

Case Study: El Dorado County Resource Conservation District

Watershed: South Fork American River

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Year	Grant Program	Project Title	Watershed	Award Amount
2007-2010	CALFED Watershed Program	Watershed Education Summit	South Fork American	\$50,000

This case study involves an assessment of one project grant received by the El Dorado County Resource Conservation District. Findings are based on interviews with project organizers and agency partners.

Overview

The Watershed Education Summit (WES) engages 60-80 high school students annually in watershed education and monitoring activities during a four-day event in the South Fork American River watershed. The summit originated in 1996 and was inspired by an Oak Ridge High School teacher's enthusiasm about opportunities to involve local students with emerging watershed assessments in response to the 1992 Cleveland fire. The teacher convened colleagues and representatives from Eldorado National Forest to explore possibilities to monitor watershed health in the fire's footprint with students. After securing a \$25,000 grant from Intel Corporation, the first annual WES was held in 1997. Three years into the program, the El Dorado County Resource Conservation District (RCD) took over project management and funded several years of the program through RCD funds and state grants, including the 2007 CALFED watershed grant. All high schools in El Dorado County participate in WES, including Oak Ridge High School, Golden Sierra High School, Union Mine High School, Ponderosa High School, El Dorado High School, and Forest Hill High School. In 2017, WES celebrated its 20-year anniversary and continues to spark excitement among the El Dorado County high school students, teachers, and specialists.

South Fork American Watershed

The South Fork American watershed stretches from its headwaters at the Sierra Crest to the Folsom Reservoir. Major tributaries to the South Fork American River include: Silver Creek, South Fork Silver Creek, Jones Fork Silver Creek, Rock Creek, Weber Creek, and Caples Creek. The watershed covers a land area of 537,166 acres, encompassing central El Dorado County and a small portion of Alpine County. Placerville is the only incorporated city in the watershed, however numerous small communities, many of which are historic mining and logging areas, exist throughout the watershed. Dominant land uses include high density residential, agricultural, and industrial land. There is also land designated as open space, including parks and recreation uses. The Eldorado National Forest manages 47% of the watershed, and approximately 51% of the watershed is privately owned.

Watershed Education Summit

Since its origins in 1997, the primary objectives for the WES program have focused on students' experience in learning watershed-monitoring techniques, connecting classroom lessons to on-the-ground application, and providing students exposure to natural resource career choices. These objectives have remained consistent throughout the WES program, including the CALFED-funded years between 2007 and 2010. The CalFed grant did not introduce new elements to the program but did contribute to the continuation and longevity of the WES program by providing essential support for updated watershed monitoring equipment, camping gear, and supplies. Since outcomes from individual years are difficult to untangle, outcomes from the WES program as a whole will be discussed in this summary report. Data collected through WES monitoring aims to improve watershed conditions through increased understanding and achieved through a comprehensive, long-term data set shared with natural resource decision-makers in the South Fork American watershed.

Process and Outcomes

Every year, teachers from each of El Dorado County's six high schools select, on average, ten – 16 students to participate in the WES program. Each school has its own process for selecting students to participate in WES, though typically, students apply and are selected through a competitive application process. Students selected typically demonstrate high levels of academic achievement. WES occurs on the last week of September, beginning on a Wednesday evening and lasting through Saturday, usually at Wench Creek Campground where students monitor adjacent streams, including Jones Fork Silver Creek, Wench Creek, Big Silver, Long Canyon and South Fork Rubicon. During a few intermittent years, WES was hosted at "active management" sites, where students had unique opportunities to monitor and learn about ecosystems recently affected by fires and other disturbances.

Beyond monitoring activities, WES promotes a holistic approach where students learn broadly about natural resource issues and realize their impact and role in the watershed ecosystem. The event kicks off with presentations from natural resource experts and a blessing and drum circle led by a Tribal representative. Tribal participation grew out of the RCD's relationship with the Foothill Indian Education Alliance (Alliance), which shares an office building with the RCD. Members of the Alliance are invited to participate in WES every year. On the first morning of the event, students are divided into small groups containing at least one teacher-chaperone, one or more scientists from the various participating agencies, and a monitoring assignment (i.e., substrate pebble counts, stream gradient and stream water flow, benthic macro invertebrate sampling, water quality testing, fish sampling by electroshocking, cross-sections, pool tail measurements, pool max depths, and GPS of large woody debris). Survey techniques are consistent with the Stream Condition Inventory (SCI) protocol developed by the Pacific Southwest Region (Region 5) of the U.S. Forest Service. Preceding the event, teachers attend a certification training and quality control session to become familiar with survey techniques and increase credibility and accuracy of the data to be collected.

Data collected through WES helps the Eldorado National Forest monitor and determine natural levels of variability in stream function, enabling comparisons when events, such as major fires,

impact WES-monitored watersheds or watersheds with similar biophysical properties. Interview participants recognized the significance of consistent data collected through the WES program because the Forest Service can be challenged to conduct long-term monitoring programs due to frequent shifts in personnel, budgets, and prioritization.

According to interview participants and program documents, WES data has contributed to the Eldorado National Forest's stream survey database and has influenced stream management decisions made by the Forest Service, Sacramento Municipal Utility District (SMUD), and other leaders in natural resource management. For example, in the early 2000's, WES data revealed high levels of sedimentation downstream of an active off-highway vehicle (OHV) and dispersed camping area along Jones Fork Silver Creek. Findings prompted the Forest Service to block user-created roads and reestablish native riparian plant communities. WES data later indicated improved creek health with decreased sedimentation. In the mid 2000's, WES data informed the SMUD's hydropower relicensing process for a diversion dam on the South Fork Rubicon River. WES data revealed decreased water quality downstream of the dam. As a result, flows were increased and large wood caught by the dam were placed downstream.

While the data collection itself has been useful, WES leaders emphasized that the most important outcome involves student learning. As one informant summarized, WES builds awareness of watershed issues, encourages engagement, and ignites a sense of responsibility among students. In numerous cases, WES exposure has influenced career decisions for alumni, which supports the program's goal to inspire stewardship practices beyond participation in the program. Student exposure to WES activities is not limited to El Dorado County. In the early 2000s, the Tahoe-Baikal Institute helped facilitate an international "environmental exchange" between students and teachers from Lake Baikal, Russia and El Dorado County. Using information and monitoring techniques from the WES program, visiting students and teachers established a similar program in Lake Baikal. In 2012, Sierra Watershed Education Partnerships (SWEP) and South Tahoe Environmental Education Coalition (STEEC) adapted the WES program to the Lake Tahoe and Truckee region and established an annual Tahoe Basin Watershed Education Summit (TBWES). Expansion of the WES program is a major accomplishment for WES organizers and participants and represents continuous opportunities for program growth.

Challenges

As reflected in interviews, safety is a key concern and priority of organizers during the WES event. Safety issues can arise through unpredictable weather, the geomorphology of the creek beds (e.g., slick surfaces, size of the stream), or unwelcomed public use of the area (e.g., public users engaging in violent or illegal activities near the site). WES organizers suggested a few categories of key considerations when selecting a suitable host site including: campground site availability and site characteristics (e.g., sufficient open space and parking), forest infrastructure (e.g., avoiding hazard trees in burned areas), and stream properties (e.g., small and able to wade). Despite the inevitable hazards that arise, project organizers agree that it should not deter the program from occurring. One informant reflected, "Every year is different and there will always be issues. The important thing is to just get out there and then adapt to issues as they arise."

Key Findings

The WES program continues to yield positive environmental and social outcomes in the South Fork American River watershed, and it has created a model for student-oriented environmental monitoring that is both transferable and expandable. In contributing to a long-term monitoring dataset, the WES program has fostered connections between experts and future stewards, and has informed adaptive solutions based on credible monitoring data. Stakeholders identified several components that contribute to the WES program's longevity and range of outcomes, with focus on the student learning and exposure to real natural resource management issues.

To effectively influence decisions on the landscape, it is important that data collection methods are credible and consistent with agency standards (i.e., USFS Stream Condition Inventory). Each year prior to the summit event, participating experts in the WES program ensure the data's credibility through teacher trainings on quality assurance and quality control guidelines, which are then extended to students during the event. Data quality is also aided by high quality monitoring instruments and equipment, which, as interview participants noted, are not attainable without funding.

According to interview participants, funding for one year of WES totals approximately \$20,000. This funds equipment maintenance, new equipment purchases, food, campground fees, WES program t-shirts, planning efforts, and additional program support. While funding has been sufficient to sustain the program, but it is not consistent each year. The RCD has allocated resources to fill funding gaps. The program's success and sustainability is also reliant on partnerships, volunteers, donations, and general community support. Several local businesses support WES each year through food donations, and the local news, *Mountain Democrat*, publishes articles about WES each year, helping to increase community awareness of the program.

In addition to funding and community support, interview participants recognized that it is the people involved and their persistent enthusiasm towards WES that sustains the program year after year. Stakeholders identified a combination of partners and factors that contribute to the success and continuation of the program each year: 1) a committed individual or entity to coordinate logistics and provide fiscal sponsorship; 2) a dedicated network of teachers to maintain school participation and student interest; 3) support and buy-in from the Board of Education, which provides transportation costs for students and teachers and covers the cost of substitute teachers during the days of the event; 4) support and buy-in from parents, who ultimately encourage and give students permission to participate; 5) willing agencies partners or retired individuals to share expert knowledge and techniques to ensure credible data collection; and 6) the students themselves, who encourage and motivate each other to participate, learn, and apply their experience to future lifestyle and career decisions. There is not currently a system in place to monitor alumni activities though some stakeholders shared stories of a few individuals who did pursue natural resource management careers. Promotional materials (e.g., videos and slide shows) aid program organizers in displaying and sharing the program's results, demonstrating the value of WES and lending to continued and increasing enthusiasm

Stakeholders credit the program organizer at the RCD for helping the WES come together each year, reemphasizing that coordination from committed and passionate individuals has been the impetus for the continuation of the program. Interview participants acknowledged that the WES network might in the future grapple with maintaining the program in the event that key individuals leave or retire.

As the WES program moves forward, participants shared visions to increase the scope of the program's objectives and impacts. In the early years of WES, organizers and teachers envisioned a summit that would serve as a gathering of educators across the state to advance natural resource education. As part of the summit, WES teachers would travel around the state to promote the program to get other school districts on board. While this has not been accomplished yet, it remains a goal for the WES program. Informants noted that adequate financial and organizational resources and support from school districts would better equip WES partners to push the vision forward.

Other opportunities to expand WES lie in the monitoring aspect itself. WES organizers acknowledge that securing funding for monitoring poses a challenge for natural resource entities across the state. Program participants see opportunities to leverage the WES program and expand its scope to include other types of monitoring (e.g., terrestrial/wildlife, climate change effects, post-fire pollination, etc.). Informants also reflected on opportunities to extend students' learning experience with WES by moving beyond data collection into data interpretation, in which the students' findings can be incorporated into management plans.

Appendix A

Methods

This case study is based on three stakeholder interviews and few program-related documents. No documents related specifically to the CalFed grant were available for review. A methodological challenge with this case involved difficulty with obtaining interviews from teacher informants due to the retired status of some and scheduling conflicts. As a result, the summary report might lack perspectives that are unique to teachers. Perspectives from primary partners, the El Dorado County & Georgetown Divide RCD's and Eldorado Forest Service, are reflected in the case report. Interviews conducted were recorded by handwritten notes and synthesized into this case study report.

Appendix B

Interview Participants include one or multiple representatives from the following:

El Dorado County Resource Conservation District
Eldorado National Forest

Appendix C

Available Grant Documents and References

	Grant Proposal (Submitted to granting agency)	Quarterly or Annual Update(s)	Final Report (Submitted to granting agency)	Catalogued Description (Published by granting agency)	Catalogued Final Report (Published by granting agency)	Other
Watershed Education Summit						X

Appendix D

Watershed Education Summit Participating Agencies

El Dorado County Resource Conservation District
Georgetown Divide Resource Conservation District
USFS Eldorado National Forest
Los Rios College El Dorado Center
Natural Resource Conservation Service
Sierra Nevada AmeriCorp Partnership
Indian Education Alliance
El Dorado Irrigation District
CalFire
CA Fish and Wildlife
El Dorado County
Sierra Pacific Industries
State Water Resources Control Board
Sacramento Municipal Utility District