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4-H Water Wizards 2017-18 Final Report

Prepared for Watershed Stewardship and Education Grant Program

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Program Description

4-H Water Wizards is a 12-week project that teaches 4th-6th grade students about water and its importance to the planet. Developed by the University of California Cooperative Extension's 4-H Youth Development Program, and delivered in after school settings, the project is designed to encourage students to explore and discover about water as they become scientists themselves.

The project includes:

- *Training for after school program providers:* Para-professionals that work in after school programs bring varied knowledge about water and the process of facilitating inquiry-based learning. To build competence and confidence, we provided three, three-hour training sessions for those who delivered the curriculum.



Ranger Linda places dye in the water so students can observe tides at the Bay-Delta Model.

- *Hands-on learning experiences that encourage inquiry:* Students learn about the water cycle, watersheds, water usage, pollution, and water properties through building models, conducting experiments, and making observations. They construct a watershed; conduct a home water use survey; and explore salinity, density, taste, and hardness through experimentation.

- *A service learning project:* Students take action on a water issue in their community. After developing an awareness of water issues, youth design, implement, and evaluate a project to address a need they identify in their family, school, or the greater community.

- *Visit to the American River Water Education Center:* Towards the conclusion of the project, after school program sites travel to the American River Education Center where they tour the activity center, see Folsom dam, and explore Beal’s Point, a collection point for our local watershed.

Through the Watershed Stewardship and Education Grant, this year 101 students in Elk Grove Unified School District cumulated their project with a field trip to the San Francisco Bay-Delta Model and the beach, to deepen their understanding of watersheds and delta issues. While this report describes the 2017-18 4-H Water Wizards Project in general, it highlights the activities and learnings specific to the funded field trip.

San Francisco Bay-Delta Field Trip

When completed in its entirety, the 4-H Water Wizards Project provides learners with a holistic view of water and the complexities of this valuable resource to our community, state and world. The project reaches beyond what most students receive in the fifth grade curriculum to include experimenting with water and the design and delivery of a service-learning project meant to empower youth to make a difference. It had been our dream to bring students to the Bay Delta Model so they could better understand about salinity and the delta (which they learn about in the project) and see the ocean, the terminus of our watershed.



Students point to where the San Francisco Bay estuary empties into the ocean.



Youth and after school program staff from Isabel Jackson at the Pacific Ocean.

Watershed Stewardship and Education Grant funds provided two day-long field trips to after school sites in the Elk Grove Unified School District (EGUSD): March 21, for students at Anna Kirchgator Elementary (44) and Irene B. West (6); March 27 for students at Isabel Jackson Elementary (51). All students were 4-H Water Wizards participant, and after school directors and program staff accompanied the groups. Prior to the field trip, EGUSD personnel from Learning Support Service and Sacramento 4-H met to review the trip logistics. Busses boarded and left the schools by 8:00 a.m. and arrived at the Bay-Delta Model about 10:30. Interest and participation was so high at Jackson that a van filled with adult chaperones followed the bus to its destinations.

Once at the Bay-Delta Model, an Army Corp ranger toured the group through the observation platform, displays about the watershed, a film, and finally the Bay-Delta model itself. The students on both trips were engaged and responded to, and asked questions throughout the presentation.

After lunch, students traveled a short distance to the beach at Fort Cronkite. Experiencing the ocean was a first for several students. The students explored the environment for about 45 minutes, dodging waves, feeling the sand, collecting pebbles, and feeling the sea breeze on their face. They boarded the buses and arrived back at school around 5:00.



The ocean was a new experience for many.

Youth Served

4-H Water Wizards is a larger-scale project reaching between 400-500 youth annually. This year 4-H Water Wizards served 488 youth at 16 after schools sites. Of those, 101 attended the field trip to the Bay Delta Model. Most students participation in the project attend schools in lower-income neighborhoods where at least 50% of students are eligible for free or reduced price lunches. Total project participation is listed in Table 1 below.

Table 1: Participant demographics for 2017-18 4-H Water Wizards Project

Ethnicity	Elementary Students (n=488)	Adult Program Staff (n=29)	Total	Percent
Caucasian	49	1	50	10%
African American	100	3	103	20%
American Indian	4	1	5	1%
Asian	156	6	162	31%
Pacific Islander	5	2	7	1%
Hispanic	145	15	160	31%
Other	29	1	30	6%
Total	488	29	517	100%
Gender				
Female	232	23	255	49%
Male	256	6	262	51%

Project Learnings

It was our first year to work on a large scale with EGUSD. The district contracts with several after school service providers, all supported by EGUSD Learning and Support Services. Below are the highlights and challenges of this year’s program.

- *The trips to the Bay-Delta Model a highlight:* This experience fully met our expectations, and it was an exceptional summative experience for the sites that were able to participate. Most rewarding was hearing the students' answers to questions our guide posed. Their responses demonstrated knowledge they had learned through 4-H Water Wizards. It was especially exciting to watch students at the ocean.
- *Service-learning capstone:* Sierra Enterprise Elementary created "The World of Water Fair," a student planned and delivered project to educate others about water. Youth from the after school program filtered through the demonstrations led by the 4-H Water Wizards participants. Many of the featured demonstrations were from the 4-H Water Wizards curriculum.
- *Positive experience for staff and students:* Overall, 4-H Water Wizards was well-received as 86% of students reported enjoying the program and most program staff reported wanting to do the project next year.
- *Student learning:* As described in the project outcomes below, students demonstrated increased understanding of water and water issues. They also reported conserving water.
- *UC Davis connection:* Dr. Samuel Sandoval Solis from the Department of Land, Air and Water Resources at UC Davis brought his ground water model and engaged students at Sierra Enterprise Elementary in an hour-long dialogue about how ground water works, why it's important, and how it becomes polluted. Students were amazed at the model and several youngsters were surprised and delighted to learn Dr. Sandoval spoke Spanish. Sierra Enterprise was selected because they did an outstanding job with the 4-H Water Wizards project and were not eligible for the trip to the Bay-Delta Model.



The Water Shed and Salinity displays at Wonderful World of Water Fair. The presentations and activities were all student-led.





Learning about ground water with Extension Specialist Sam Sandoval Solis from UC Davis.



- *The opportunity and challenge of after school:* After school programs are eager for engaging, hands-on learning experiences like 4-H Water Wizards, and the flexibility and openness of after school hours allows for much more in-depth investigation. However, unlike the school day, programs are fluid, staffing changes are common, and schedules may change with little notice. This means the project is not always presented in with fidelity or in its entirety. Our history tells us that while the changeable nature of after school settings is to be expected, program consistency is more likely to happen over time as relationships with program staff develop.

- *The challenge of year-round schedules:* The year-round schedules at both Anna Kirchgator and Isabel Jackson meant youth “off track” didn’t participate in the full project. One way to address this would be to have the program delivered twice a week, thus shortening its duration and enabling it to be presented between track changes at year-round schools.

- *The challenge of new partnerships:* The year came with hic-ups including irregular attendance at staff trainings; confusion in setting up the busses for spring sites to visit ARWEC; and gathering program evaluation data. These may largely be attributed to poor communication systems and the unfamiliarity of working with new partners. A review meeting with EGUSD and UCCE 4-H early this summer will allow for a thorough debrief and smoother communication systems next year.

Key Participants

This experience would not have been possible had it not been for several key partners:

- Members of the Elk Grove Unified School District Learning Support Services including Debra Layton and Katie Hedrick (site directors at Kirchgator and Jackson), Erin Sipes, Amanda Madrigal and the 12 after school site staff who attended trainings and led the weekly project.
- The Bay-Delta Model, especially Ranger Linda who led both tours.

- Samuel Sandoval Solis, Assistant Professor and Cooperative Extension Specialist in Water Resources at UC Davis.
- The American River Water Education Center, especially Kathy Marlow and the volunteer docents.



Project Outcomes

We measure project effectiveness through pre- and post-survey data from a sample of students and all after school program staff who participate in 4-H Water Wizards. Sites choosing to participate in the evaluation take a pre-survey the first week or two of the project, and a post-survey at the conclusion of the project. All program leaders fill out a pre- and post-survey that assesses their knowledge about water topics and comfort level teaching science. Data analysis is not complete, but some results from this year's evaluation include:

- Students increased their knowledge about water as 42% of participants surveyed showed an increase in post-test scores (mean scores 4.04 pre and 4.57 post on a 5-point Likert scale).
- 76% of participants said they were using less water as a result of participating in 4-H Water Wizards.
- Exit interviews show 94% of after school staff who delivered the program hope to lead the project again next year.

Some quotes from staff about their experience with 4-H Water Wizards and what they learned:

“ I would want to do the program again because it’s fun and organized.”

“Time restrictions [were a challenge] and the noise level in the setting.”

“Always ask questions. Allow students to direct conversation and allow curiosity to fuel interest in science.”

“The best part of the program is the way the kids light up when there is a hands-on experience.”



Future Plans

We plan to continue 4-H Water Wizards next year, and EGUSD will be a primary partner. We see students increase their knowledge about water and begin to understand how important it is to people, farmers, and the well-being of the environment. We need to assure the project is delivered with greater consistency. Sites selected for the Bay-Delta Model field trip were those that made 4-H Water Wizards a priority in their programs and delivered the curriculum in its entirety. To strengthen the project's impact among all sites, we will:

- Meet with after school program administrators this summer to review this past year, identify areas for improvement, and create a plan for adjustment.
- Improve communications and build relationships with site staff who are delivering the program to assure they know about trainings and receive support they need.
- Continue to find ways to incentivize program excellence.

