

Suisun Marsh

Watershed Education Program

2019-2020 Program Summary

Solano RCD is grateful to the program funders:

Solano County Water Agency

Solano County Department of Resource Management

Fairfield Suisun Sewer District

**Written and Administered by
Solano Resource Conservation District**



1170 N Lincoln Suite 110 Dixon, CA 95620
Office 707.678.1655
solanorcd.org

PROGRAM OVERVIEW

Solano County Water Agency (SCWA) is in the twelfth year contracting the Solano Resource Conservation District (Solano RCD) to implement the Suisun Marsh Watershed Education Program. Additional support is provided by Solano County Department of Resource Management and the Fairfield-Suisun Sewer District.

Sections of the curriculum were adapted from the California Coastal Commission's *Waves, Wetlands and Watersheds* and *Our Wetlands, Our World*. The teaching objectives are directly linked to California's Next Generation Science and Common Core standards. The curriculum was written in August 2008 and has been revised each year. Upon attending the BEETLES Project leadership Institute in August 2019, housed within the Lawrence Hall of Science at UC Berkley, Solano RCD leadership implemented research-based approaches and tools to improve science teaching and learning.

Marianne Butler directs the program, Allison Martin manages in curriculum and teacher relations. Laura Morgan and Lidia Tropeano coordinate in-class lessons and lead the field trips. Wendy Low, Shiree Rezendes and Olivia Wong teach in class lessons in addition to program educators Don Broderon, Carla Murphy, Deborah Bartens, Olivia Wong, and Paula Pashby lead field trip groups.

AUDIENCE

29 field trips occurred with 62 classes of 1954 students from Crystal Middle in Suisun City, Green Valley Middle and Public Safety Academy in Fairfield, Sierra Vista K-8 School, Orchard Elementary, Browns Valley Elementary and Willis Jepson Middle in Vacaville, Franklin Middle and Hogan Middle in Vallejo, Travis Elementary and Scandia Elementary in the Travis Air Force Base, Benicia Middle in Benicia, Dixon Montessori in Dixon and Riverview Middle in Rio Vista. 40% of all Solano County 6th grade classes participated in the program.

School	City	Grade	Total Students	Number of Classes
Sierra Vista K-8 School	Vacaville	7 th	120	4
Orchard Elementary	Vacaville	6 th	68	2
Willis Jepson Middle	Vacaville	7 th	162	5
Browns Valley Elementary	Vacaville	6 th	105	4
Riverview Middle	Rio Vista	6 th	64	2
Crystal Middle	Suisun City	6 th	68	2
Travis Elementary	Fairfield	6 th	66	2
Scandia Elementary	Fairfield	6 th	67	2
Green Valley Middle	Fairfield	6 th	272	8
Public Safety Academy	Fairfield	6 th	136	4
Benicia Middle	Benicia	6 th	365	12
Dixon Montessori	Dixon	6 th	47	2
Franklin Middle	Vallejo	6 th	170	5
Hogan Middle	Vallejo	6 th	240	8
TOTAL			1954	62

Since 2008, 11,557 students in 365 classes have participated.

GOALS AND OBJECTIVES

The Suisun Marsh Watershed Program takes a macro view of a discreet, special watershed, and builds on the ecology and stewardship lessons from our Watershed Explorers Program, but also stands alone. Participants leave the program:

- Understanding the concept of storm water pollution on their watershed, particularly the impacts of oil, chemicals and human debris in storm water;
- Increasing their awareness and knowledge of reduce, reuse, recycle messaging, and its impact on storm water pollution issues;
- Articulating the threats to Suisun Marsh and demonstrates how they can improve these ongoing issues;
- Articulating how water moves through the watershed and how it ends up in the Delta and ocean;
- Understanding that drought is inevitable in the California landscape and how students can conserve water and lessen their impact on the water system.

METHODOLOGY

Four program sessions take place between August-February. Three classroom lessons are held prior to each field trip and one lesson occurs after the field trip. Each class has the option of participating in a poster session at their school and taking a field trip to the North Bay Regional Water Treatment Plant.

The student field manual is included with this report. The lessons are updated each year and align with the current state science standards. Descriptions of the lessons are as follows:

Lesson One: In this lesson students use a model (Enviroscape) to explore important features of the Suisun Marsh and to understand how storm water affects our creeks, marsh, and ocean. This demonstration involves the addition of “pollutants” (motor oil, animal waste, and trash) to a landscape, adding “rain,” and tracking where the water goes. Students are introduced to techniques to hone in their observation skills and ask questions like a scientist.

Lesson Two: Students explore the features and functions of the Suisun Marsh and other Solano County watersheds through mapping activities and modeling. Students are able to explain that pollution can be globally distributed as a result of the interconnectedness of water. Student’s use I notice, I wonder to explain the function of a topographic map of the Suisun Marsh watershed and answer a series of questions about where and how water flows through Solano County. Finally, students model the path a piece of litter takes from a student’s home, through the storm drains and creeks systems and eventually ending up in the ocean.

Lesson Three: Students investigate, analyze, and compare data to determine the impact of trash in Solano County and beyond. After describing how trash enters the ocean from in-land sources, students conduct a Solano County trash survey by sorting and counting the number of “trash” items collected during a “volunteer cleanup event.” From this activity, students can describe that the most common items ending up in Solano County waterways are single use plastic debris. After quantifying the trash, participants create a plan of action to reduce the amount of waste they personally contribute to the environment (such as by practicing the Three R’s).

An optional poster session allows participants to examine plants and animals found at Suisun Marsh more closely by researching and creating posters about the organism’s habitat, behavior, and population status.

Field Trip to Rush Ranch Center: Students spend 4-5 hours thinking like a scientist as they collect data and engage in three science stations centered on the topics of soil, water, and plants. At the soil station, students use a color chart to identify soil composition and use their hands to experience the different textures of soil in the marsh and grassland. At the water station, students test the water from First Mallard Slough for dissolved oxygen, temperature, phosphates, pH, and turbidity. At the plant station, students set up a plant sampling quadrat and analyze the percent cover of plant species (native or non-native, invasive) within the site using

plant guides created by Suisun RCD. As a small group, they discuss the data from the different experiments and theorize how storm water pollution, development, drought and invasive species may affect the Suisun Marsh.

Following the stations, students enjoy lunch at the picnic tables in a eucalyptus grove. Students also take a moment to assess the environmental impact of their lunch choices and how they can utilize the Three R's to have a waste free lunch.

Next, students explore the Rush Ranch property by taking a nature walk through different habitats. Program educators facilitate an observation activity in which students can practice using all five senses as they explore the Rush Ranch. While on the walk, students look for scat, tracks, plants, and wildlife. Each student is equipped with a pair of binoculars to look for birds and they have the opportunity to view a sleeping barn owl.

Following the interpretive walk, students sit quietly on top of Overlook Hill and write poetry about their experiences and impressions of the wetland. Teachers submit the poems to River of Words. River of Words is a California-based non-profit organization that connects kids to the watersheds they live in through art and poetry. The organization runs an annual Art and Poetry Contest in conjunction with the Library of Congress. All program participants receive a Watershed Explorers Certificate.

Lesson Four: Following the field trip students participate in a Water Conservation Challenge. Students participate in a discussion about the importance of water in their daily lives and reflect on how they would survive with extremely limited water resources. Students complete a prediction of their household's water use for an upcoming day based on their family's usual water use. After they complete their prediction, students take their worksheet home and log their family's water for an entire day. Students also calculate the cost of their day's water use and extrapolate it for a year. The goal of this lesson is to get students to assess if their water use is more or less than they predicted and to implement along with their families water conservation measures.

PROGRAM EVALUATION

Student participants were asked to take a five-question assessment quiz developed by program staff on the last day of the program. The program ended just prior to COVID-19 pandemic was starting to take hold in California. Whether for this reason or not, 6 classes did not return post-program quizzes, so the data discussed here does not provide a full picture of the knowledge participants left with at the end of program. For this reason, this assessment measures student proficiency after a period of instruction and study in correctly providing answers to five questions intended to represent the program's core concepts.

The participant cohort returned 1387 post assessment quizzes. From this response, a straight 30 percent randomized sample was drawn for processing and analysis.

QUIZ RESPONSE OVERVIEW

Student ability to provide correct or partly correct answers to the five questions ranged from 45% to 88%. On average, 72% were able to provide correct or partially correct answers to all questions. Students were most challenged by the question asking them to "draw or write what they thought of when they heard the word watershed." 19% were able to include all the elements quiz designers were looking for, 26% provided some elements for a combined 45% providing a correct or partially correct answer to this question.

Students demonstrated more understanding in answering the question about behaviors and decisions that harm watersheds. 43% provided correct answers, 45% provided a partially correct answer (88% combined). They also did well with the question asking them for ways to protect watersheds: 45% gave a correct answer, 42% gave a partially correct answer (87% combined). When asked to predict how the marsh environment might change over

five years, 22% answered correctly, and 46% gave partially correct answers (68% combined). The cohort had a slightly more difficult time listing three things they learned about water over the program. 28% listed the requested 3 things and 43% listed at least one thing (71% combined). Overall, the cohort scored 72% correct and partially correct answers on the post-program quiz.

This is the second year we have asked students to draw or write an answer to one of our questions. This year, again, students performed slightly better in the narrative version of this question, providing correct or partially correct answers 3% more in the narrative than they did in the drawing. This is a relatively small difference, but it suggests that students are learning the rote facts better than they are integrating the knowledge we are teaching in a way that lets them explain and illustrate the concept to someone else. We continue to use these assessments to look at the areas where students struggle and make program adjustments and adapt our methodology to improve student understanding of our core concepts.

Appendix A – Teacher/Student Feedback

“I really enjoyed the whole experience and the quality of education we received.”

– Chad VanHeusen, Scandia Elementary teacher (6th grade, Travis AFB)

“I loved the map activities. It was great to also use Google Maps to show students how to utilize [how] technology can be used in science.”

– Mrs. Bracken, Browns Valley Elementary teacher (6th Grade, Vacaville)

Student Exit Tickets

My mind has changed about pollution. I’ve learned that there’s way more trash in the world than I thought there was, and we can do something about it.

– Jasmine Leal, student

I learned outside water and storm drain water doesn’t get cleaned and goes straight to waterways, and inside household water gets treated.

– Vanessa Sandoval, student

Today I learned how all the pollution like trash gets pushed down storm drains during storms and then flows into rivers. Also, sink water and wastewater flows to a place where people clean it a lot and then put it into the rivers. This was all demonstrated in a model. I had a lot of fun.

Appendix B – Photo Documentation



Students from Suisun City's Crystal Middle School test the temperature of a water sample from the marsh.



Students from Vacaville's Browns Valley Elementary reflect on their day and share their watershed poems.



Nelda Mundy students participate in a BEETLES (Lawrence Hall of Science) activity called *Making Observations*.

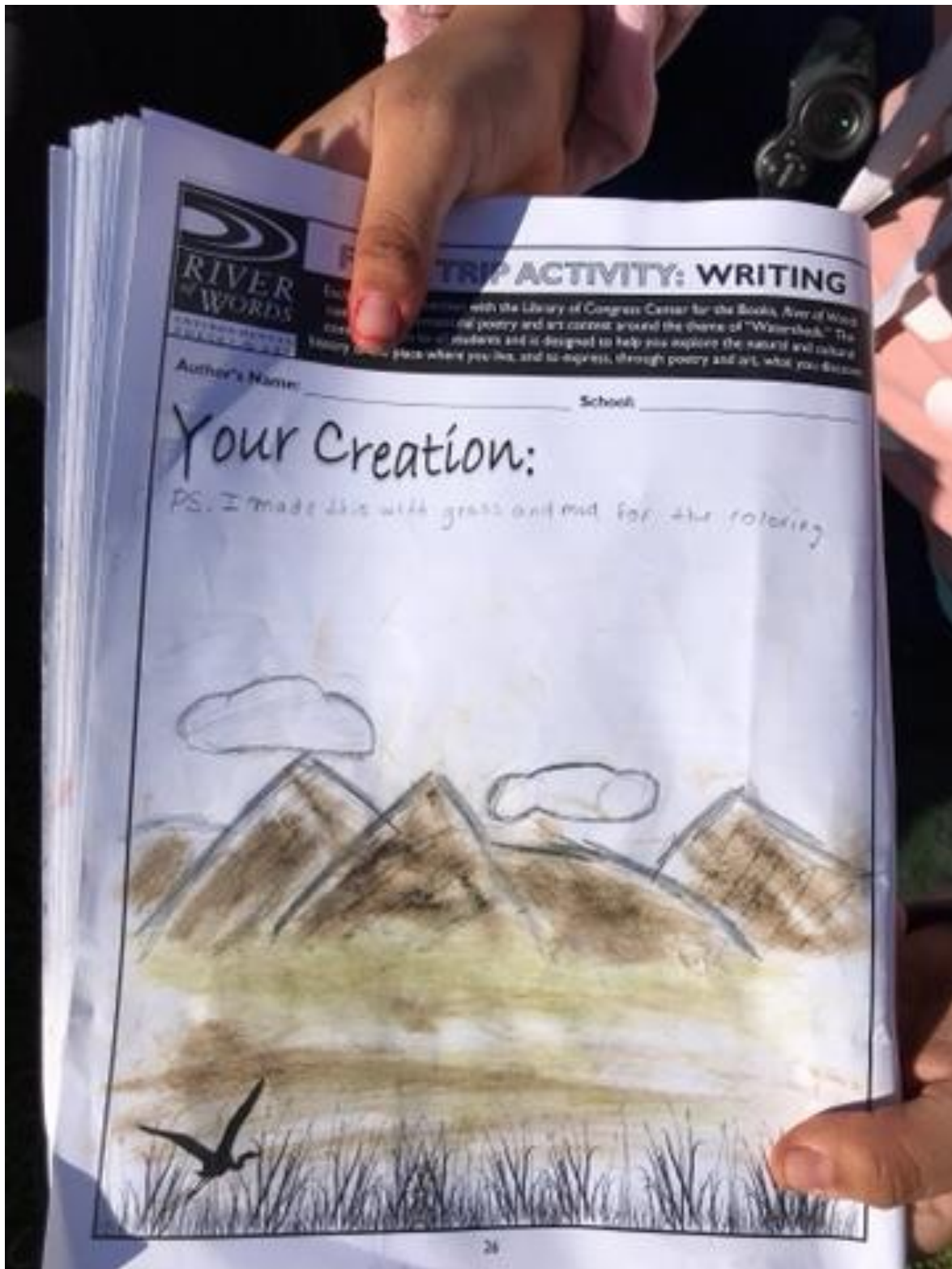


Suisun City's Crystal Middle School students compare soil samples from wetland and grassland habitats.



Benicia Middle students demonstrate how stormwater enters our creeks.

Appendix C – River of Words Poetry/Drawing



Franklin Middle School student in Vallejo provides an illustration using grass and soil from the marsh to add color to their drawing.

Appendix D – Program Thank You Card



Dear Ms. Rezendez,

Thank you for being my guide on the field trip! You helped me with a lot of ways to conserve water. One of the ways I learned to save water is to put a bucket in the shower while the water is heating up and use that water for plants. Once again, thank you!

Sincerely,
Macy

Transcribed from above –

Dear Ms. Rezendez,
Thank you for being my guide on the field trip! You helped me with a lot of ways to conserve water. One of the ways I learned to save water is to put bucket in the shower while the water is heating up and use that water for plants. Once again, thank you!
Sincerely, Macy
6th grader from Orchard Elementary School (Vacaville)