Point Blue Conservation Science

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Point Blue Conservation Science STRAW Project
2022-2023 Report

Task 1: Marin County Education

Sub-Task 1: In person lessons

Table 1.1 STRAW Marin Countywide Metrics

School	Grade	Total Students	Total Teachers	Total Volunteers/ Chaperones
Bahia Vista Elementary School	4th	101	4	3
Bahia Vista Elementary School	5th	80	3	5
Edna Maguire Elementary School	5th	46	2	5
Glenwood Elementary	3rd	44	2	7
Glenwood Elementary	4th	42	2	6
Hamilton Elementary School	3rd	74	3	8
Hidden Valley Elementary School-Marin	5th	51	2	9
Loma Verde Elementary School	4th	60	2	5
Loma Verde Elementary School	1st, 2nd	25	1	5
Loma Verde Elementary School	3rd	23	1	4
Loma Verde Elementary School	5th	55	2	6
Loma Verde Elementary School	2nd	52	1	5
Loma Verde Elementary School	3rd	46	2	4
Lynwood Elementary School	3rd	42	2	6

Lynwood Elementary School	2nd	48	2	8
Lynwood Elementary School	4th, 5th	25	1	6
Lynwood Elementary School	1st	46	2	6
Lynwood Elementary School	4th	26	1	5
Lynwood Elementary School	5th	28	1	4
Miller Creek Middle School	6th	136	1	0
Miller Creek Middle School	7th	127	1	2
Miller Creek Middle School	7th, 8th	90	1	1
Old Mill School	3rd	19	1	6
Olive Elementary School	4th	30	1	7
Olive Elementary School	5th	30	1	7
Park Elementary School	3rd	24	1	5
Ross Elementary School	7th	36	1	5
San Martin Gwinn K-8	5th, 6th, 7th, 8th	10	1	2
Vilda Nature School	4th, 5th, 6th	12	1	2
TOTALS		**1428**	**43**	**144**

In Marin County in the 2022-2023 school year, we did restoration projects with 1428 students, 43 teachers, and 144 volunteers/chaperones. These students, teachers, and chaperones came from 14 Marin County schools. All restoration days were completed between October 2022 - March 2023.

During the school year, we provided pre-restoration lessons for all students who attended a restoration, and additional lessons for students who did not complete a restoration, but still wanted to be involved in our program. In total, we provided pre-restoration lessons and full restoration days integrating stormwater pollution prevention for 3,936 students throughout the Bay Area. Table 1.2 shows all totals throughout the Bay Area for the school year.

All of the lessons and restorations we conducted with students, teachers, and chaperones in Table 1.1 were in class lessons done in person.

We anticipate hosting 17 Marin County teachers at this year's Watershed Week, which will introduce teachers to the plant nursery work STRAW conducts as an environmental education resource for their students. This year's Watershed Week will focus on supplemental curriculum for teachers that highlight connecting to and learning about the structure and functions of plants. As always, we aimed to celebrate and nourish teachers with interesting and relevant information, conversation, and network opportunities free of charge.

In being attentive to state and local guidance on the COVID-19 pandemic, we decided a hybrid event (partially on zoom, partially in person) remained the safest and most inclusive for everyone. About 56 folks are expected to participate in Watershed Week this year with 36 teachers participating in the in-person portions of Watershed Week. We plan to host 12 people during our-in person, Marin County-based gathering at the STRAW Novato Baylands Plant Nursery in Novato. Resources from Watershed Week will be compiled on a tablet teachers have access to indefinitely: https://padlet.com/ggraziano1/watershed-week-2023-growing-native-plants-wo7kdfh4ah2o5zkc

Table 1.2 STRAW Wide Metrics

STRAW Wide Metrics ~ 2022-2023	
Total Students	3,936
Restoration Days (with Schools)	180
Total Volunteers	4,821
Total Volunteer hours	17,468
Total Volunteer Match	$523,167
Unique Schools	43
Total Counties (students)	X

Total Counties (restorations)	4
Total Plants	9,918
Total Planting Area (acres)*	28
Total Linear Feet*	6476

Sub-Task 2: Curriculum Updates

STRAW delivered the final curriculum to students, and implemented the effectiveness assessment protocol, as part of STRAW's school year educational activities between September 2022 and April 2023. Examples of lessons we revised to incorporate MCSTOPPP Public outreach, education and participation objectives are attached to this report as appendix A.

STRAW's Multi-Visit Program (MVP) was conducted fully in person this year, and we were able to host all Bahia Vista Elementary MVP students for a total of 3 restoration days. This year we were able to double the number of students we worked with from about 81 students last year to 178 students this year by working with two grade levels. A three-part lesson series was delivered to three 5th grade classes and four 4th grade classes which consisted of about 101 4th graders and 77 5th graders. Two lessons were delivered before the students' restoration day to familiarize them with wetland ecology and one lesson was delivered after to enrich their learning experience in the field. All three lessons were taught in both English and Spanish as many students in all classes were bilingual and some students were primarily Spanish-speaking. Lessons were taught by two STRAW educators with the support of two new STRAW apprentices as a way to model STRAW's watershed education curriculum for entry level members of the team. Our Bahia Vista MVP lessons created a learning experience for our STRAW apprentices from which they will reference during their continued environmental education work throughout Marin County. Our first lesson introduced students to the five parts of a watershed, orienting them to the location of a wetland within a watershed and describing the role storm drains near their school have in water runoff. In our second lesson we taught students the 5-part structure of a wetland through scientific sketching and reviewed how to make scientific observations in the field about the plants and animals they would see. Our third lesson stamped the animal and plant identification that students conducted in the field and facilitated time for reflection of their restoration day with STRAW. Quotes from students demonstrating their understanding and critical thinking after a Bahia Vista MVP lesson are attached to this report as appendix B.

A critical learning goal for students was to understand the deep connection between water and land, learning that what we do to the land affects all inhabitants of the watershed. Following the success of past years, we emphasized the importance of storm drains in our first lesson when introducing the connectivity of watersheds. One of our main learning goals was that students understood that all storm drains in Marin discharge any trash or pollutants that people litter or dump directly to the nearest creek or bay. Students learned that when we protect the watershed from harm such as pollution, we are also protecting and helping ourselves and the many species that call our watershed home.

In addition to classroom lessons and restorations, this year STRAW participated in five public outreach events that used an Enviroscape watershed model to demonstrate stormwater pollution prevention methods to youth and adults. One of these events was the Family Fun Day portion of the Point Reyes Birding and Nature Festival in West Marin County where a STRAW apprentice took the lead on connecting with families and youth. Another event was Hamilton Elementary's Science Night for students in Novato, CA. Photos of this outreach are attached to this report as appendix C.

Student Assessments

Assessment of Students *(oral and written assessments were provided in both English and Spanish)*

- Pre and post oral or written assessments during restoration and conservation science lessons
- Pre and post oral or written assessments during restoration days
- Oral responses to questions at restoration days
- STRAW's MVP students also completed end of program reflections and shared out with their peers

We maintained our successful education plan that included different assessment approaches to understand students' learning, reflections, and questions to inform the lessons we provided to the students.

The specific assessment technique we used at the end of students' classroom lesson before their restoration day was to ask students to finish the following three phrases: "I know, I feel, I wonder." This technique was a successful approach across a range of grades and provided valuable information to our educators. This information allowed our educators: to understand concrete themes students understood, the opportunity to clarify any misconceptions or questions students had, and to share this synthesized information with the students' teachers and restoration site project managers.

For restoration site days, we began our restoration with an opening circle that served as a welcome, schedule and site orientation, and as an oral assessment of their classroom lesson by reviewing key themes to ensure a more meaningful day. Similarly, the end of the students restoration day concluded with a closing circle where we ask students to share what they hoped their restoration sites will look like in 20 years; it is a space where students can share their hopes for their work and their highlights of their STRAW experience.

Our successful collaboration supports these young students to become responsible and informed community members. The reliable and consistent support from MCSTOPPP allows us to continue to expand and address the innate curiosity that many young Marin County residents have about their local environment and how they can help improve it.

Appendix

Appendix A: Sample lesson revised and implemented to incorporate MCSTOPPP outreach objectives, specifically about watersheds, and how storm drains carry trash and pollution to the bay and local creeks. This lesson was taught by two STRAW educators with the support of two new STRAW apprentices to model STRAW's watershed education curriculum for entry level members of the team.

STRAW Multivisit Program (MVP): Visit 1 Bahia Vista Elementary (out of 3)

Wednesday, November 9th

- Pierre 9:30-10:10
- Kristin 10:30-11:10
- Amy 11:10-11:50

Thursday, November 10th

- 10:05 - 10:55 Schafer
- 11:55-12:45 Brand
    - Spanish-speakers - Davin and Juan
- 12:45 - 1:50 Maldonado
- 1:50 - 2:40 Koller
    - Spanish-speakers: Daniella and Feliciano

Enduring Understanding:

- Students will understand what a watershed is and that they will make a difference through our work together.

Essential Question(s):

- What is STRAW and what is my role within the program?
- What is a watershed?

Students will know:

- The story of STRAW and how it began
- That they will make a difference through this program
- Students will understand that they are part of our STRAW community, and have something unique to offer our community

- That storm drains are part of a watershed and lead to local creeks and rivers

Students will be able to:

- Define what a watershed is: anywhere water is collected, stored, or drained.

Learning Plan

Engage: (8 min) (CM, Apprentices)

- *Write your name with a marker on the name tag if they don't already have name tags on/ tape we pass out and then join me in a toe-to-toe circle/ stay in desks if that seems better in the classroom.*
- "Hello! I'm _____ from STRAW. These are my friends _____ who are also from STRAW at Point Blue Conservation Science. You may have heard we are going on a field trip in a couple of weeks to plant plants and that we get to visit your classroom a few times today we are going to learn about watersheds! Our plan for our time together today is to learn about what a watershed is.
- First, I have a question for you all! I'm wondering if anyone knows what a watershed is? If you don't know, that's okay" Well, I have a challenge for you!

Explore: (7 min) (AEL, CM)

- Show students a photo of a shrimp and tell them you have a story for them. Share the story of STRAW in the most exciting way, emphasizing that students created the project. At the end of the story, mention that our name changed from the Shrimp Club to STRAW.
- Write "STRAW" on a field white board and ask students what those letters stand for. When they get to the W ask them to share their hypothesis for what a watershed is with someone next to them and then ask for a few volunteers to share with the whole group.

Explain: (10 min) (AEL, CM)

- *When you get to the "W" in STRAW, ask students to do a think-pair-share.*
- Now we are back to that word, watershed! Take 48 seconds with your elbow partner and share your best guess of what a watershed is.
- *Invite students (aka "brave scientists") to share with a quiet hand: What is a watershed?*
    - *Affirm students for being brave and sharing but help them create an accurate definition of what a watershed is by affirming correct answers and redirecting incorrect ones* (i.e. "not quite - remember it's not something humans have created…")
- Direct Instruction: Tell students that a watershed is anywhere where water is collected, stored, or drains.
- *Give directions for going outside to really explore what a watershed is. Have students leave all materials in the classroom and tell them we will make a toe-to-toe circle when we go outside.*
- Outside: Ask students to look around, do they see any hills, mountains, taller parts of their school yard? When it rains, where does that water go? (2 volunteers share out)
    - Water "sheds" off the mountains
    - Look around, do you see a storm drain?

    - Show a laminated photo of a storm drain- where does water go that goes into this storm drain? To local creeks and rivers.
        - Storm drains- where do the storm drains go? Storm drains are part of the watershed.
    - All water eventually flows to a stream or lake and ends up in the ocean.
    - Show laminated photo of a watershed
    - Watershed dance- mountain, rivers, wetland, open bay, ocean (Cuenca de agua - Empieza en las montañas, fluye en el río, a la bahía, y al final el mar)
    - No matter where on Earth you go, you're always in a watershed!

Elaborate: (12 minutes) (AEL, CM, Apprentices)

- With materials right here in this schoolyard (*give 4 corners parameters to stay within*), you have 5 minutes to build what you think a healthy watershed would look like. (*Decide or ask the teacher if you want students to work in pairs, groups of 3 or 4*) The goal is to create a mini-version or a model that represents a healthy watershed. You will collect:
    1. Five to ten items, such as rocks, leaves, twigs
    2. No items that are alive, such as a large branch or parts of a bush (that is habitat for so many other critters!)
    3. And nothing that can hurt you, such as something sharp or a piece of trash that may have unhealthy germs.
- When I give the coyote call again, you must return to this circle for the next set of directions. After they are in a circle, ask them to share with the person next to them how they know they are being helpful to their team. I know I am helpful when I am listening to others, when I am sharing what I know, and when I respect others space.
    1. (2 min + 5 min) They get into groups, and they begin to build their model.
- *Emphasize to students to include the five parts of the watershed.*
    1. *Optional: Guide students to start their models by deciding where the bay is first. Ask students where their school is in the watershed. Introduce different species they may be familiar, such as crows, deer, rabbits, and other birds.*
- *Another coyote calls, and then does a gallery walk in a line or in a wide circle.*

Evaluate: (8 minutes) - (AEL, CM, Apprentices)

- Back inside the classroom
    - Review what a watershed is and why they are so important. Introduce to them that next time we meet we will be learning about what part of the watershed we will be visiting, the wetland!
- Have students complete the following sentence starters on the back of their pre-assessments (or just choose 1-2 sentences to complete if short on time):
    - I know…
    - I feel…
    - I wonder…

Materials:

- Learning Plan
- Name tags for students and STRAW teachers (envelope labels)

- Pre-assessments for all students
- Photo of California freshwater shrimp
- Photo of watershed

Appendix B: Quotes from students demonstrating their understanding and critical thinking after a Bahia Vista MVP lesson.

STRAW Multivisit Program (MVP): Visit 1 Bahia Vista Elementary (out of 3)

4th Grade

- I wonder how the planting will look
- I wonder how many types of flowers you can find in a wetland
- I wonder what wetlands look like
- I wonder when people are going to stop cutting down trees
- I wonder why we have watersheds
- I feel thrilled to learn how to help squirrels

5th Grade

- I can help people not to pour dangerous oil and paint down the drain
- I know a watershed is near a wetland
- I feel happy because I'm going to help endangered species
- I wonder how I can help the California Freshwater Shrimp and other endangered species even more to survive
- I wonder how water goes from freshwater to saltwater

Appendix C: Photos

STRAW apprentice, Nick Arriaza, practices his engagement strategy with a family at the North Bay Science Discovery Day in preparation for tabling at the Point Reyes Birding and Nature Festival.

STRAW apprentice, Sam Smith, and STRAW educator, Alba Estrada López, teach two students about nonpoint source and point source pollution at Hamilton Elementary's Science Night on 5/11/23.