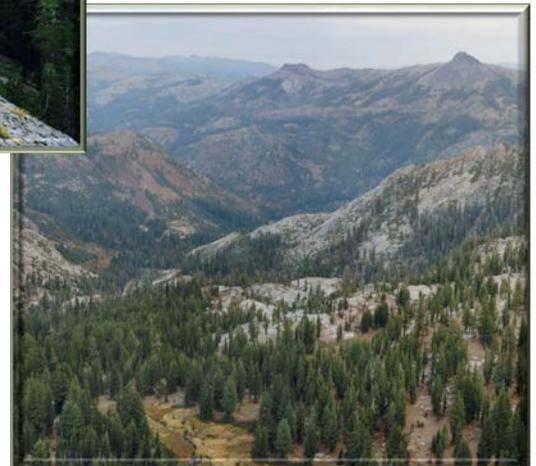
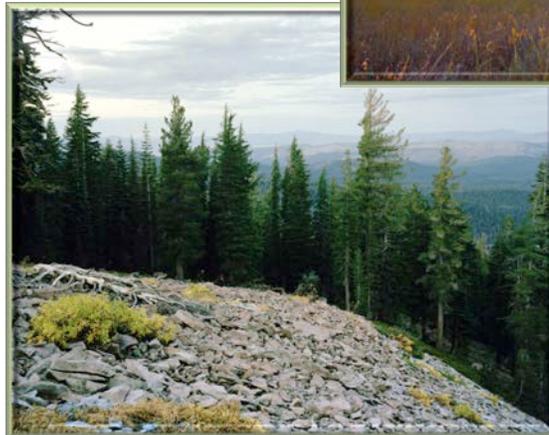
University of California

Berkeley NRS Reserves Review 2014-15



Angelo Coast Range Reserve * Jenny Pygmy Forest Reserve * Hastings Natural History Reservation * Sagehen Creek Field Station * Chickering American River Reserve

28 August 2015



Executive Summary

In August and September 2014, the systemwide office of the UC Natural Reserve System (NRS) assembled three peer committees to conduct a decadal review of five of the six NRS reserves administered by the UC Berkeley campus. Such 10-year reviews are required as part of the unit's self-governance policies as outlined in the NRS *Administrative Handbook*. The goal of each reserve review is to determine whether each NRS site continues to fulfill the NRS mission to facilitate university-level research, education, and public service. As described in Chapter 16 of the *Handbook*) http://nrs.ucop.edu/staff/admin_handbook/Chapt_16_10-Yr_Reserve_Reviews.pdf):

Physical, ecological, management, programmatic and administrative considerations may change over time, often because of factors beyond the University's control. Thus, a period review is needed to assess whether the values represented by a given reserve continue to or have the potential to be of sufficient importance to the research, teaching and public outreach mission of the NRS. It is also useful for an independent committee to recommend new management and administrative strategies to improve further the management, use, and administration of each reserve. (Chpt. 16, p. 1)

Berkeley's reserves were chosen for review at the request of NRS faculty representative Professor Todd Dawson. An internal assessment of the history of systemwide reserve reviews revealed that three of Berkeley's reserves had never been reviewed (i.e., Angelo Coast Range Reserve, Blue Oak Ranch Reserve, and Sagehen Creek Field Station), while three had not been reviewed since the early to mid 1980s (i.e., Hastings Natural History Reservation, Jenny Pygmy Forest Reserve, and Chickering American River Reserve). Blue Oak Ranch Reserve was excluded from review because it has not yet been part of the system for 10 years, and because of the manager's request to postpone the review until the current facilities construction project is completed.

Each review committee consisted of one member of the NRS systemwide office, one (or two) manager(s) of an NRS reserve, and three faculty members representing three different UC campuses. One faculty and the NRS systemwide staff served as co-chairs of each committee. Two committees reviewed two reserves that exist in close proximity to each other (i.e., Angelo Coast Range and Jenny Pygmy Forest reserves, Sagehen Creek Field Station and Chickering American River Reserve) and the third committee reviewed a single reserve (Hastings Natural History Reservation). Committee charge letters are included at the conclusion of this document.

Each committee reviewed relevant documents, conducted site visits, deliberated on the merits of each unit in the context of the NRS's mission, and prepared a final report. Findings of each committee's review were presented to the Universitywide NRS Advisory Committee in April 2015. Each committee's recommendations are condensed in the following text. Fifty-three recommendations were made in total, several were duplicated by different committees (and thus collapsed in the following text), and while the great majority was focused on the reserve under review, six recommendations qualify as campuswide, not reserve-specific, recommendations. In general, staff were praised for their dedication to the NRS and its mission while the pervasive theme was that the campus should address the campus-wide administrative structure, fiscal

parity, and uncertainty in responsibilities at all levels of the campus NRS.

Campus-wide recommendations (6)

1. Establish a campus-wide faculty NRS Director and a campus-wide NRS Advisory Committee that reports to the Director. Provide a 0.5-1.0 staff FTE to serve as Associate Director for the UCB NRS to assist both the campus Director, the office of the VCR, other individual faculty reserve directors, and staff reserve managers.
2. Coordinate the budgeting process for and among all UC Berkeley reserves.
3. Provide active faculty reserve directors with some type of stipend or release time.
4. Clarify the role of the NRS faculty representative to the Universitywide NRS Advisory Committee, currently Professor Todd Dawson, in the context of campus reserve oversight and responsibility.
5. Review and amend the UCB NRS organizational chart to help provide clarity to all campus reserves, so managers do not have to rely on informal communication channels with the campus.
6. Clarify how UCOP funds, campus funds, and other funds, such as endowment and extramural funds, are utilized strategically.

Sagehen Creek Field Station (7)

7. Ensure that at least one member of the reserve staff be on site at all times when users are present.
8. Complete construction of the classroom that is already in progress.
9. Prioritize plumbing and vermin control over all other infrastructure projects.
10. Establish a priority list of deferred maintenance and janitorial issues, and in so doing, determine whether it is necessary to increase the steward position to full-time.
11. Hire a part- or full-time Sagehen-dedicated IT manager.
12. Signage, website, etc., should clearly indicate that reserve is a member of the UC NRS.
13. Commend reserve directors for extensive stakeholder involvement, which has led to many successful fundraising campaigns at the reserve.

Chickering American River Reserve (4)

14. Reserve manager should consult with the Chickering family and campus representatives to expand research, teaching, and education.
15. Reserve manager should continue efforts to create a fire management plan and maintain positive relations with the adjacent North Folk Association.
16. Campus should reevaluate the Chickering Reserve at least one year after this review to assess whether research, education, and/or outreach has increased respective to the Reserve's unique capacity.
17. Obtain a written agreement for the University's long-term use of site where the NSF-funded weather station equipment is located on the neighboring private property.

Hastings Natural History Reservation (23)

18. Commend reserve manager and staff for their outstanding work, particularly for the extensive (and critical) structural revitalization of the Hastings Reserve infrastructure.

19. Develop a deferred maintenance priority plan.
20. Develop an operations needs plan.
21. Develop a clear procedure for budgeting in the context of annual planning.
22. Establish clear mechanisms delineating the governance and decision-making structure.
23. Clarify interactions between the faculty governance and the site operations to evaluate the progress of the operations needs plan.
24. Clarify the role of Museum of Vertebrate Zoology and its director with respect to the oversight of Hastings.
25. Clarify what the opportunities and obligations of UCOP are in helping to develop sustainability at Hastings.
26. Clarify what roles other units at UCB have played in leveraging the site [Hastings], in connecting to the site, and in helping prioritize activities at the site.
27. Clarify what the structure of the 'Friends of Hastings' group is, and determine how it can become a better partner.
28. Increase housing fees for short-term visits.
29. Obtain additional photos of housing on the website to attract appropriate use.
30. Renovate the old wet lab.
31. Address the need for greater computer and data management infrastructure.
32. Negotiate the use of the adjacent Oak Ridge Ranch (Hamm property), either through a use and management agreement or purchase.
33. Update the web page.
34. Engage in a strategic partnership with Climate Change Initiative (ISEECI).
35. Diversify the research discipline base.
36. Expand education and outreach.
37. Seek alternative user groups as revenue sources.
38. Consider hiring an office assistant to help with the website maintenance, RAMS help, and simply day-to-day help for the Director.
39. Reinstate the resident researcher position.
40. Conduct a careful discussion and strategic planning effort with the MVZ director and couple this effort with the Hastings and NRS strategic plans.

Angelo Coast Range Reserve (6)

41. Develop a comprehensive reserve management plan.
42. Investigate implementing zoning for reserve use.
43. Broaden reserve use significantly to include other campuses besides UCB and UCD, as well as expanded outreach and educational use.
44. Establish an effective and functioning NRS Advisory Committee to assist and advise Professor Power with regard to the administration and operation of the Angelo reserve (as well as other UCB reserves).
45. Create an additional staff position so that there is both a permanent, full-time Reserve Manager and a permanent, full-time Reserve Steward.
46. Obtain additional funding for increased reserve staffing and faculty director compensation.

Jenny Pygmy Forest Reserve (5)

47. Appoint a faculty director who is active and committed to the site.

48. Explore alternative management strategies, including the possibility of establishing the Reserve as a satellite to Angelo Coast Range Reserve or transferring management of the reserve to another UC campus.
49. Create a current management plan.
50. Address access issues, starting with an official survey of the property.
51. Promote the site for research use, including the development of a more comprehensive website.

**NATURAL RESERVE SYSTEM
UNIVERSITY OF CALIFORNIA, BERKELEY:
10-YEAR REVIEW**

Sagehen Creek Field Station

September 2014

Review Committee

Peter Moyle – Co-Chair, *UC Davis*
Michael Kisgen – Co-Chair, *UC Office of the President*
Heather Henter – *UC San Diego*
Patrick Robinson – *UC Santa Cruz*
Joshua Viers – *UC Merced*¹
Todd Dawson – *UC Berkeley, ex officio*

Sagehen Staff

Jeff Brown – *Station Manager*
Faerthen Felix – *Assistant Station Manager*
Rauri Bowie – *UC Berkeley, Faculty Director*
James W. Kirchner – *Faculty Director Emeritus*

Executive Summary

The managers at Sagehen Creek Field Station (“Sagehen”) have excelled at engaging the surrounding community to create stakeholder involvement. The results include impressive accomplishments in the education and public service components of mission of the Natural Reserve System. At-risk youth are attending college, wildlife protection and fire-prevention have become sources of pride, cutting edge art and nature projects flourish, and university students are learning valuable field study skills. Repairs and maintenance to the reserve’s physical facilities are required, and staffing should be reviewed to aid the rapidly expanding IT infrastructure and to maintain a physical presence at the reserve at all times during the year.

Introduction

Sagehen Creek Field Station (“SCFS” or “Sagehen”) is located near the crest of the Sierra Nevada in the Donner Summit region, approximately 20 miles north of Lake Tahoe. Sagehen itself is embedded within the approximately 8,000-acre Sagehen Creek Basin. The University of California operates the station under a long-term, special-use permit from the U.S. Forest Service. Research has been ongoing at Sagehen since about 1951, and there are long-term databases that go back many years.

UC Berkeley’s Starker Leopold and Paul Needham originally established the Sagehen Creek site for the purpose of fisheries and wildlife research with particular emphasis on the study of fish. There are some unique facilities at Sagehen, such as the “fish house,” which is

¹ Professor Viers was unable to attend to the reserve review due to medical reasons.

constructed so that direct observations of fish behavior may be made through an underwater viewing window. It also has facilities to house and feed up to 40 people in the winter and more than that in the summer, as well as to provide classroom and meeting space for them. There are a number of cabins and buildings in various states on the site, ranging from immaculate to disrepair.

Sagehen should be considered in the context of a network of field stations that Berkeley administers in the Donner Summit region. It is located about ten miles north of Truckee just east of the Sierra Crest. The University also operates the Central Sierra Snow Laboratory just west of Donner Summit along the old Donner Pass Road, and attached to the snow lab is the Onion Creek Experimental Forest down in the headwaters of the North Fork of the American River. Adjacent to that is the North Fork Reserve, which is currently in the NRS as an auxiliary site to the Chickering American River Reserve and reviewed in conjunction with Sagehen.

The climate at Sagehen encompasses severe contrasts in climate that provides opportunities to study the effects of climate change. Summers are typically dry with daytime high temperatures averaging around 25 °C, but summer nighttime temperatures routinely may drop below 0 °C. Winters are typically snowy with daytime high temperatures averaging around 5 °C; snow cover typically lasts from November to April or May, and winter access often requires traveling by skis, snowshoes, or snowmobiles.

A. Scientific Criteria

1. Does the reserve contain significant or unique species (including listed/threatened species), habitats, or physical, archaeological or cultural resources? Are these resources unique to this reserve or are they available at other NRS sites?

Sagehen is situated at 1940 m on the eastern slope of the northern Sierra Nevada at approximately 39°26'N 120°14'W. The station is embedded in a mosaic of vegetation communities that includes coniferous forest, montane chaparral, sagebrush steppe, wet and dry meadows, and spring-fed fens. The forest varies in age and composition but it is dominated by Jeffrey pine, lodgepole pine and white fir. Within the larger Sagehen Creek basin (elevation range: 1815 m to 2650 m) there are also subalpine forests of red fir, western white pine and mountain hemlock; krumholz-like communities of mountain mahogany and stunted conifers; small stands of trembling aspen, willow, and alder; and subalpine meadows. Aquatic habitats include cold springs, a perennial stream, and a small cirque lake. This high habitat diversity is due to the topographic and hydrologic complexity of the basin, combined with a strong east-west precipitation gradient. No existing NRS reserve contains this particular constellation of habitats—the most similar in habitat composition is Valentine Eastern Sierra Reserve—and few exhibit such sharp habitat gradients.

Not surprisingly the habitat diversity at Sagehen is matched by a diverse biota, including 500+ species of vascular plants, 212 species of vertebrates, and 340 families of insects. The species richness of plants and vertebrates is unique among NRS reserves.

The ecosystems at Sagehen appear to be relatively resilient. Open areas such as sagebrush steppe, wet meadows, fens and subalpine scrub have undergone little obvious change for decades. The forests are heterogeneous, reflecting the spatially and temporally variable influence of fire and logging. A large part of the Sagehen basin was cut over at the turn of the last century and some of the post-logging forest is now dominated by dense stands of conifers, which pose a substantial fire risk. Sheep grazing occurred on a seasonal basis in the early part of the 20th century and continued sporadically until 1995.

Many significant species, habitat, and physical, cultural and archaeological resources are present in the basin. A few species-oriented examples are as follows:

- Birds are especially well documented in including presence of a number of rare and special concern species. The Goshawk, for example, is a nesting species and protection of nest sites is a major focus of new forest management.
- A major reason the station was established at Sagehen Creek was Paul Needham's desire to have a place to study wild trout populations. Sagehen Creek supported brook, brown, and rainbow trout, as well as 5 species of native fishes. The pioneering studies from the 1950s and 60s are still widely cited and are the basis of many other studies up to the present day. Needham's quantitative surveys have been repeated for the last 13 years and the comparison between fish populations in the two eras reflects widespread changes to fish populations in the Sierra Nevada and elsewhere.
- The fish studies also form the basis for the proposed re-introduction of Lahontan cutthroat trout after the creation of a series of barriers and removal of non-native trout above the barriers. Money is available for barrier construction. Interestingly, the barriers may also become part of an art project by a group at UN Reno.
- There is a long history of pine marten studies at Sagehen. Recently, PSW funded a UCB graduate student to revisit sites of previous marten studies. The results indicated that present forest practices were leading to the decline of the martens.

B. Management Issues

1. Are the reserve's resources viable in the long term? Are there management actions that should be taken to ensure their viability?

The richness of studies is one of the main scientific attractions of SCFS and surrounding area. In 2005, the US Forest Service ("USFS") designated the 8,000-acre Sagehen Creek watershed as the Sagehen Centennial Experimental Forest ("Experimental Forest"). The Tahoe National Forest ("TNF") and Pacific Southwest Field Station ("PSW") jointly manage the experimental forest. The Experimental Forest distinction creates opportunities for exciting collaborations between PSW, TNF, and Sagehen. Experimental forest management is taking place at SCFS, which has multiple objectives. The highest management priority is maintaining

the basin's distinctive, well-studied biota. While the director of PSW has signature authority for the experimental forest, PSW, TNF, and SCFS work together in developing management plans. The collaboration among these three parties may promote funding from USFS for management and research in the basin. In May 2010, the "Sagehen Collaborative Process" started for forest management, with 50 stakeholders. Next year, the forest around the field station will undergo substantial fire suppression activities, funded partly as a USFS Treasured Landscape Project.

The historic information base was a major reason for the interest by USFS. It has also led to the SCFS being chosen as a monitoring site for such programs as the US Geological Survey's Benchmark Stream Monitoring Program, Atmospheric Deposition Program, and California Department of Transportation's Highway 89 Project. In essence, SCFS includes a vast watershed and is a hotbed of research and monitoring programs regarding coniferous forests and their associated biodiversity. There is a national pilot project applying spatially placed area fuel treatments (SPLATs), a new approach to managing forest fire risk, to a real-world landscape. SCFS is also a focal point for climate change research. It is currently in the process of expanding its weather station capacity, which already includes 11 towers that are supported by the Keck HydroWatch Project and the NRS Systemwide office.

The reserve's various structures are in largely functional condition and can accommodate large groups with a variety of sleeping and bathroom facilities in addition to a kitchen. These structures are critical for the reserve to house large groups and the manager takes full advantage of this by facilitating thousands of visitor user-days (mostly school groups) throughout the warmer months. There has been a consistent effort to update facilities as necessary, but consideration should be made into the safety of a couple of the buildings before allowing use by some groups. Of particular concern was exposed wiring in one bunkhouse and rodents in the kitchen area. Due to the harsh winters, degradation of buildings will likely require additional financial resources in the near future.

The digital infrastructure at the reserve is impressive and includes sensor networks, weather stations, and high-speed internet relayed from a local tower (at relatively little expense). This infrastructure sets Sagehen apart from many reserves and should be used as a model.

The natural resources, which include an entire watershed, are critical for the science being done there. Management of the forest is a key initiative and the reserve manager has taken an extremely active role by facilitating meetings among stakeholders to establish a long-term sustainable approach. Projects to remove fuel and thin dense, single-age stands have been key priorities. These activities are helping to ensure not only the viability of the reserve for research and teaching (and reduced risk of catastrophic burns), but also the general health of the forest.

2. Is there a reserve management plan? Are appropriate measures being taken to implement this plan?

The current reserve management plan was created in 2003 at the time that Sagehen was added as a UC Natural Reserve. The goals of the management plan are:

1. To provide for the day-to-day operation of the facility.
2. To outline management policies for research, education and outreach.
3. To acquaint the local community, the University community, other academic entities, government agencies, and other potential users with current and future research and education opportunities at Sagehen, while at the same time encouraging further suggestions for management, development and operations.
4. To anticipate and plan for future use and visitor needs.

The management plan is a thorough document that discussed the operations including the successes and challenges. By all accounts tremendous effort was taken to implement the management plan. This is evident by the diverse array of activities occurring at the reserve and the increased use (especially class visits). Additionally, a key component of the management plan was to implement an appropriate forest management plan and this is being actively pursued. The reserve would likely benefit from a re-evaluation of the management plan, especially in light of the cancellation of the planned expansion of facilities.

3. *Is there legal, appropriate access to the reserve? Discuss problems, if any.*

Yes, access to Sagehen is legal and appropriate. A locked gate prevents unauthorized visitors from entering the reserve. Physical access to the reserve is inhibited only by winter snowpack. This is a perennial concern (recent winters have been mild) and the reserve owns a snow-clearing vehicle.

4. *Is public use, if any, of the reserve appropriate and controllable? What means of controlling trespass should or can be undertaken?*

On-site reserve staff oversee and prevent unauthorized access, which appears to be minimal.

5. *Are present, planned, or potential land use activities adjacent to the reserve likely to significantly and adversely affect the reserve? Could these impacts feasibly be mitigated?*

The reserve and adjacent federal land encompass an entire watershed, making the actions of adjacent property owners less important than other reserves. The reserve staff appears to maintain good relationships with the local community and have worked successfully with stakeholders to navigate any issues that arise.

6. *Is the University's management and use of the reserve supported by the local community? Do adjacent landowners have concerns that need to be addressed?*

The community surrounding Sagehen is extremely supportive of the reserve. They view the staff and researchers as collaborators and beneficial neighbors. Jeff and Faerthen have cultivated a number of crucial partnerships with groups in nearby area (see discussion of outreach programs in D. 3.). We are not aware of any adjacent landowner concerns.

C. Legal/Ethical Issues

1. *Is the administering campus complying with legal or ethical restrictions associated with the original conveyance, funding used to acquire the reserve, or any other terms of an applicable agreement (e.g., use agreement, license, conservation easement)?*

Agreements and Permits:

The terms of the Sagehen's Cooperative Agreement with the USFS, dated March 2, 1951 ("Agreement"), and Special Use Permits ("Permits") are generally favorable to the University. The Agreement provides that "the term of this agreement shall remain indefinite or until such time as circumstances require the development of a new cooperative agreement or the termination of the agreement as outlined above." This term precludes the need for renewing this Agreement from time to time.

The Permits were issued pursuant to the Agreement for specific improvements such as the buildings, dam, utility lines, and garage, but also for use of approximately 112 acres of land under the initial permit. The Permits contain standard provisions that were used by the USFS during the 1950s, but it may be prudent to note a couple of conditions. First, upon the termination of the agreement, the University must remove all University-owned structures and improvements and restore the site unless otherwise agreed to. If termination was to occur and the USFS were to refuse to accept title to the improvements, the University would remain liable for the cost of their removal and restoration. It should be noted that this type of provision is fairly standard in use agreements of this nature, because it provides the landowner with control over how it may wish to address the subject of user-installed improvements. A variation of this provision exists in other long-term NRS use agreements. If the University were to decide to terminate this Agreement, it would be advisable for the University to negotiate the transfer of title to these improvements to either the USFS or a successor entity/organization that will continue the field station program.

Liability-related issues

Some members of the Review Committee raised various liability-related matters. First, stringent food preparation and storage rules must be adhered to greatly reduced potential problems related to rodents and disease, such as hantavirus. Moreover, a review of the building should be conducted to assure vector control and prevention. One committee member interviewed a user that claimed to have seen a rodent in the kitchen area.

The reserve manager reports that the cabins housing users, while modest are structurally sound after some harsh winter conditions. One committee member reported exposed electrical wires in a visitor cabin. Deferred maintenance should be a high priority.

D. Academic criteria

1. What is the level of past, current and potential research and teaching use at the reserve by the administering campus, other UC campuses, and other non-UC institutions? Is the current level and kind of research appropriate to the reserve? Should this use be expanded or improved and if so, how?

As previously stated, the richness of studies is one of the main scientific attractions of SCFS and surrounding area. The USFS designated the 8,000-acre Sagehen Creek watershed as the Sagehen Centennial Experimental Forest creates opportunities for exciting research collaborations between PSW, TNF, and Sagehen. The historic information base was a major reason for the interest by USFS. Experimental forest management is taking place at SCFS, which has multiple objectives. In May 2010, the “Sagehen Collaborative Process” started for forest management, which includes 50 stakeholders. Next year, the forest around the field station will undergo substantial fire suppression activities, funded partly as a USFS Treasured Landscape Project. Specifically, a new approach to managing forest fire risk, to a real-world landscape is a national pilot project applying spatially placed area fuel treatments called “SPLATs.”

These collaborations have also led the SCFS to being chosen as a monitoring site for such programs as the US Geological Survey’s Benchmark Stream Monitoring Program, Atmospheric Deposition Program, and California Department of Transportation’s Highway 89 Project. In essence, SCFS includes a vast watershed and is a hotbed of research and monitoring programs regarding coniferous forests and their associated biodiversity. SCFS is also a focal point for climate change research. It is currently in the process of expanding its weather station capacity, which already includes 11 towers that are supported by the Keck HydroWatch Project and the NRS Systemwide office.

2. What is the level of past, current and potential teaching use at the reserve by the administering campus, other UC campuses, and other non-UC institutions? Is the current level and kind of research appropriate to the reserve? Should this use be expanded or improved and if so, how?

The main UC undergraduate class that uses Sagehen is UC Davis’ Insect Taxonomy and Field Ecology (also known as Bug Boot Camp). The advantages of teaching at Sagehen include the great habitat diversity at the reserve itself and the central location for travel to other habitats. The use of Sagehen for many university-level field classes, however, is limited by the lack of a large classroom and/or lab facility. Additionally the fee of \$20/night for accommodations is high for undergraduate students. The substantial cost to run any field course, given small class size and vehicle needs, means that university subsidies are unlikely. The number of undergraduate

courses that use the reserve has gone down, but the committee believes that this is likely due to a reduction in UC offerings of field courses in general. Classes from the University of Nevada, Reno also use the station.

3. *What is the level of past, current and potential public outreach programs at the reserve? Is the current level and kind of public use appropriate to the reserve? Should this use be expanded or improved and if so, how?*

Sagehen excels in public outreach/service; the third part of the NRS mission. The reserve manager has taken remarkable initiative to involve stakeholders and take on a variety of local projects (e.g. forest management, a highway wildlife underpass, and a roadkill database/mapping initiative). From a social perspective, these efforts appear to have made a positive impact in the local community and this will help to streamline any future activity requiring community involvement. Notable, outreach projects include:

1. Adventure-Risk-Challenge Summer Literacy and Leadership Program (ARC). This is a unique combination of academic summer camp and Outward Bound-style outdoor education for teen English language learners, primarily from Nevada and Placer Counties. These counties rank 43rd and 57th, respectively, out of 58 counties in California in college attendance rates. Nevada County has the third highest high school drop out rate in the state (33%) and the second lowest high school graduation rate (47%). Participants spend 6 weeks at SCFS and surrounding wilderness areas in rigorous language study combined with outdoor wilderness activities, leadership training, and scientific research. Some of the accomplishments of ARC include:

97% of ARC alumni pass the California High School Exit Exam, compared with the CA statewide average of 40% for English language learners and 70% for socio-economically disadvantaged students

83% of ARC graduates attend college, compared to 36% of Latinos and 46% of Caucasians nationwide.

The high-school age participants have their own somewhat separate area, yet they can and do interact with scientists during meal times. The students have a comfortable place to call their own when not engaged in more rigorous outdoors expeditions. To date, over 200 California teens have participated in the program at SCFS. ARC started at Sagehen 19 years ago and has expanded to Yosemite and Sedgwick Reserve. Funding is largely through individual donations and private foundations.

2. Highway 89 Stewardship Team is a diverse group of county, state, and federal agencies, nonprofit organizations, and university researchers that are trying to reduce animal-vehicle collisions (which annually cause \$1 billion in property damage) while preserving wildlife habitat. Highway 89, which borders the Sagehen Creek Experimental Forest, bisects major movement corridors for deer and other species. With funds from several sources the team is installing underpasses beneath the highway, fencing, and cameras to study animal movement patterns. Local school children made the signs that are posted to explain the project. Reducing

car-wildlife collisions has tremendous support from the local community and the project is an example of the ability of the Sagehen managers to effectively merge diverse groups to accomplish a common goal while engaging the public.

3. All 5th graders in the Tahoe Truckee Unified School District take part in the very popular Sagehen Field Days, three days that students spend learning about natural history and participating in team building exercises. UCB graduate students teach an inquiry-based science curriculum that is in line with the Common Core standards. The station is crucial to the program due to the graduate student participation, the District's desire to instill in participants a "sense of place," and the proximity of SCFS to the schools. Because of the location, many parents accompany the children, for a few hours, a day, or overnight. According to station managers, any problems the station had with vandalism of equipment in unmonitored areas disappeared after the community was engaged with the station through the Sagehen Field Days.

4. The station has numerous workshops available to the public. In 2014, these included Wildlife Tracking, iNaturalist, Sierra Nevada Wildflower Identification, Kidzone Family Camp, and Geomorphic and Ecological Fundamentals of River Restoration. The station's website includes many resources, including educational videos and an impressively up-to-date blog with several posts each month.

4. Are existing facilities and infrastructure (eg., roads, water, phone, electricity) adequate for academic needs? If not, what is needed to achieve minimal level of adequacy?

Yes, facilities are adequate. Some buildings are above average, while others are in need of repair. The facilities are split into two areas – the lower camp, where the bulk of the current facility is located and where a lot of the overnight use occurs, and the upper camp, which is a combination of cabins, bathhouses, etc. Total housing consists of 22 buildings for up to 59 people year-round, includes: library/computer lab; two classrooms; communal kitchen, eating area, and deck; office space; fish observation house. Amenities include: Electricity with backup generator, wireless network with satellite Internet service, VCR, slide and LCD projectors. Flush toilets, showers, sinks, and washing machines. Heat is available in all buildings.

Until very recently, Sagehen operated without a Reserve Steward. Users report that the addition of a 50% Steward has been critical for improved maintenance and staffing of the station. Serious deferred maintenance issues remain, however, primarily plumbing issues and vermin. The number of working toilets and showers has been at times insufficient for the number of users. Exposed wiring and janitorial upkeep are also issues.

The station does not have a meal plan, although caterers can be hired. This does add an organizational burden onto instructors, but some instructors use cooking as a team-building exercise, or believe that independent cooking is a good way to save money. The consensus is that the kitchen operates well as is.

5. Has baseline information (e.g., research data, environmental monitoring records, species lists) been collected, archived and made accessible to reserve users and others?

SCFS's website provides access to material that documents baseline information for the many significant species, habitat, and physical, cultural and archaeological resources present in the basin. Additional baseline information includes: Daily weather data (1953 to present) from National Climate Data Center; climate data (1961 to present) from Western Regional Climate Center. Streamflow/water- quality data from U.S. Geological Survey; precipitation (2001 to present) from National Atmospheric Deposition Program. Online biological inventories of amphibians, birds, bony fishes, insects, mammals, plants, and reptiles. Onsite teaching collections of birds, insects, plants, and mammals.

E. Reserve Administration

1. Is the existing campus NRS administrative structure appropriate?

As described in other reserve reviews for the Berkeley campus, an organizational chart was provided for the UCB NRS reserves. This chart provides for all of the necessary (and more) administrative structure and advisory committees for both the collected set of the Berkeley reserves and for each individual reserve. Unfortunately, this organizational plan appears to have fallen by the wayside and virtually all of the positions are blank. The Review Committee was unable to discern if the positions and committees identified in the organizational structure (mostly reserve advisory committees) were unfilled or unknown. It would be helpful to establish these groups, if none exist. The current campus based NRS director *appears* to be the UCB Vice Chancellor for Research. The Review Committee finds this to be inappropriate as the VCR is the individual to whom a campus NRS director should be reporting. Indeed, we could find no evidence that UCB has a faculty member (notwithstanding the Faculty Directors of individual reserves) who serves as the Berkeley NRS Campus Director. Similarly, there appears to be no active overall campus-based NRS governance or advisory committee.

2. Is the current level of staffing adequate to achieve reserve goals? If not, what more is needed?

The staff at the reserve provides a high quality service to the reserve and surrounding community. It is recommended that Sagehen with its relatively harsh winter conditions and high use increase the part-time steward to a full-time, year round position. Further, Sagehen's long-term staffing needs must be determined by the future conditions of the site, including the growing cyber infrastructure. The Reserve Manager and Faculty Director request that that future funds be made available to hire a part- or full-time Sagehen-dedicated IT manager to oversee the extensive weather station network, as well as to troubleshoot the new high-bandwidth internet connectivity.

3. How are faculty and students on the administering campus informed about the reserve? What efforts could be made to promote its use?

Several UCB field biology courses use the site annually, along with local community groups mentioned in Section D.3. The broad base of support has allowed for other groups to utilize the site, but the specific UC participation is a smaller fraction of the total occupation numbers. Marketing to the UCB departments, to other UC campuses, and to institutions outside of California (such as the University of Nevada, Reno collaboration) would likely yield positive returns.

4. Is there adequate funding to achieve reserve program and management goals? If not, how much additional funding is needed to achieve these goals?

The Station Manager has assured the Committee that present funding is adequate for the Reserve, while successful fundraising within the local community is on going.

F. Recommendations

1. Management
 - a. Based on user feedback, the committee recommends that a member of the reserve staff be on site at all times while users are present.
2. Research, teaching, and public service use
 - a. Sagehen is ideally suited to host more classes, but the lack of classroom space is a constraint. The committee recommends that efforts be made to complete the classroom that is already in progress.
3. Facilities
 - a. The Committee recognized that there are constant demands to improve and repair Sagehen facilities considering the increased educational activity, ongoing renovation needs, and harsh winter climate.
 - b. Based on user feedback, the committee recommends that plumbing and vermin control take precedence over all other infrastructure projects.
 - c. The committee also recommends that the Managers and Reserve Steward establish a priority list of deferred maintenance and janitorial issues. In addition, it should be determined whether it is necessary to increase the steward position to full-time.
4. Information management
 - a. A recent MOU was created between the Sierra-Plumas Joint Unified School District (“District”), University of Nevada, Reno (“UNR”), and UC. The District will provide high-bandwidth internet connectivity, approximately 100 megabits per second (Mbps), to Sagehen.
 - b. Recommend that funds be made available to hire a part- or full-time Sagehen-dedicated IT manager to oversee extensive weather station network, as well as to troubleshoot the new high-bandwidth internet connectivity.
 - c. Bring Sagehen into conformance with the promotional standards in widespread use throughout the UC Natural Reserve System.
 - d. Signage, website, etc., should clearly indicate that reserve is a member of the UC NRS.

5. Administrative structure
 - a. The UC Berkeley NRS should review and amend its organizational chart to help provide clarity to all UCB reserves. This should address representation on campus, so managers don't have to rely on informal communication channels with the campus.
6. Staffing
 - a. The reserve staff (manager, assistant manager, and steward) should be sufficient to manage all levels of activity at the reserve throughout the entire year, including the off-season.
7. Funding
 - a. Commend Jeff and Faerthen for extensive stakeholder involvement, which has led to many successful fundraising campaigns at the reserve.

**NATURAL RESERVE SYSTEM
UNIVERSITY OF CALIFORNIA, BERKELEY:
10-YEAR REVIEW**

Chickering American River Reserve

September 2014

Review Committee

Peter Moyle – Co-Chair, *UC Davis*
Michael Kisgen – Co-Chair, *UC Office of the President*
Heather Henter – *UC San Diego*
Patrick Robinson – *UC Santa Cruz*
Joshua Viers – *UC Merced*²
Todd Dawson – *UC Berkeley, ex officio*

Chickering Staff

Jeff Brown – *Station Manager*
Faerthen Felix – *Assistant Station Manager*
Rauri Bowie – *UC Berkeley, Faculty Director*
James W. Kirchner – *Faculty Director Emeritus*

Executive Summary

In 1975, the Chickering family placed a long-term conservation easement for the benefit of the NRS. The impressive resources at Chickering include some of the last old growth forest in the Sierras outside of a national park and an impressive collection of pictographs. However, there are serious constraints to use; the combination of limited access and lack of infrastructure means that potential users are faced with either setting up their own camp or driving in/out on a daily basis. This has resulted in limited use of the reserve. The UC is neither expending many resources nor deriving much benefit from Chickering Reserve, at present. Despite the current lack of use, the Committee believes that at a minimum there is extreme value to retaining the pristine forest as a baseline for climate change studies, as well as to preserve the extensive collection of Native American pictographs.

Background

Located in the headwaters basin of the North Fork of the American River, the Chickering American River Reserve (“Chickering Reserve” or “Reserve”) is the only Natural Reserve System (“NRS”) site set on the windward western slopes of the Sierra Nevada. This rugged site has thin soils and a variety of mountain habitats, including black oak woodlands, montane and subalpine coniferous forests, aspen groves, willow thickets, mixed riparian woodland, wet and dry subalpine meadows, montane chaparral, alpine lake margins, and fell fields. The basin also

² Professor Viers was unable to attend to the reserve review due to medical reasons.

has scattered soda water springs, which contain a variety of minerals, primarily calcium bicarbonate.

A. Scientific Criteria

1. *Does the reserve contain significant or unique species (including listed/threatened species), habitats, or physical, archaeological or cultural resources? Are these resources unique to this reserve or are they available at other NRS sites?*

Rich in flora and fauna, Chickering Reserve harbors at least 1,000 plant species. (Fiedler, Rumsey and Wong, 2013. *The Environmental Legacy of the UC Natural Reserve System*. UC Press). It also lies within the habitat ranges of high-elevation mammals such as the American pika (*Ochotona princeps*), yellow-bellied marmot (*Marmota flaviventris*), American marten (*Martes americana*), and fisher (*Martes pennanti*). The 100 documented bird species include northern goshawks (*Accipiter gentilis*) and California spotted owls (*Strix occidentalis occidentalis*), and the 15 reptile and amphibian species include the foothill yellow-legged frog (*Rana boylei*), a declining species that has persisted primarily in California's least polluted streams.

In addition to great natural diversity, the Chickering Reserve preserves reminders of an earlier era in California history. These include petroglyphs carved into granite and basalt that probably date to 5,000 years before the present. These petroglyphs are attributed to the Martis people who summered in the area. In more recent times, the area attracted visitors to Soda Springs Hotel, an early "destination resort" and an important stopping point for Sierra Nevada travelers from the 1870s to the 1890s. The resort hotel burned down in 1892, was rebuilt, and then burned once again in 1925. This unusual mountain parcel was made available to the NRS by the reserve's namesake the Chickering family, a family of conservation-minded pioneers.

B. Management Issues

1. Are the reserve's resources viable in the long term? Are there management actions that should be taken to ensure their viability?

The Reserve's natural resources are quite impressive and include old-growth forest, but accessibility is a key concern. This is a perennial problem for potential users, but the resource itself is viable in the long term. The one exception is perhaps the petroglyphs that have been vandalized. A greater effort should be made to attract researchers to this reserve to warrant its continued status as a Natural Reserve.

2. Is there a reserve management plan? Are appropriate measures being taken to implement this plan?

The Reserve is managed by Jeff Brown, who is also the Sagehen Creek Field Station manager. Due to the very limited use of this reserve (combined with difficult access), management does not require much effort. There is no management plan in place for this reserve. A management plan would be beneficial to help solidify a path forward with respect to both increasing research usage and maintaining a strong relationship with the Chickering family and neighboring property owners.

3. Is there legal, appropriate access to the reserve? Discuss problems, if any.

Access to the reserve is perhaps the largest issue. During most, if not all, of the year access is available only via a rather long/steep/windy road that requires four-wheel drive. This in combination with the lack of infrastructure means that potential users are faced with either setting up their own camp or driving in/out on a daily basis, which is extremely time-consuming. This has resulted in extremely limited use of the reserve for teaching or research.

4. Is public use, if any, of the reserve appropriate and controllable? What means of controlling trespass should or can be undertaken?

The Chickering family predominantly uses the land as a vacation property. While there are a few houses in the area, most are summer homes for the extended Chickering family. The difficult access means public access and trespass is not a major concern.

5. Are present, planned, or potential land use activities adjacent to the reserve likely to significantly and adversely affect the reserve? Could these impacts feasibly be mitigated?

There are no known land activities that would significantly or adversely impact the Reserve.

6. Is the University's management and use of the reserve supported by the local community? Do adjacent landowners have concerns that need to be addressed?

The Reserve's staff appears to maintain good relationships with the local community, including the North Fork Association.

C. Legal/Ethical Issues

1. *Is the administering campus complying with legal or ethical restrictions associated with the original conveyance, funding used to acquire the reserve, or any other terms of an applicable agreement (e.g., use agreement, license, conservation easement)?*

The National Science Foundation (NSF) awarded a grant to the UC and the University of Nevada, Desert Research Institute (DRI), for the installation of a network of weather monitoring stations on multiple NRS reserves, including the Chickering Reserve. The original location for the monitoring station ("Tower") on the Reserve was determined to be suboptimal for the functioning of the equipment. The Reserve manager found a relocation site for the Tower on an adjacent property approximately two miles away from the Reserve. The private landowner orally agreed to allow the University to use a small area, approximately 2500 square feet, on his undeveloped property to install the Tower at no fee.

Prior to installation, the Reserve manager was advised that the placement of the Tower required a written agreement with the landowner in order to protect the University's interest in the Tower, as well as limiting potential liability. A draft license agreement was prepared for the landowner.

Additionally, an Environmental Impact Classification (EIC) was created to internally document the UC's determination that the Tower project was "categorically exemption" under the California Environmental Quality Act (CEQA).

Ultimately, the Reserve manager informed the NRS Systemwide office, at the time, and the Committee, at present, that the private landowner was unwilling to execute a written agreement. The Reserve manager proceeded with to erect the Tower without a signed agreement between UC and the landowner. The Committee strongly advises the Reserve manager to reengage the landowner and to obtain a license agreement.

D. Academic Criteria

The Reserve has experienced very little use for quite a while. The Reserve manager estimates approximately 1-3 requests per year on average. It is this Committee's opinion that this site could potentially be attracting and sustaining more research use in areas such as anthropology, hydrology, biodiversity of unique habitats, vegetation classification, soils, geology, earth systems science, climate change effects, entomology, and endemic species.

This Reserve does not have facilities available, so at a minimum there is need for a camping area and discreet access for approved users. Baseline information, aside from the scholarly work mentioned above, is limited to an amateur survey; there is definitely a need to expand the survey.

E. Reserve Administration

As described in other reserve reviews for the Berkeley campus, an organizational chart was provided for the UCB NRS reserves. This chart provides for all of the necessary (and more) administrative structure and advisory committees for both the collected set of the Berkeley reserves and for each individual reserve. Unfortunately, this organizational plan appears to have fallen by the wayside and virtually all of the positions are blank. The Review Committee was unable to discern if the positions and committees identified in the organizational structure (mostly reserve advisory committees) were unfilled or unknown. It would be helpful to establish these groups, if none exist. The current campus based NRS director *appears* to be the UCB Vice Chancellor for Research. The Review Committee finds this to be inappropriate as the VCR is the individual to whom a campus NRS director should be reporting. Indeed, we could find no evidence that UCB has a faculty member (notwithstanding the Faculty Directors of individual reserves) who serves as the Berkeley NRS Campus Director. Similarly, there appears to be no active overall campus-based NRS governance or advisory committee.

F. Recommendations

There are serious constraints to use of the Reserve. The long, rough dirt road to enter the reserve rises to 7200 feet and is not passable until rather late in the season. Heavy snow during winter months generally restricts the research season to June through October. The property owners grant limited access and there are no overnight accommodations. The combination of limited access and lack of infrastructure means that potential users are faced with either setting up their own camp or driving in/out on a daily basis. This has resulted in limited use of the reserve.

Allen Fish – Chickering family representative – expressed that there is interest in increasing the NRS mission of research, teaching and education at the property. The generation of family members that initially made the agreement with UC are no longer active in the property, and most current family members view the Reserve simply as a family vacation site.

At present, the Jeff Brown is negotiating a large-scale fire management plan with the Chickering representatives, and the adjacent land managed by the North Folk Association. The fire management plan would also have direct benefit for Sagehen. Moreover, the results of the fire-management negotiations may improve the family’s willingness to accommodate more research.

In sum, UC is neither expending many resources nor deriving much benefit from Chickering Reserve at present. Despite the current lack of use, the Committee believes that at a minimum there is extreme value to retaining the pristine forest as a baseline for climate change studies, as well as to preserve the extensive collection of Native American pictographs.

Specific Recommendations

A. Research, teaching, and public service use

- a. This reserve has had little use over its history in the NRS. The Committee recommends that the Reserve manager concerted effort be made to consult with the Chickering representatives to expand research, teaching and education.
- b. The Reserve manager should continue efforts to create a fire management plan and maintain positive relations with the adjacent North Folk Association.
- c. The Committee further recommends that UCB NRS should reevaluate the Chickering Reserve at least one year after this review to assess whether research, education, and/or outreach has increased respective to the Reserve’s unique capacity.

B. Legal

- a. It is strongly recommended that the Reserve manager obtain a written agreement for the University’s long-term use of site for the NSF funded-weather monitoring tower. The purpose of the agreement is to protect the University’s property interests in the Tower and to limit potential liability, while operating on a private landowner’s property.

- b. *Transfer management of the reserve to another UC* so they can provide an active and committed faculty director.
3. *Create a current management plan.* This could be accomplished by updating an old management plan that is rumored to exist. We suggest taking advantage of the local experts on this habitat in this process.
4. *Address access issues.* The first step is to conduct an official survey of the property to determine boundaries and whether there are encroachment issues, and where the most appropriate access will be. Care needs to be taken to provide for approved access (parking and access trail) in a subtle way so as not to encourage inappropriate and potentially damaging activities on the site (hikers, marijuana growers, etc.).
5. *Promote the site for research use.* This site could attract research from a variety of topics such as hydrology, geochemistry, geology, earth systems science, endemic species, and more. We recommend a more comprehensive website be developed and promoted to relevant faculty across the UC system and beyond.

CONCLUDING REMARKS

Jenny Pygmy Forest Reserve is a research asset. It boasts a unique and rare climax pygmy forest in pristine condition, an ecosystem type that none of the other NRS sites have. This site is in need of a relatively small amount of resources and attention to oversee the property, discourage and prevent inappropriate use of the site, and to facilitate and promote appropriate, low-impact research use.



OFFICE OF THE PROVOST AND EXECUTIVE VICE PRESIDENT
NATURAL RESERVE SYSTEM

OFFICE OF THE PRESIDENT
1111 Franklin Street, 6th Floor
Oakland, California 94607-5200

August 13, 2014

Committee for the 10-year Review of the UC Berkeley NRS Reserves: Chickering American River Reserve and Sagehen Creek Field Station

Michael Kisgen, Co-Chair, UC NRS Office of the President

Peter Moyle, Co-Chair, UC Davis NRS

Heather Henter, UC San Diego NRS

Patrick Robinson, Manager, Año Nuevo Island Reserve, UC Santa Cruz

Josh Viers, UC Merced NRS

Todd Dawson, UC Berkeley, *ex officio*

Subject: Committee Charge & Background Information

Dear Colleagues:

Natural Reserve System requires that NRS reserves, field stations, marine laboratories and research centers are to be reviewed at least every ten years to determine whether each site continues to fulfill the NRS mission of university-level research, education and public service. Specifically, as outlined in the NRS Administrative Handbook, Chapter 16 entitled "10-Year Reserve Reviews" states:

Physical, ecological, management, programmatic and administrative considerations may change over time, often because of factors beyond the University's control. Thus, a period review is needed to assess whether the values represented by a given reserve continue to or have the potential to be of sufficient importance to research teaching and public outreach mission of the NRS. It is also useful for an independent committee to recommend new management and administrative strategies to improve further the management, use and administration of each reserve. (Chpt. 16, p. 1)

Recently, the NRS systemwide office examined the list of reserve reviews conducted throughout the system. Three of Berkeley's reserves (Angelo Coast Range, Sagehen Creek, and Blue Oak Ranch) have never been reviewed, and three have not been reviewed since the early to mid- 1980's (Hastings Natural History Reservation, Jenny Pygmy Forest, and Chickering American River). Therefore, it is appropriate and timely to initiate a review of Berkeley's six NRS sites during the Academic year 2014-15.

We believe a review of all six sites is too much to ask of any one committee, so we have decided to assemble three committees to review two sites. Each committee will be composed of three faculty from separate UC campuses, one reserve manager, and one member from the NRS representative from the Systemwide office who will serve as co-chair of each committee. The Universitywide NRS Advisory Committee faculty representative, Professor Todd Dawson, will serve as the *ex officio* member of each committee. The Berkeley NRS sites are grouped as follows: Chickering American River Reserve and Sagehen Creek Field Station; Blue Oak Ranch Reserve and Hastings Natural History Reservation; and Angelo North Coast Range and Jenny Pygmy Forest reserves. However, to coordinate the reviews so as not to ask too much of Berkeley's NRS faculty and staff, we expect to stagger the three reviews over this academic year. Due to the practical concerns of winter weather, we have asked this committee to schedule their review of Chickering and Sagehen Creek as soon as possible to avoid later inaccessibility due to snowfall.

The NRS Systemwide office will provide a set of documents for your review via the *Dropbox* website (if you need assistance to access these documents, please contact the committee co-chair, Mike Kisgen, at michael.kisgen@ucop.edu). Documents provided will include historic records, background materials, Regents' items, maps, use statistics, and key publications that have resulted from research at these reserves. The documents will also include several chapters from the *NRS Administrative Handbook* that provide guidance relating to our guiding principles on selection, operation and use of NRS sites (Chapter 6), and 10-Year Reserve Reviews (Chapter 16). If you find materials that are not included but should be, please provide them and we'll work to get them disseminated as quickly as possible.

NRS Administrative Handbook Chapter 16, Appendix A, outlines five categories of review criteria and issues to be addressed, which are followed by a final "recommendation" category. Chapter 16 should form the basis for the Committee's final report. With respect to a completion of the final report, I kindly request that a draft form be included as a short agenda item in the October 27, 2014 Universitywide NRS Advisory Committee meeting, with a full and final report on Berkeley's reserves at the April 2015 Universitywide NRS Advisory Committee meeting.

At your earliest convenience, please consider, and if necessary, request whether:

1. UCOP NRS should identify and provide in advance a list of the additional participants that should be invited to join the Review Committee during the site visit, and
2. Staff and/or research scientists from the Chickering-Sagehen community, or the local Truckee community whose input would be valuable should be invited and made available during the site visit.

Again, thank you very much for your willingness to contribute your time and insights to this process. Should you wish to speak to me personally about any aspect of this review, or about the NRS in general, please do not hesitate to contact me via email (peggy.fiedler@ucop.edu) or phone (510-987-0143).

Kind regards,

A handwritten signature in black ink, appearing to read "Peggy L. Fiedler". The signature is stylized and cursive.

Peggy L. Fiedler
Director
Natural Reserve System