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: **Eastern Sierra Institute for Collaborative Education**

Project title: **Eastern Sierra Watershed Project**

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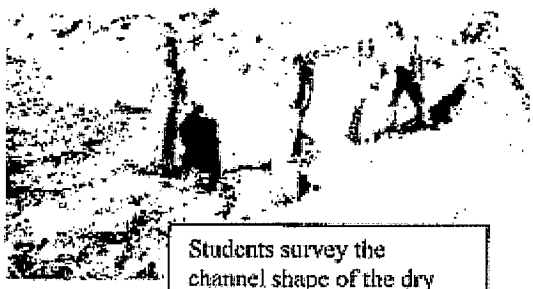
____ 6-Month Progress Report
___x__ Final Report

A. Progress Report Summary

a. **Maintain ESWP's school-based watershed education program.** In December 2006, the Los Angeles Department of Water and Power returned water to 63 miles of the Lower Owens River that had essentially been dry since it was diverted to Los Angeles in 1913. Since 2002 middle school students have been collecting data to document the changes in vegetation, soils, wildlife, aquatic life, stream channel shape and water quality that are occurring along the river. The once dry channel is now flowing with waist deep water, supporting a vast array of aquatic and terrestrial life. In the spring of 2009 one student sighted a mink swimming across the river. The photos below show the dramatic changes the students are able to witness.



Students survey the channel shape of the dry river channel 2005.

Fall 2009, same location, big changes.

At the elementary school level, in partnership with the Bureau of Land Management, the ESWP established field and classroom programs at Fish Slough, a designated Area of Critical Ecological Concern, so designated for its unique habitat that is the home to ten rare plants and the endangered Owens pupfish. Over 400 students each year spend

the day with local scientists and trained docents learning about the archeology, geology, plants and aquatic ecology of Fish Slough. Teachers participating in the Watershed Program tell us they have witnessed firsthand the way active participation in science activities in the field and classroom sparks their students' interest, engagement, and learning. From May 2008 to December 2009, 1,685 students from 5 grade levels participated in the Eastern Sierra Watershed Project's field studies.

In the field the students are broken into small groups of 4 – 8 students allowing every student the opportunity to actively participate in the monitoring activities and learn to use the same scientific equipment used by field scientists. Each small student group is led by a trained community docent. In 2008 and 2009, 30 community docents volunteered over 300 days teaching students about the local watershed and the life it supports.

For each of ESWP's field programs, pre and post classroom hands-on materials are provided to classroom teachers. These materials integrate the field experiences into the classroom. ESWP has over 50 science kits which provide all the materials needed for teachers to extend the field trip back to the classroom. Over the summer all kits are cleaned and restocked by ESWP staff for use during the next school year.

b. **Develop online access to student data.** Beginning in 2002, students began collecting data on the Owens River Watershed. Sixth grade students are introduced to watershed monitoring as they study the health of local creeks. Each school works on a creek near their school collecting data on water quality, streamside vegetation, stream flow, fish and aquatic invertebrates. Seventh and eighth grade students travel to the Lower Owens River to monitor changes due to the rewatering. As 7th graders, they participate in an invasive species monitoring project to see how the re-watering affects native and introduced species on the Lower Owens River. They return to the Lower Owens River as 8th graders to monitor the physical changes, such as changes to stream channel shape, occurring in the riverbed. A database consultant was hired and together with ESWP staff, eight years of data was sorted and entered into a Microsoft Access and can be downloaded from our website: [redacted].

c. **Paiute Mountain School/Camp.** A revised timeline was developed to complete all PMSC activities by September 2008. The PMSC was held in the Sierra Nevada Mountains on Coyote Flats, on July 14-18, 2008. Forty-eight Paiute youth attended, with an adult staff of four speakers, two cooks, and eight counselors. The number of youth attending the camp was down from the previous year's attendance of 55. This is attributed to the large number of youth that had become too old to attend. The camp is open to youth 10 – 14. In the future it is hoped that a second week of camp will be held for youth 15-18. On July 3, the Eastern Sierra Watershed Project (ESWP) trained the PMSC staff. The staff was trained to present the following ESWP field activities: Wildlife Track and Scat Identification, Water Quality Testing and an Aquatic Invertebrate Survey. The PMSC integrated these scientific activities with their traditional skills workshops, focusing on the importance of preservation and conservation of water and land resources. Two ESWP staff members conducted the training, with 4 members of the PMSC staff attending.

The recruitment of all counselors, speakers, cooks, drivers for the 2009 summer started immediately following the close of this year's camp and will continue up until the day of camp departure. Nine members of this year's staff and drivers have agreed to return next summer. A draft recruitment flyer for next year's camp has been designed (attached). Workshops ideas for the 2009 camp include: incorporating traditional uses of native plants with a presentation from a botanist on native plants, having an archeologist present the scientific perspective on the value of learning from the past.

A two-hour watershed information workshop was held in August as part of the PMSC Stewardship program. During this workshop five young adults and one adult assistant participated in the ESWP activities. This workshop was held with hopes of interesting these older youth in participating at next year's PMSC as junior counselors. At the end of the workshop, the adult assistant and 3 of the youth expressed interest in becoming counselors for our next year's camp.

B. Statement of tasks or milestones completed.

a. Maintain ESWP's school-based watershed education program. From May 2008 to December 2009, 1,685 students from 5 grade levels from 9 schools participated in the Eastern Sierra Watershed Project's field studies.

Participation 4/08 – 11/08:

13 middle school classes, 386 students, 10 teachers
18 elementary school classes, 362 students, 18 teachers
42 science kits for use in classrooms
20 docents worked 83 docent field days

Participation 4/09 – 12/09

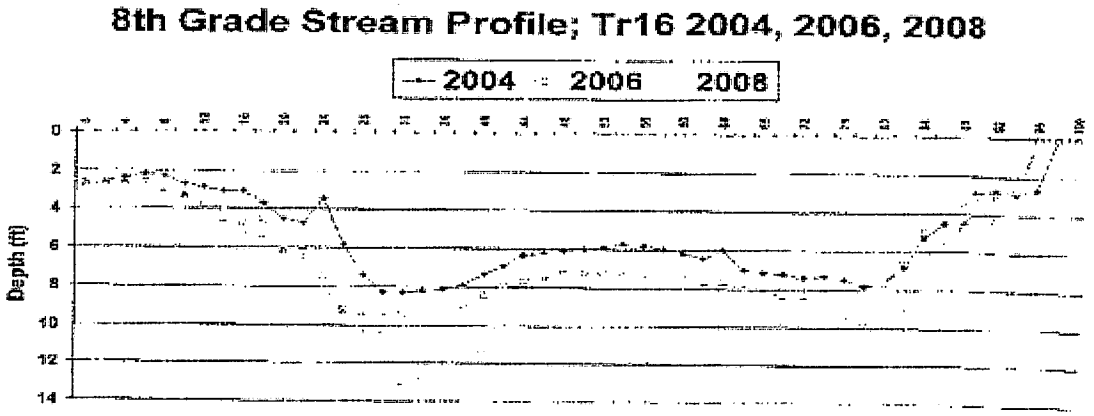
13 middle school classes, 437 students, 10 teachers
18 elementary school classes, 311 students, 17 teachers
50 science kits for use in classrooms
22 docents worked 118 docent field days

Each year 5 docent training days were held where docents received training conducted by ESWP staff and local scientists.

b. Develop online access to student data. Since the inception of ESWP, one of our long term goals was to have the student collected data in a format where students can retrieve past year's data for comparison and analysis. Development of a database turned out to be a much bigger undertaking than anticipated due to the diversity of data the students have collected over the past 8 years. In the fall of 2008, the Inyo County Office Education and ESWP staff hosted a workshop for the Inyo County middle school teachers (7 of 10 middle teachers attended) to work with a database consultant on the design of the database. This project was suspended during the winter of 2009, but was resumed in the late spring with a focus on the 6th grade creek study program. A

workshop was held for the 6th grade teachers on use of the database in the classroom. A database worksheet was developed (see attachments). Teacher comments and evaluations were used to improve the worksheet and database for the next year. In the fall of 2009 a docent/teacher training workshop was held on the 8th grade data. Input from that workshop was incorporated into the database and worksheet. ESWP staff went into an 8th grade classroom and worked with the students on data analysis to evaluate student use of the database and worksheets. Our observations were that the 8th graders learned quickly to navigate around the database, but need guidance on using data to make inferences and draw conclusion. This was the opposite of our experience with the adults at our database workshops, who had much more trouble locating a single fact, but were very interested and involved in the process of analysis. From these experiences we reworked the 8th grade student worksheet to help guide the students through the scientific process of using data to support a hypothesis, encouraging them to use critical thinking skill.

At the 2008 teacher workshop we surveyed the teachers to determine the methods they currently used and time spent with their students on data analysis following the field program. The majority spent one class period reviewing the data. Two of the teachers that have participated in ESWP since the inception, commented that they often spend 2 or more days just to summarize the data collected by the students. With the creation of the database teachers can now use classroom time with the students on analysis of data, rather than days to create a class summary of the data recorded by each student in their field journals. A common comment in the first data workshop was that the students need more practice reading and interpreting graphs. Exposure to different kinds of graphs (line, bar, pie charts) was requested. Teachers who used the database with their class felt that the time spent on data analysis after the field trip was better used and they felt that the use of computers as opposed to large sheets of paper strung across their blackboard continued the theme of ESWP to introduce students to the methods used by scientist. Below is a graph from the database that illustrates how the stream increased close to 5' in depth since the introduction of water to the Lower Owens River.



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C. Paiute Mountain School/Camp. Project completed fall 2008. Final report and evaluation received by ESICE.

C. Challenges or opportunities. All California schools have been hard hit with by the budget deficit. Since the beginning of ESWP the schools have funded the bussing to the field sites, which can run as high as $500 per day for trips that involve a 100 miles of driving. With school budget cuts, field trips are often first to go. We are constantly working with the school on ways to keep the field trips going. In 2009, we provided financial support to 2 schools that would not have been able to afford to bus their students. One option we are exploring for the future includes the possibility of the bus from one school district to pick up students from another school district. Another possibility we are working on is reorganization of our field programs to handle more students in one day, while still maintaining the low student to adult ration necessary to ensure each student is able to fully participate in the hands-on activities. This option will involve the purchase of more field equipment and the availability of double the number of docents on a single day, but will save on the number of bus trips.

One of our ongoing challenges is to pick dates for teacher workshops allowing the maximum number of teachers to attend. There is never a date everyone can make it. In addition to holding a teacher training workshop, ESWP staff went into the classroom and presented the database to the students, allowing the teacher to observe. The benefits of this method is a chance for us to directly observe how the students access the knowledge they had retained from the field trip and how they were able to use it when working with the database. The downside was that the teacher is not able to ask questions and comment on the materials as they are being presented. Teacher workshops also enable the teachers to interact with the database consultant, the County technology Coordinator and the other science teachers. We will continue to hold teacher workshops, with the next to be held this spring on the 7th grade data, as due to the timing of the grant and the suspension of funds last spring, we have not met with the 7th grade science teachers to review and evaluate their data and worksheet.

D. Unanticipated Successes Achieved.

All schools throughout Inyo County have experienced an increase in their standardized science test scores since the beginning of the Eastern Sierra Watershed Project. In 2004, 31% of the 5th grade students scored "proficient" or above. Last year, 2009, Inyo County test scores had increased to 46% scoring "proficient" or above. An even greater increase was seen at the 8th grade level. The first testing in science of 8th grade students was in 2006, with 37% of the counties' students scoring "proficient" or above. In 2009, 63% scored "proficient" or above. Looking at each individual school in the county, all have seen an increase in student 8th grade science scores of at least 20%. ESWP is certainly not the only factor that contributed to the rise in science scores in Inyo County, but it has brought hands-on standards based science programs into classrooms throughout Inyo County and provided the opportunity for students to experience real world science outside of the classroom. Continuing to providing a strong science education program throughout Inyo County schools will insure that:

- Students are prepared for high school science courses
- Increase enrollment in advanced high school science courses
- Local students will choose to further their studies in science, and then be able to return to the Inyo County qualified for resource management, engineering, medicine and other science-based jobs that constitute a majority of professional careers in the area.

Experience in field activities coupled with classroom activities creates the perfect environment for children to explore, question, and seek answers about the world they live in. Science education can provide opportunities for all students to engage in activities involving investigation, inquiry, critical thinking and experimentation processes. ESWP seeks to increase student interest, involvement and capability in science within our schools.

E. **Compare Actual Costs to Budgeted Costs**

PROJECT BUDGET CATEGORIES	Budgeted SNC Dollars	Actual Dollars
Project Manager Salaries	69,400.00	69,400.06
Teacher development/speakers/training	3,000.00	2,999.92
Supplies	1,600.00	1,599.95
Transportation	2,200.00	2,188.57
Online data costs	5,000.00	5,000.00
Administrative indirect costs	10,400.00	10,400.00
GRAND TOTAL	**$91,600.00**	**$91,588.50**

F. **Materials Produced.** Attached are the database worksheets for use with the middle school students. Attached are photos from the field program, sample field journals and news articles that appeared in the local papers. Also attached are letters we received from participating students. All PMSC materials were included in the October 2008 6 month report.

G. **Next Steps:** The project will continue to provide field and classroom programs for all Inyo County students. This spring the 7th graders will travel to the Lower Owens River to collect data on native and introduced species. A teacher /docent workshop will be held to review and evaluate the 7th grade database. Students will use the database to analysis how the rewatering has impacted both native and introduced plants, animals and aquatic invertebrates. Later this spring the 6th grade students will collect data on creeks within the Owens River Watershed and will develop critical thinking skill through data comparisons.

H. **Resources Leveraged:** chart below lists funds awarded for ESWP in 2008-9 and in-kind services leveraged. The Federal Challenge Cost Share Program and the Bureau of Land Management "Take It Outside" needed non federal matching which was matched both by Sierra Nevada Conservancy and private local foundations

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Source	Funds awarded
Federal Challenge Cost Share Program	$7,635
Bureau of Land Management "Take It Outside"	$4,900
Branson Foundation	$18,480
US Fish and Wildlife Service	$21,978
Sunset Foundation	$12,300
TOTAL	**$62,293**

In-kind	Value
Agency scientist teaching students in the field and assisting with program	$6,000
Docent training days, no stipend received	$4,500
Inyo County Office of Education staff time for teacher training workshops , building usage, computers, copies and laminating	$2,500
Equipment loaned from agencies	$4,000
School provided busing and substitute teachers	$9,000
TOTAL	**$26,000**

J. Capacity-Building Results and collaboration and cooperation with Stakeholders:

Our partnerships with local agencies were strengthened through greater involvement of scientist in ESWP. In the fall of 2008, the US Fish and Wildlife Service sent 3 biologists to assist with our 4th grade Fish Slough Program. They worked as docents teaching students for 3 days in the field. We met one day after the program to talk about future funding possibilities. Through these connections, we received the Federal Challenge Cost Share grant and the funding from the US Fish and Wildlife Service to work on a desert fish education program. This funding will be used in 2010 to continue our Fish Slough education program and to initiate a public education program on the native fish of the Owens River watershed. Local high school graphic arts students will work on a traveling display to educate students and the public on the plight of the 4 species of fish native to the Owens Valley and the importance of protecting their aquatic habitats.

Beginning in 2008 and again in 2009, ESWP participated in the Community Earth Day Celebration and the Celebrating Wildlife Festival. Both are community events where 75 – 100 people visited our booth to learn about our programs and participate in the hands-on science activities we designed to interest the community in our watershed education program. ESICE is currently working with the Paiute Tribe on a proposal to start a weekend enrichment program for native youth which would include a watershed education component.

K. Project Accomplishments:

1. **How did the Project succeed in accomplishing its intent?** The Eastern Sierra Watershed Project was designed to build as the students experience the field studies from 2nd to 8th grade. By introducing students at an early age to the wonders of science and then increasing the complexity of the explorations they are able to develop critical thinking skills so vital in when making decisions affecting the environment. By eight grade students have been exposed to the multitude of factors that play a role in the health of a watershed. They have learned how to use data to support their ideas and to seek additional information if needed before drawing conclusion. The youth attending the Paiute Mountain School were given the opportunity to work with their elders on integrating modern science with their traditional knowledge.
2. **Describe any follow-on or indirect benefits resulting from the Project.** ESWP has developed a strong docent program. It has brought together community members with both an interest education and the environment. Through ESWP docents meet local scientist, agency land managers and other members of the community with similar

interest. Docents learn of other programs where community volunteers are needed and they step up. ESWP docents are now volunteering as Archeology Site Stewards, Fish Slough pupfish patrol, organizers of the Community Earth Day and many other volunteer roles in our community.

3. **Describe any significant experiences, unanticipated results or noteworthy events that create a "wow" factor.** Wow is what was said when one of the 7th grade student sighted a small mammal swimming across the Lower Owens River and climbing up to look at the curious creatures standing open mouthed and pointing. This little mink caused a great deal of excitement among the student and docents on the river that day. This is just one of many changes occurring due to the rewatering that has been documented by local students. The once dry river is now teaming with aquatic invertebrates, supporting a variety of wildlife, and slowly developing into a productive riparian corridor.
4. **Describe any lessons learned.** Data management is complex and what seems like a simple project can be much more involved that originally estimated, even by a professional. It was not the quantity of data that we had collected, but the variety. Each set of data was slightly different and needed to be expressed in different way. The database consultant we hired was great at helping us understand how to best display the information we had, though we were all surprised at the amount of time it took to render our masses of paper files into a usable electronic form. The amount of funding we budgeted for was enough to get 8 years of student data into the database with graphing capabilities. Currently the database is available on our website, [redacted], and can be downloaded for use in Microsoft Access. Additional funds will be sought to convert the database to the format need for interactive online use.
5. **How do you intend to share the results of your work on this project?** Newspaper articles share what the students are doing with the local community. The student data is available for anyone to view. We have sent out two mailings seeking more community support and also letting more community members know about our program. We have made presentations at the local rotary clubs and will have a booth at a number of community events this year. We will be meeting with County Water Department and the Los Angeles Department of Water staff to share the information collected by the students on the Lower Owens River restoration project.