

Sierra Nevada Conservancy-Progress Report

Sierra Nevada Conservancy Grant Program
Safe Drinking Water, Water Quality and Supply, Flood Control
River and Coastal Protection Act of 2008 (Proposition 84)

Grantee Name: **INSERT**

Project title: **INSERT**

SNC Reference Number: **SNC XXXXXX**

Submittal Date: _____

Report Preparer: _____

Phone #: _____

Check one:

6-Month Progress Report

Final Report

6-Month Progress Reports should reflect the previous six months. **Final Reports** should reflect the entire grant period.

Progress Report: (Please provide a general description of work completed during this reporting period.)

Progress Report was submitted in November 2009.

F. project.)



California
Institute for
Biodiversity

2008 Sierra Nevada Classroom Project Final Report

*SNC Ref # G00770019
January 2010*

*Prepared by Carol J Baird, Ph.D.
Executive Director*

*Sierra Nevada Conservancy Grant Program
Safe Drinking Water, Water Quality and Supply, Flood Control
River and Coastal Protection Act of 2008 (Proposition 84)*



Jack L. Boyd Outdoor School
Teachers observing local wildlife during Journaling activity
Sierra Nevada Classroom Project G0770019

CAPACITY BUILDING RESULTS AND COLLABORATIONS AND COOPERATION WITH STAKEHOLDERS

"In the end, we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught." —A quote from Baba Dioum, a natural resource conservationist in Senegal, who founded the Executive Committee for the United Nations Programme for the Environment, and sits as a Board member on the Executive Committee of the IUCN (International Union for Conservation of Nature)

As a direct result of the *Sierra Nevada Classroom Project (SNCP)*, funded in part by the Sierra Nevada Conservancy (SNC) in 2008, our nonprofit organization the California Institute for Biodiversity (CIB) was able to initiate a series of valuable partnerships, and to strengthen existing links:

Capacity Building: Stakeholders (School Districts)

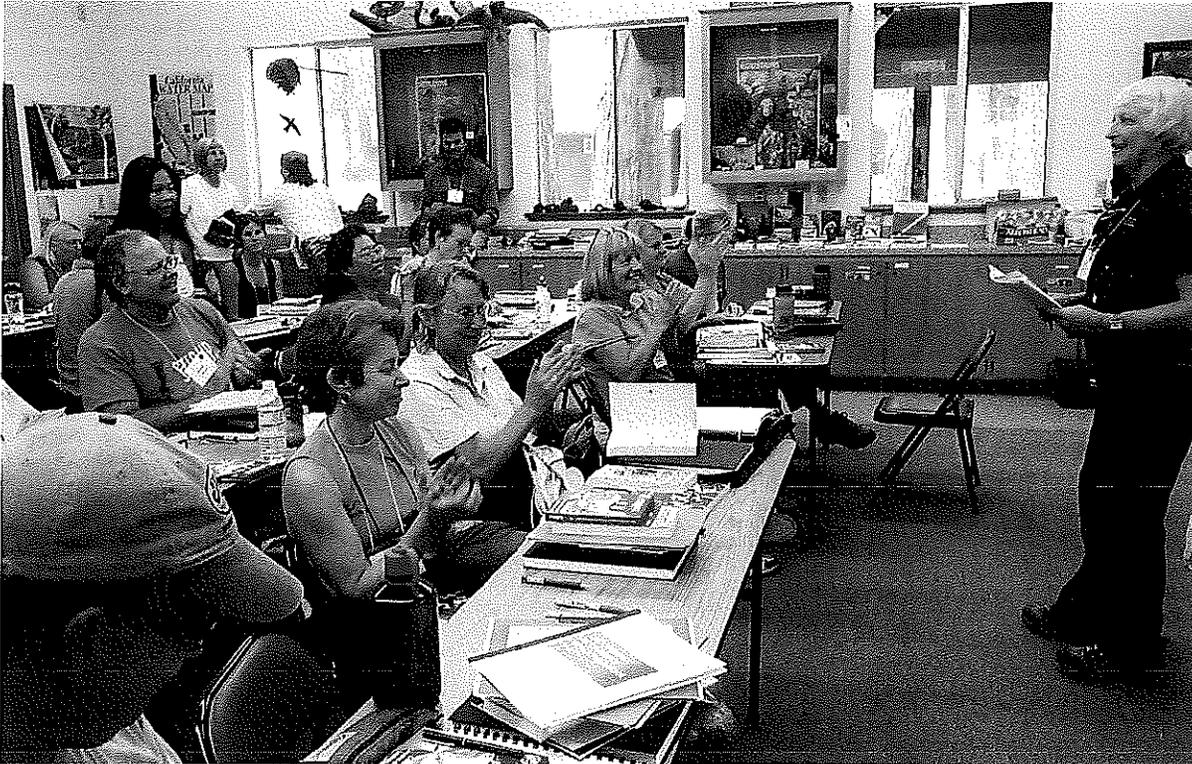
Through this project, we reached professionals in several distinct ways:

- (1) The pilot institute SNCP attracted 25 science teachers and environmental educators, of whom seven teach in higher **Sierra counties**, while ten teach in **valley or foothill schools** (the remainder arrived from points all over the state: Los Angeles, Riverside, the central coast, and the Bay Area.) All of them successfully completed the institute (raving about their experiences), and received stacks of curricular materials used in instruction during the institute. All planned to use the materials back at their schools, and to conduct local stewardship activities with their students.
- (2) Our CIB staff, together with California State Park senior personnel, recently visited twelve different **County Offices of Education** in the Sierra Nevada, where they met in person with science curriculum specialists to share teacher experiences from the SNCP, to inspire interest in future programs, and to donate relevant resource materials.

Capacity Building: Stakeholders (Outdoor Programs)

Through this project, we strengthened our relationship with Peter Leinau (Principal) and the **Jack L. Boyd Outdoor School** in Fish Camp, five minutes from the Wawona entrance to Yosemite National Park. The school is a unit of the **Merced County Office of Education**, so their officials also participated briefly in the pilot program, to share with teachers the possibility of bringing students up to the facility for a week during the school year. Peter Leinau is a great believer in our program, and helped us enormously in logistical support and a local stewardship effort for our educators.

We also worked with one of the instructors at the **Yosemite Institute**, who became staff for the SNCP during the summer institute, and was an exceptional teacher himself!



Jack L. Boyd Outdoor School
Dr. Baird conducts introductions on the first day
Sierra Nevada Classroom Project G0770019

Capacity Building: Partners—Professional Development Programs for Teachers

Offering the *Sierra Nevada Classroom Project* also strengthened our existing collaborations (with the **California State Department of Parks and Recreation** (State Parks) and with Yosemite Institute) while allowing us to initiate a new partnership with the California Academy of Sciences (CAS). CIB has a long-standing memorandum of understanding with State Parks, in the person of Donna Pozzi, the Chief of Interpretation and Education, through our joint Eureka Series of professional development programs. State Parks is especially interested in enhancing use of the parks by middle and high school classes, and our programs have been instrumental in helping in that regard (SNCP is part of the Eureka Series). State Parks provided both personnel for institute instruction (a senior-level naturalist-interpreter with an enormous range of skills), and visits by our participants to several State Park visitor centers in the general vicinity of Yosemite National Park.

While we were unable to create joint programs with the Director of Education at the **California Academy of Sciences** (Dr. Meg Burke), due to the fact that they were in transition to their newly renovated facility in Golden Gate Park, we did work very closely with one of their naturalist-scientists, **John Muir Laws**, who became an integral staff member for the institute. Mr. Laws not only helped develop much of the curriculum, but also prepared lessons and taught extensively during the institute.

Capacity Building: Collaborators—Sierra Nevada Naturalists and Conservation Scientists

We also were able to invite **David Lukas** onto our teaching staff. Mr. Lukas had recently completed his revision of *Sierra Nevada Natural History*, the renowned book originated by Storer and Usinger back in the 1970s. David is an exceptional naturalist and teacher, and made the Sierra Nevada come alive for all of our participants!

As mentioned above, Mr. Laws was an integral part of our staff. He is a brilliant naturalist/scientist, who also has extensive experience in developing nature journaling for young people. He is a talented visual artist and had just completed *The Laws Guide to Sierra Nevada Natural History* (co-published by CAS and the Heyday Press), which became one of our texts for the course.

Additionally, CIB was able to contract with **Lloyd Goldwasser, Ph.D.**, a consummate UC Berkeley ecologist/demographer, to help boost the rigor of the science content. To our delight, we also were able to engage **Ian Signer, M.A. Geog.**, as one of our outstanding instructors (Ian is a dynamic teacher and international conservationist who works for the Wildlife Conservation Society out of the Bronx Zoo.) And we worked with **Dr. Connie Millar**, a nationally-known forest ecologist out of the Pacific Southwest Field Station of USFS, to enhance our understanding of mitigation/adaptation management strategies in Sierran/White Mountain forests.

How did the Grant Increase CIB Capacity?

The funding granted by the Sierra Nevada Conservancy enabled CIB to attract the most brilliant, incomparable teaching staff this side of the Rockies for the course! It also enabled us to produce stellar publications and reproduce other highly relevant materials. **Thank You!**

And through the grant funding, CIB was able to provide high quality scientific and technological equipment for our teachers to use during the program. The equipment vastly improved their investigative ability as they worked through their experimental designs and stewardship projects (e.g. binoculars, computers, water testing kits, soil pH kits, cameras, headlamps, GPS units, insect aspirators, decomposition kits).

Momentum

With the momentum from the 2008 SNC grant, CIB was able to :

- (1) **Produce two more six-day Sierra Nevada teacher institutes in 2009**, one focused on secondary level teachers and climate change content (along with Grinnell scientific journaling and experimental design), and the other on nature journaling with Jack Laws. *The two 2009 institutes attracted 50 teachers!*
- (2) **Win a 2009 US EPA Environmental Education program (headquarters) grant** (which was one of only 13 subsequently awarded nationwide) for one of our proposed Sierra Nevada programs. We will be putting on that climate change program at Jack L. Boyd Outdoor School in June 2010!

DESCRIPTION OF PROJECT ACCOMPLISHMENTS

1. Most Significant Accomplishment

The major accomplishment of the Sierra Nevada Classroom Project was the pilot institute itself! We enrolled 25 intellectually curious and enthusiastic teachers from the Sierra Nevada counties as well as other regions of the state. We trained ten first-rate instructional staff, and we all taught at creek sites near the Wawona entrance to Yosemite National Park, at the Mariposa Grove, at state parks just outside the national park, and in state and national forest land. We focused the content on understanding the geological, climatological, hydrological, and ecological processes underlying California's major watershed (the Sierra Nevada), and the implications of global and local threats to these ecosystems, as well as to



Jack L. Boyd Outdoor School
Ian Signer exploring the geology of the Sierra Nevada with participants
Sierra Nevada Classroom Project G0770019

the state's human populations. All of these teachers then went back to their home schools to inspire student learning about (and informed action related to) the Sierra Nevada.

Through the pilot institute, SNCP fostered stewardship of public and private lands via personal experience in natural settings, appreciation of local biodiversity, and greater understanding of both regional issues and the functioning of natural systems within the Sierra Nevada.

2. WOW Factor

CIB brought in three top-notch naturalist/scientist/instructors, trained at CAS (Laws), at World Wildlife Society (Signer), and in the Sierra Nevada (Lukas). They were among the most charismatic teachers we have seen: able to provide content with great élan and enthusiasm, to share their love of the Sierra Nevada, and to highlight skills, especially journaling and observation skills, to share with the students of our participants.

3. Design and Implementation

We named the course a "pilot institute" with good reason: while we had worked hard in planning the course, we did not know if it would play out well with our target audience. Two issues stand out that might help other grantees:

- (1) Our "top-notch" instructors were unavailable for pre-planning sessions held monthly in Northern California. As a result, during the institute some planned lessons were pre-empted by instructors who had not participated in pre-institute training days. We have since required our instructors to attend at least one training day.
- (2) We had aimed our program at local issues, with a local audience in mind, but realized after the bulk of the planning that interest in this program was fully statewide. We are now aware of our statewide appeal, and although we focus on the Sierras Nevadas, we strongly emphasize connections to other parts of the state as well.

4. Indirect Impact

The content of the pilot course included the issue of global climate change and its impacts on Sierran ecosystems (and indirectly on all of California). It led, in 2009, to the creation of a focused climate change booklet of activities and background information for teachers. The booklet has been sent around to fellow educators, especially those working with teachers, and has become the source of inspiration for several major grant proposals that we have jointly presented to granting agencies this fall (2009). The same has occurred for two of the booklets/guides created by Mr. Laws for this institute: they are now the mainstay of our joint programs with Jack, and are attracting broader attention. And of course, while the effect may have been anticipated, it is clear that the program introduced many formerly unaware people to the wonders of the Sierra Nevada landscapes: state parks, national parks, state and national forests. Our program caused participants to look closely, observe, and pay attention.

5. Collaboration and Conflict Resolution

CIB staff worked well in collaboration with our counterparts at State Parks. The State Parks people are very close to our projects, so the cooperation between the two agencies is in lockstep, having worked together since 2004. Everything went smoothly with personnel at both Jack L. Boyd Outdoor School and CAS as we carried out the program.

6. Capacity-Building

Overall Health of CIB

The California Institute for Biodiversity is a 501(c)(3) not for profit corporation established in 1995. Our most recent 990 form computes a public support figure of 65%. Until 2009 the organization was doing very well financially, with substantial reserves, multiple five- and six-figure government grants (NOAA), and a good deal of support at the four-figure level from local private foundations. But this past year has been a very difficult one for the organization, despite the good news on the programmatic front: while the NOAA grant was extended for two more years, other sources have completely dried up, and we have had serious difficulties meeting our basic operating costs. All staff are on reduced time/salary, in the form of a 15% furlough, and we just laid off our first employee this past month. The state's freeze of Proposition 84 funds could not have occurred at a worse time.

Nevertheless, we were committed to putting on the two Sierra Nevada teacher institutes in summer 2009, as well as a full week NOAA science institute in the East Bay in August. All courses were deemed successful by participants. A potential Delta program was postponed until 2010.

Involvement of the Board

At the time of the project (2008), our Board of Directors was not involved in the Sierra program, except for their awareness of the grant and the capacity requirements of the program, especially staff size. But since early 2009 they have become more personally involved and supportive of Sierra programs.

Effects of the SNCP Project on Our Partners

State Parks: The Eureka Series, of which the SNCP is a constituent program, was conceived in 2004 to be a statewide series of *regional* programs that would be created by CIB, with logistical support from State Parks. This new vision was in counterpoint to our existing *Cal Alive!* program, which had looked at the *state as a whole*. We envisioned programs for large geographical blocks within the state, whose content would focus on more local geology, climate, ecology, and watershed. And all the programs were to consist of three elements: (1) in-depth teacher professional development including field investigations and stewardship projects, (2) publication of curricula and print materials for educators, and (3) development of student resources in the form of interactive multimedia delivered electronically (i.e., via CD-ROMs and the internet).

In keeping with this vision, State Parks and CIB have co-produced the following programs: (1) *Coast Alive!—Earth Wind Fire Water* aimed at the five southern California coastal counties, (2) *Coast Alive!—Land-Sea Interface* aimed at the central California coast, and (3) *Bay Alive!* a program in progress for the greater Bay Area. Those first coastal programs were supported in large part by the Coastal Conservancy of California, with the aim of reaching out to students, teachers and the public to share the good conservation work accomplished by the conservancy.

The development of the *Sierra Nevada Classroom Project* was not only the next logical step in the progression, but it also extended the program inland for the first time. Needless to say, State Parks personnel were thrilled with this move, and deem it a true expansion of our mutual outreach efforts.

The Outdoor School community in the Sierra Nevada: While many counties in the state have made available to their public (and private) schools a system of weeklong outdoor education experiences designed for 5th and 6th grade students (in some cases, middle and high school students as well), few if any have also offered similar programs for the teachers of these students, thus limiting the long-term impact of the weeklong experience once students return to the classroom. When CIB initiated weeklong programs for teachers using outdoor facilities (Jack L. Boyd Outdoor School for one), it opened the eyes and minds of the outdoor school administrators to the obvious benefits to them and their districts of having teachers experience the Sierra Nevada environment firsthand. CIB is now in discussion with officers and senior personnel of NatureBridge, which operates Yosemite Institute, regarding ways to provide focused professional development for the teachers of attending students.

7. Challenges

Internal Challenges: Despite efforts to limit the institute registrants to specific grade levels, we ended up with 25 teachers who taught everything from 3rd grade to high school biology. Our curriculum strained with the effort to make the course professionally relevant as well as personally rewarding. While our exit polls were remarkably positive, during our staff debriefs we realized that we had actually tried to put on two courses simultaneously. The secondary level teachers were especially keen on doing rigorous science and learning new investigative techniques, while the elementary level teachers were particularly taken with the aesthetics of the natural environment, and with learning how to engage their students. Since we had ten instructors on hand, we were able to be somewhat flexible in proposing small group work organized by grade level to accommodate these differences. But that effort was purely “on the fly,” and in retrospect, all staff recommended dividing the course into two courses: one aimed primarily at elementary teachers and one aimed at secondary teachers. We followed this advice in 2009, to great acclaim.

External Challenges: (1) Politics: (Author’s note: I am going to be very candid here) The very day we arrived at the SNC Board meeting (March 13, 2008) to have our award announced, the board became entrenched in a public discussion of the merits of awarding conservancy funds for outreach and education. From that point on, the subsequent overall sense of waning support from SNC for its awardee(s) became overwhelming and quite frankly, almost incapacitating. SNC staff who had

been in our corner, remarkably helpful and supportive, were suddenly absent or non-responsive. Instead of feeling that our project was respected and admired, we felt defensive and apologetic for doing education.

Nature education **is** one of the stated goals of Proposition 84. It is a legitimate use of public funds and our organization does a more than respectable job at it. The lack of understanding of some of our political appointees to this conservancy who have distorted the spirit of this proposition is astounding. On the bright side, the Chair of the Governing Board of the Conservancy, Mike Chrisman, started that same meeting with a lengthy and impassioned statement about the value of public education about what the conservancy is doing. I thank him for his statements, and hope that someday everyone will embrace the fact that without widespread public support and transparency, conservancies and propositions for clean water will lose the backing of the voters of this state.

(2) Content: It was hard to keep up with fast-moving events coming out of climate change science. We had based a lot of our material on the 2007 IPCC volumes, translated to California ecosystems by the various state agencies, and a lot of those projections were volatile. (Most of the controversies in 2008 have now evaporated.) We were conservative in our approach at the time, as a result.

(3) The Freeze: Obviously, the suspension of funds, of further action on our projects, and of future granting was a real challenge for all of your awardees, and surely our own organization suffered much, much less than many of your major awardees. CIB staff and board wish to profusely thank your Executive Officer Jim Branham for his frequent, sincere, and informative bulletins regarding the freeze and its impacts on funding of Prop 84 projects.

8. Photographs

Back in 2008, CIB was asked to submit photographs and videos taken during our institute, to be part of an annual report for the Conservancy. We were more than happy to respond at the time. And we are thrilled to submit to you in an appendix to this report many other photographs that are representative of the work SNC supported financially through this grant. If you would like more photos, or videos, do inquire with our tech staff; we have huge archives of our Sierra Nevada work, and will happily share them with SNC. Contact Tim Brocato at timothy@calalive.org

9. Post Grant Plans

Changes in Operations and Scope: The resounding success of the pilot Sierra Nevada Classroom Project motivated the CIB and State Park staff to offer two six-day institutes the following summer (2009). The first, which took place in late June 2009, was aimed at secondary level teachers, focusing on Climate Change and the Sierra Nevada, and introducing the tools of experimental design and scientific journaling. The second, which took place in mid-July 2009, was focused on nature journaling and was aimed at elementary level teachers.

Replication or Use of Findings:

- (1) We published a Climate Change curriculum, which we will use in our 2010 Institute and in our projected 2011 Climate Change Project (which consists of three separate one-week institutes: one in the Sierra Nevada, one in Monterey Bay, and one in Humboldt Bay).
- (2) We assessed teacher performance in both the 2008 and the two 2009 institutes. Those findings are being used to provide evidence of success to future funders.
- (3) We will evaluate impact of the programs (i.e., student performance and stewardship activities) for all Sierra Nevada institutes, as teachers find opportunities to use the curricula, the restoration tools, and the field investigation techniques that we modeled for them in the institutes.

Other Organizations We Expect to Involve

In 2009 we worked closely with State Parks, with Cal Academy of Sciences, and scientists from UC Berkeley's Museum of Vertebrate Zoology and the Pacific Southwest Field Station (US Forest Service). In 2010 we intend to collaborate with the same group of organizations. In 2011 we will add the Moss Landing Marine Lab (CSU San Jose), and CSU Humboldt and its marine lab for our Climate Change programs.

Plans to Support the Project Financially

2009: The two projects were supported largely internally.

2010: CIB has been awarded the US Environmental Protection Agency's Headquarters grant for Environmental Education (for our Sierra Nevada Climate Change program 2010). Only thirteen of these grants were awarded this year throughout the nation! We are very honored to have been selected. We will supplement the grant with corporate funds and possibly education funds from various district sources.

2011: CIB has filed a large grant proposal with US EPA again this winter, this time to fund not only our Sierra Nevada Climate Change program, but also to provide support for similar efforts in other bioregions of the state (pelagic ecosystems of the Pacific Ocean and Monterey Bay; and the coastal ecosystems and fisheries of the Humboldt Bay region). In addition, we hope to locate funding from corporate foundations and private foundations, as well as from various state conservation and educational agencies.

Communication Plans

CIB hopes to prepare a publishable curriculum on climate change effects in California; SNC helped to fund our original explorations into this work and will be acknowledged. We are also interested in producing a CD-ROM on this topic, should funding become available. We are planning to publish articles and newsletter notes about these programs in conservation and education publications.

10. Post Grant Contact

SNCP contact person at CIB: The Executive Director of the California Institute for Biodiversity, at 1660 School Street, Suite 105, Moraga, CA 94556, is the appropriate contact person for this project. The phone is (925) 631-2481. Generic email is info@calalive.org. Currently the E.D. is Dr. Carol J. Baird; her email address is below. In addition, SNC should also contact our Board of Directors; the current President of the board is William "Sandy" McCoy, at (510) 848-1991. His email address is also below.

caroljobaird@gmail.com
sandymccoy@mindspring.com

SNC-APPROVED PERFORMANCE MEASURES

Other than numbers of teachers and students, SNC did not identify specific Performance Measures for our 2008 project. Instead, we outlined with SNC staff a series of milestones, with related dates of completion. The California Institute for Biodiversity developed a successful Sierra Nevada institute for teachers and we will attempt to provide objective measurements of actual performance, where relevant, and also address the milestones by category.

Did we succeed in meeting our 2008 goals?

Numbers: 25 teachers completed our course during the Sierra Nevada Classroom Project, and 1250 students participated by using our curriculum and course materials, through field investigations and field stewardship activities, or a combination of both.

In addition, we circulated portions of the curriculum to twelve Sierra Nevada county offices of education, which then dispersed them among school districts in those counties (numbers vary). Fifty sets of curricula were distributed in all.

Content Knowledge: We found that the Sierra Nevada Classroom Project did equip teachers with the ecological knowledge needed to provide meaningful watershed experiences to their students. We also found that our institutes motivated teachers to use educational experiences that were effective in engaging student learning. And finally, that our institute did provide exciting exercises that lead to teachers engaging their students in outdoor field investigations or stewardship projects.

In order to make informed decisions about changes to the institute, we developed evaluation questions. Evaluation questions relate directly to the learning goals we established for the institute. Evaluation tools were created and used to measure our results. Several different means of data collection were used with our target audience.

Pedagogical Skills

One of our project objectives asked us to equip teachers with the ecological knowledge they will need to provide meaningful watershed experiences to their students. The evaluation question was:

Does inquiry based learning help teachers achieve a better understanding of their local watershed systems?

Assumptions: If inquiry-based learning is an appropriate learning style for teachers attending our six-day institute, we will see evidence that they have discovered what a watershed is and how it was formed, they will have been able to trace waterways from the high Sierra Nevada to the sea, they will have been able to explore how the local flora and fauna have adapted, and finally, they will have left the institute with a deeper understanding of the processes underlying these systems.

During the institute, ten instructors presented content in multiple ways in order to reinforce understanding on how watersheds form, how the Sierra Nevada interconnects with the rest of the state, how plants and animals live here, and how people fit in. Teachers were asked what sort of experiences would help their students grasp how the Sierra Nevada watershed and snow pack works and why we need to protect it.

With data gained from the pre-test and post-test, we determined that inquiry-based learning is a successful method for teachers to achieve a better understanding of their local watershed systems.

Methods

A pre-test and post-test written examination [Appendix A] was given to each participating teacher. Specific questions were selected to demonstrate teachers' knowledge of the Sierra Nevada. Of the 25 teachers who attended the institute, 20 teachers completed both the pre-test and the post-test. For the purpose of evaluation, we considered the test-sets [pre and post] from these 20 teachers the "entire population" and used their responses to answer our evaluation question.

The pre-test was given on the first day of the institute. Twenty-five minutes were allowed to answer 15 questions. The same questions were again asked at the end of the course. Time to answer these questions was again restricted to 25 minutes.

Of the 25 test questions, 14 questions on each test-set specifically related to the ecological knowledge needed to understand watershed and hydrologic systems. The number of correct answers for each of these questions from the pre-test was compared to the number of correct answers for each of these questions on the post-test in order to assess whether teachers gained this knowledge.

There was a 25% improvement from pre-test to post test as a whole, and a 40% improvement on the questions specifically related to that watershed knowledge. Teachers demonstrated a clear understanding of the material presented. **Please see Table 1, attached, for the data, and a graphical representation of teacher improvement.**

The ecological knowledge of the Sierra Nevada was presented in a way that lead to teachers having a better understanding of their local watershed systems. The use of inquiry based learning, including presenting content in multiple ways, did reinforce understanding of the material.

Inquiry based learning is the correct way to present material. We will continue to adhere to our instructional design and use this method of learning as the primary way to instruct teachers. Our future institutes will incorporate activities that support engagement, discovery, and "doing science."

Impact

Another project objective asked if we motivated teachers to use educational experiences that were effective in engaging student learning. The evaluation question was:

Are teachers presenting new knowledge, skills, and activities to their students?

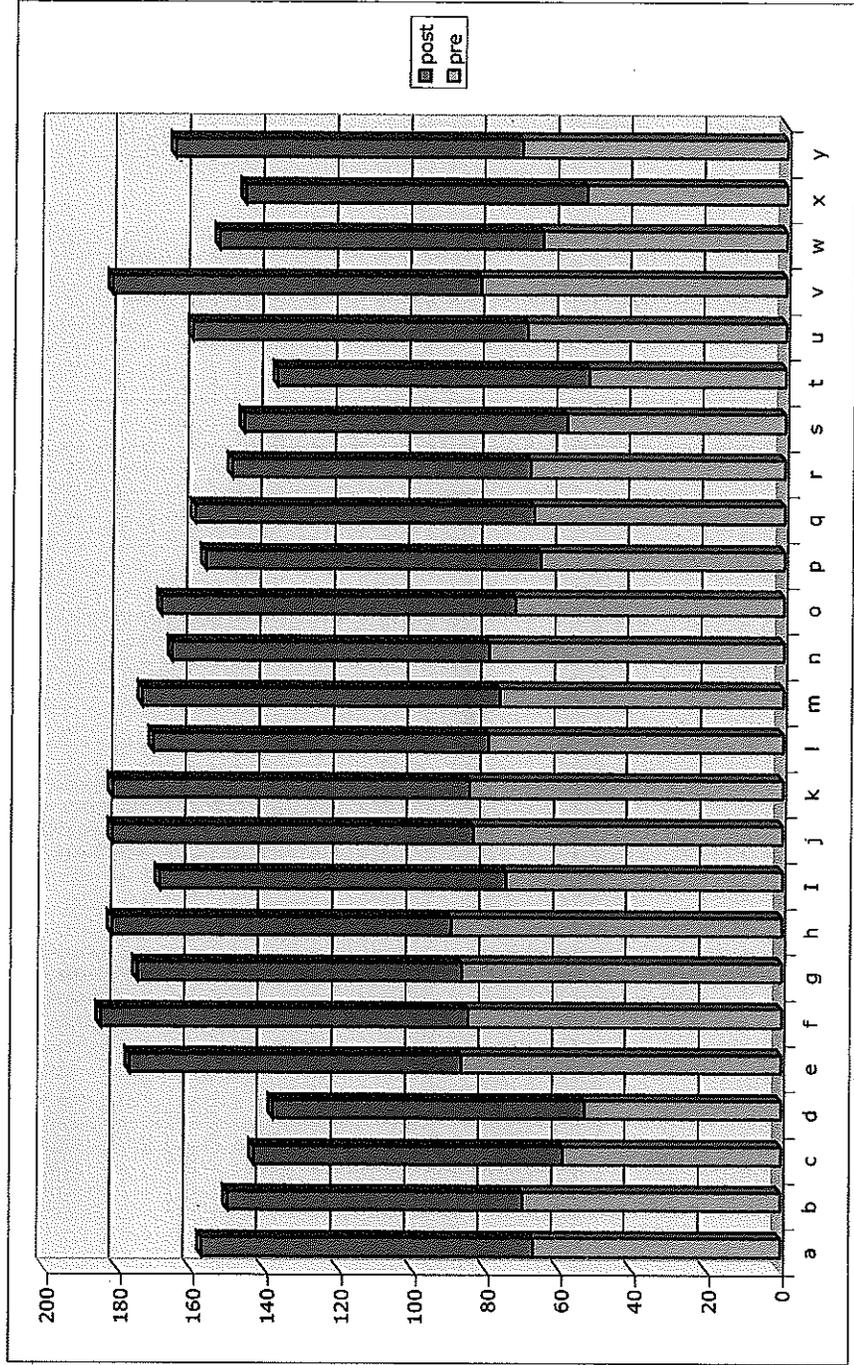
If using activities is an appropriate way to present new knowledge, skills and activities to students, then teachers will return to their classroom and present these activities to their students. Using this strategy will enable teachers to leave the institute with a deeper understanding of the Sierra Nevada.

During the institute, instructors modeled activities in multiple ways, using a variety of learning modalities. Lectures were replaced by hands-on activities, many using inquiry or "discovery." Teachers were asked to become the "students" and to actively participate. We determined that using activities is a successful method to achieve a better understanding of the Sierra Nevada.

Teachers were asked during the course of the institute if they would use the activities. We also watched as they engaged in each activity and we asked for comments on the exit questions. They reported that they would use our materials and that they had a positive experience. They reported that modeling and actually doing the activities helped them present these activities to their students. And many teachers emphasized that having a comfort level with the material made them effective in engaging student learning.

TABLE 1, PICTURE A: ASSESSMENT SCORES
Sierra Nevada Classroom Project; 25 TEACHERS

mean pre = 72.5
 mean post = 90.8
 difference = 18.3



Here is what they said:

"Science journaling has been the most wonderful experience I have had and I can take it to my students."

"The knowledge and teacher skills of the staff were outstanding. Actually participating in the activities was very powerful. I found the experience of being in the Sierras exceptionally inspiring and rejuvenating."

"My science class will be much better because my students will be better observers, notice details, and be able to document and communicate these better."

"I gained a much deeper appreciation for the Sierra Nevada and all that it provides me. I also gained a different and more applicable and user friendly way to "do" science."

"I felt energized through Jack and David's presentations. How their eyes sparkled when they talked about their passion."

Our Teacher Institute modeled activities for teachers to present new knowledge, skills, and activities to their students. This strategy led to teachers having a better understanding of their local watershed systems. Modeling activities for teachers during the institute did motivate teachers to use educational experiences that were effective in engaging student learning.

Another project objective asked us to provide teachers with exciting hands-on field investigation opportunities that lead to engaging their students in outdoor field investigations or stewardship opportunities. The evaluation question was:

Does the Institute result in teachers taking their students outdoors for a meaningful watershed or a stewardship project?

Our Institute enabled teachers to leave the institute with the ability to take their student outdoors. Teachers were asked if they would.

Here is what they said

"Science does not just come out of a science book. My outdoor experiences can be converted into science, and that in depth science experiences can make us see and love the world, and can make us take on stewardship."

"Going into the field with a lot with knowledgeable people was the most beneficial."

"I loved finally getting to see and experience the Mariposa Grove! It will be a memory to cherish. I hope to get some of my fellow science teachers here next summer!"

Our Institute provided teachers with the tools to take their students out and many did.

Final Recommendation

After careful review of our objectives and review of the teachers responses, we recommend our institutes continue to be presented in the Sierra Nevada and that they incorporate as many activities as possible that support engagement, discovery, inquiry, and “doing science.” Key to this inquiry learning style is modeling activities for teachers and providing the field and stewardship experiences for their students.

Milestones

Planning

The SNCP team met multiple times to develop the overall project and finalize a syllabus for the institute. By the end of January 2008, we had posted our application data online, and successfully recruited teachers over the next few months.

Publications

CIB produced a student CD-ROM, *The Frog Experiment*, based on real data on Sierran frog species, to be used during the institute. We also completed and published three booklets—“Rapid Biological Assessment” and two instructional guides to accompany *The Laws Field Guide to the Sierra Nevada Natural History*. The Sierra Nevada Conservancy has copies of all of these publications, sent along with interim reports, in 2008.

Requisitions

As of mid-June 2008, CIB had ordered and received equipment, supplies, media, and books for the institute.

Training of Instructors and Implementation of the Institute

CIB ran two two-day training sessions for our ten instructors. In July, we implemented both weeks of the pilot Sierra Nevada Classroom Project. Several visitors from SNC attended the first week of the program. They were able to describe to the participants the role of SNC in the Sierra Nevada, and their support for our project.

Distribution of Curricula

This milestone was interrupted by the freeze on Proposition 84 funds and related activities. It was resumed in November and December 2009, after notification from SNC for grantees to go ahead and finish up projects. CIB and State Park personnel visited twelve county offices of education in the Sierra Nevada and distributed curricula to curriculum specialists who then dispersed our curricula to many school districts per county. In all, fifty sets were dispersed.

Impact

Participating teachers began to use SNCP activities—both classroom and field—with their students in the 2008-2009 school year. This process is still on-going, as some districts only allow a certain number of field excursions per school each year.



Jack L. Boyd Outdoor School
David Lukas discussing different plant strategies to attract pollinators
Sierra Nevada Classroom Project G0770019



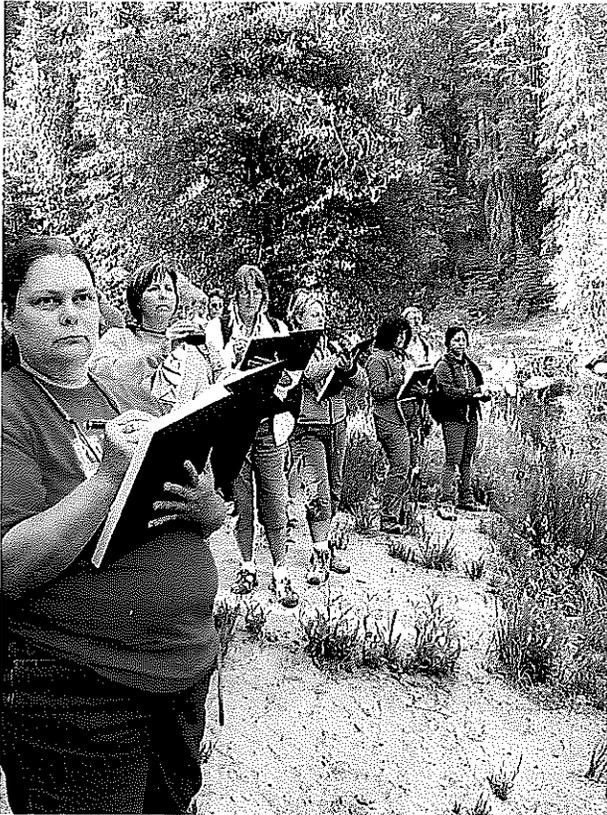
Jack L. Boyd Outdoor School
2008 Sierra Nevada Classroom Project Teachers, Scientist, and Staff
Sierra Nevada Classroom Project G0770019



Jack L. Boyd Outdoor School
Participants conduct experiments with local soil samples
Sierra Nevada Classroom Project G0770019



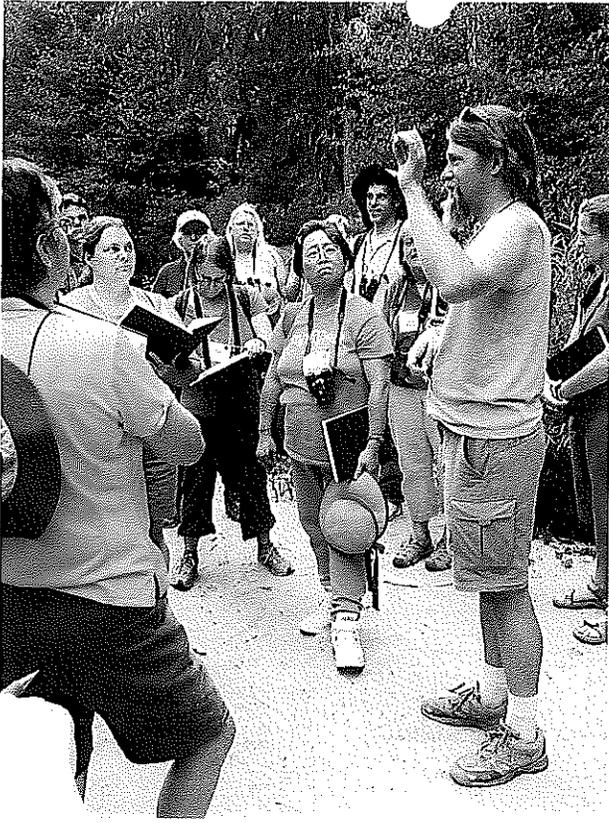
Jack L. Boyd Outdoor School
Ian Signer using a field guide to identify fauna on a hike
Sierra Nevada Classroom Project G0770019



Jack L. Boyd Outdoor School
Participants practice observation skills and scientific documentation in the field
Sierra Nevada Classroom Project G0770019



Jack L. Boyd Outdoor School
Participants record important aspects of the Sierra Nevada watershed
Sierra Nevada Classroom Project G0770019



Jack L. Boyd Outdoor School
 David Lukas outlining the formation of the Sierra Nevada Mountain Range
 Sierra Nevada Classroom Project G0770019



Jack L. Boyd Outdoor School
 Participant journal and observation sketches from the institute
 Sierra Nevada Classroom Project G0770019



Jack L. Boyd Outdoor School
 Jack Laws demonstrating bird behavior
 Sierra Nevada Classroom Project G0770019



Jack L. Boyd Outdoor School
 Participants learn about techniques for sampling biodiversity in the field
 Sierra Nevada Classroom Project G0770019