



**STRAW Project
2015-2016 Program Report**

TASK 1

PROJECT DESCRIPTION

Students and 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 the removal of invasive exotic plant species, planting native species, erosion control, and providing educational and environmental stewardship opportunities for the local school. Table 1 summarizes student participation in the project.

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	03/29/16	180
	Eric Lunde	6 th	3		
	Sue Holland	7 th	5	03/31/16	271
	Janice Woods	7 th	4		
	Mike Schulist	8 th	5	04/05/16	189
	Janice Woods	8 th	1		
	Eric Lunde	8 th	2		
TOTALS	5	-	25	3	640

WORK COMPLETED

The following work completed includes weeding and planting in zones designated on the site memo revised November 2015 (see Attachment A, Miller Creek 2015). The main invasive plant species removed were English ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), and cape ivy (*Delairea odorata*). Approximately 100 Basket sedge (*Carex barbarae*) were transplanted from the large patch upstream of the areas of removal and installed in the work zones as described below. Forty-five container trees, shrubs and graminoids were purchased

and installed. In addition, 4 California buckeyes (*Aesculus californica*) were installed that were grown by students on site. Most container plants were installed using Driwater for supplemental irrigation. The remaining container plants were installed with Cocoons manufactured by the Land Life Company (<http://www.landlifecompany.com/products.html>). We have been piloting this new technology at a variety of STRAW sites to assess its effectiveness as a supplemental irrigation strategy on sites such as Miller Creek that do not have an adequate water source to develop for drip irrigation. Plants installed in previous years received weeding and browse cage repair if necessary. Table 2 summarizes total amount of invasive species removed and area restored, and Table 3 summarizes the container plant numbers and locations.

In addition, we chose Miller Creek as a site to pilot our Climate Smart restoration process (<http://www.pointblue.org/our-science-and-services/conservation-science/habitat-restoration/climate-smart-restorationtoolkit/>) for revegetation and invasive removal type projects. Associated documentation is attached as Attachment B.

Zone 1.12

Clearing and sedge planting continues to be successful here along a small drainage swale. Completed follow-up detail weeding of Himalayan blackberry and cape ivy.

Zone 1.13 & 1.14

Cleared more weeds opening up the area for planting of basket sedge along the drainage.

Zone 1.2 & 1.3

The grassy flat area (1.2) and adjacent slope (1.3) is a welcome opening in the dense bay and alder riparian zone. Follow-up weeding was done to keep the small sprouts of ivy and blackberry in check. Container plants were installed as described in Table 3.

Zone 5.1 & 5.2

Continued to weed out the Cape and English ivy, clipped privet sprouts, and sawed down privet suckers. Bare patches were mulched with rice straw.

Zone 5.3

Himalayan blackberry was removed to create additional planting zones for container plants described in Table 3. In addition, some browse cages were repaired so they continue to be effective.

Total area	Total sedge transplants	Volume of invasive plants removed
14, 976 sq. ft.	100	25 cu. yds.

Table 2. Area and volume of work completed

Scientific Name	Common Name	Zones 1.2/1.3	Zone 5.3
<i>Leymus triticoides</i>	Creeping Wild Rye	10	
<i>Aesculus californica</i>	CA Buckeye		4
<i>Aristolochia californica</i>	Dutchman's Pipevine		5
<i>Calycanthus occidentalis</i>	Spice Bush		5
<i>Sambucus cerulea</i>	Blue Elderberry	2	6
<i>Heteromeles arbutifolia</i>	Toyon		5
<i>Rhododendron macrophyllum</i>	Rhododendron	3	
<i>Ribes sanguinum</i>	Flowering Currant	5	
<i>Rubus parviflorus</i>	Thimbleberry	4	
	TOTAL	24	25

Table 3. Installed Container Plants by Zone

TASK 2

SUB TASK 1

As outlined in the scope of work, Gina Graziano, Conservation Educator, and John Parodi, Restoration Manager, held multiple conversations, meetings and email correspondence with Lynne Scarpa, the MCSTOPPP staff assigned to this portion of the scope of work. Please see attachments C-F for the final curriculum lesson plans.

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 a “share project” to represent their personal connection to the restoration and share their learning with their community

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 seemed to grasp the importance of biodiversity and applied their knowledge to caring for different animals like the California freshwater shrimp.
- A confusion some students may be left with is the difference between willow sprigs and willow wattles. Students may need some clarification on what willow sprigs, wattles, native plants, and riparian fencing are and why they are used for the topics they did not read about/ become experts in. Some assessments showed really specific learning about the topic they did become an expert in, however.
- Lots of students wrote they felt good that they will be restoring a creek and making a difference. (“I feel like I can make a difference in the environment.” “I wonder if after a couple years we can make it a better place.” “I feel good to know I can help.” “I feel like it will help greatly when we go to plant the trees.”)
- Students wondered how old willows will get to be, and how fast they will grow compared to other plants. Some students wondered how our riparian models will compare to creating actual riparian habitats.
- Many students also wondered what other issues in their community they could help with.

Below are some examples of the information we received from students in their assessments:

Poem written by a Middle School student when asked what he hoped their restoration site would look like in 20 years:

20 years from now

*Green, green everywhere
great amazing willow trees standing like guardians
guarding the sacred waters, glowing with freshness
shining, glistening fish swimming excitedly
birds flying gracefully singing their beautiful tunes
the watershed, great and full of life
the rolling hills and the rippling grass
guests visiting, playing having good fun
all because of the great work of STRAW
giving us opportunities that weren't possible without it
every year that passes more beauty comes
bringing joy to everyone
a great thriving ecosystem
all because of volunteers*

Poem written by a Middle School student when asked what she hoped their restoration site would look like in 20 years:

*Twenty years from now it will be full of life
The darkness will turn to light bright colors
The browns will become green and the creek will become clear
The tall willow trees will be towering over the creek
They will protect the creek
Keep it safe from erosion
Keep it safe from the sun
Keep it safe from creatures
It will be protected
And how did the trees get there?
It was through me :)
Deep in my heart it fills me with joy knowing the influence I have made
Because of me, no because of US, we have made a difference*

Poem written by a 5th grade San Rafael student when asked what she hoped their restoration site would look like in 20 years:

Plants

*In the heart of a seed,
Buried deep so deep,
A dear little plant lay fast asleep.*

*Wake said the sunshine,
A creep to the light,
Wake said the voice
of the rain drops bright.*

*The little seed heard,
And it rose to what the
Wonderful outside world might be.*

SUB TASK 2

During the 2015-2016 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 4 shows all totals for the 2015-2016 schoolyear.

2015-2016 Restoration Season	
Total Students	3023
Restoration Days	50
Total Plants	5193
Total Volunteers	703
Total Volunteer hours	703
Total Planting Area (sqft)	2214772.98
Unique Schools	34
Total Counties (students)	11
Total Counties (restorations)	5
Total Linear Feet	16899.1

Table 4. STRAW Totals 2015-2016

Marin Specific Metrics

We hosted 17 restoration days in Marin. We worked with 1,438 students in Marin, 513 who attend underserved schools. About 200 of those underserved students were a part of our Multi-visit program and received 6-7 lessons each throughout the school year. We worked with 182 volunteers during the restoration day, extending our outreach about healthy watersheds, pollutants, and how to keep our waterways clean to parents, grandparents, other family members and volunteers. We planted 1,530 plants in Marin County last year.

TASK 3

As outlined in the scope of work, two workshops were completed for streamside landowners in two regions of Marin County, focusing on site-specific hands-on watershed protection and creek bank restoration. Each workshop addressed the following concepts as requested by MCSTOPPP staff: best management practices (BMPs) that improve and/or protect water quality in creeks and other water bodies and that enhance creek and bank habitat value. BMPs included erosion and sediment control, integrated pest management (IPM), planting using appropriate California native species and general watershed protection and storm water pollution prevention practices. Point Blue staff, in conjunction with Harold Appleton from Prunuske Chatham, Inc., taught the specific BMPs associated with erosion and sediment

control, planting using appropriate California native species, and general watershed protection at both workshops.

One workshop was held on December 5th, 2015 at Spirit Rock Meditation Center in Woodacre, and the second workshop was held on February 27th, 2016 at Old Mill Park in Mill Valley.

SUB TASK 1

John Parodi, Restoration Manager at Point Blue, and Harold Appleton, from Prunuske Chatham, Inc. participated in multiple planning meetings, site visits, and email discussions to plan at least two months prior each workshop date to plan and implement the two workshops.

SUB TASK 2

Please see attachments G and H for the final agendas and plant lists for each workshop.