



**STRAW Project
2016-2017 Report**

TASK 1

PROJECT DESCRIPTION

Students & Teachers Restoring A Watershed (STRAW) continues to work on riparian vegetation restoration along Miller Creek near Miller Creek Middle School under contract with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP). The focus has been on the removal of invasive exotic plant species, planting native species, erosion control, and providing educational and environmental stewardship opportunities for the local school.

PROJECT PARTICIPANTS

School Name	Teacher	Grade	Number of Classroom Presentations	Restoration Date	Number of Students/ volunteers
Miller Creek Middle School	Bob Arigi	6 th	5	05/05/17	192
	Eric Lunde	6 th	3		
	Sue Holland	7 th	5	05/04/17	281
	Janice Woods	7 th	2		
	Mike Schulist	8 th	5	05/02/17	180
	Janice Woods	8 th	2		
TOTALS	6 Teachers	-	22 Presentations	3 Days	653 Students

WORK COMPLETED

The following work completed includes weeding and planting in zones designated on the site memo December 2016 (see attached document, "Miller Creek 2016.pdf"). The main invasive plant species removed were English ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), and cape ivy (*Delairea odorata*). Eighty-three container trees, shrubs and graminoids were purchased and installed after the invasive species were removed. Most container plants were installed with Cocoons manufactured by the Land Life Company (<http://www.landlifecompany.com/products.html>). We had been piloted this new irrigation technology at a variety of STRAW sites to assess its effectiveness during the 2015-2016 planting

season, and found high survival rates at Miller Creek. Plants installed in previous years received weeding and browse cage repair if necessary. Table 1 summarizes total amount of invasive species removed and area restored, and Table 2 summarizes the container plant numbers and locations.

Zone 1.1 (includes sub-zones 1.11- 1.13)

Continued weeding of blackberry, cape ivy, night shade, and broom as in previous years. Planted 27 additional container plants.

Zone 1.2

Continued weeding of blackberry, cape ivy, night shade, and broom as in previous years.

Zone 5.2 (on slope below 5.3)

Removed ivy and blackberry on slope.

Zone 5.3 (on the flats near road)

Continued weeding of blackberry, cape ivy, night shade, and broom as in previous years). Students maintained previous plantings by fixing and weeding within plant cages. An additional 23 more plants were installed.

Zone 5.4 (new area at west end near road and bend in creek)

Students weeded invasive plants in area, and installed 23 native plants.

Zone 7

Students weeded invasive plants in area, and installed 6 native plants.

Table 1. Area and volume of work completed

Total area	Volume of invasive plants removed
2, 925 sq. ft.	18 cu. yds.

Table 2. Installed Container Plants by Zone

Scientific Name	Common Name	1.1	Zone 5.3	Zone 5.4	Zone 7
<i>Carex barbarae</i>	basket sedge	15			
<i>Iris douglasiana</i>	Douglas iris		10		
<i>Frangula californica</i>	coffeberry		5	5	
<i>Heteromeles arbutifolia</i>	toyon		5	5	
<i>Ribes sanguineum</i>	flowering current	5		5	
<i>Rubus parviflorus</i>	thimbleberry	5		5	
<i>Sambucus nigra spp cerulea</i>	blue elderberry	2	3	2	5
<i>Festuca rubra (Molate-seed)</i>	Molate red fescue			1	1

Task 2

During the 2016-2017 schoolyear, we provided pre-restoration lessons for all students who attended a restoration. In total, we provided pre-restoration lessons and full restoration days for over 3,000 students throughout the Bay Area. Table 1.1 shows all totals for the 2016-2017 schoolyear. Of the total number of classes we worked with, 32 of those classes were in Marin County.

STRAW-Wide Metrics	
Total Students	3180
Total Marin Students	1980
Restoration Days	51
Total Plants	6808
Total Volunteers	3768
Total Marin Volunteers	2346
Total Volunteer hours	17478
Total Marin Volunteer Hours	10836
Total Planting Area (acres)	19.188
Unique Schools	32
Total Counties (restorations)	5
Total Linear Feet	11629

Table 1.1 STRAW Totals 2016-2017

As part of our education plan and each lesson, we assessed students on their learning, reflection, and questions to increase the quality of future lessons and celebrate learning among our students. Our assessment plan was as follows:

Assessment of Students:

- Pre and post oral or written assessments during pre-restoration presentation
- Pre and post oral or written assessments during restoration day
- Oral responses to questions at restorations
- STRAW Multi Visit Program (MVP) students complete end of program reflections and share out with each other

More specifically, we asked students what they know, feel, and wonder at the end of pre-restoration lessons and what they hope their restoration sites will look like in 20 years at the end of the restoration day. Both assessment techniques provided our educators will incredibly useful information which we were able to synthesize, type up and share with teachers and the project managers for the restoration sites. This allowed information from the pre-restoration lesson to carry continuously into the restoration day. It also allowed the teacher and project manager to highlight specific interests, curiosities, and questions they had to make the restoration experience more personalized for our students. This inquiry-based, student-interest based form of education is and has always been integral to STRAW. It is in fact how our project began!

In regards to storm drains specifically, students learned that storm drains are part of their watersheds. Each class either went outside, identified storm drains and discussed how they were connected to the watershed, or were shown a picture of a storm drain with that same discussion to follow.

Common themes in student assessments throughout the year:

- Students Know:
 - That watersheds start in the mountains and hills
 - “That we have to look to the future when we plant because the climate can change”
 - “That I can help save endangered species!”
 - “A creek that turns is best”
 - A snag is when a tree falls into a creek
 - That manmade structures can cause erosion
 - That riparian means bankside
 - Many students also wondered what other issues in their community they could help with
- Students Feel:
 - Good about contributing to help the earth

- Really good about planting all different types of plants and helping lots of different species
 - Like people can help make a difference
 - “like I’m going to really enjoy this field trip”
 - “that if we plant enough plants and tell people we can make California healthy”
 - “Great about what we learned today”
 - “Like I really want to restore as much of Earth as possible”
 - “Very proud because I like helping the environment and saving endangered species
- Students Wonder:
 - How big their plants will grow
 - If they will see any new wildlife where they planted because of the work they do
 - If there are other ways to help animals
 - How it will look in 25 years
 - “If we tell enough people we can change the world”
 - How they can help after the restoration day
 - How many places still need help in restoration
 - How many animals live only in the Bay Area
 - “How everyone can become involved in STRAW”
 - “Why people don’t feel for small as much as big” (animals)
 - How they will plant trees
 - How many major watersheds are in California
- Interns who gained teaching experience as part of their involvement leading the Multi Visit Program wrote, “I really enjoyed working with the student groups and seeing their excitement in capturing materials for their projects. They were so curious. I think the MVP restoration day and allowing then students to “take the reigns” was extremely beneficial for the student development. I also think this type of program gets back to the student driven nature of STRAW.”