KIDS for the BAY

Report to the Alameda County Fish and Game Commission
December 12, 2024

INTRODUCTION

In the 2023 - 2024 school year, with the support of an $8,000 grant from the Alameda County Fish and Game Commission, KIDS for the BAY (KftB) delivered the Watershed Action Program (WAP) to six classes in two elementary schools in Oakland and in Hayward. KftB lessons and activities engaged students in hands-on learning, helped them connect to their local watershed environments, and empowered them to work together to have a lasting, positive impact for their schools and communities. The WAP included four watershed lessons and an Environmental Action Project for each class, as well as a bus field trip to a local creek or bay location.

Partner classes and schools included:

- Four third grade classes at Lincoln Elementary School in Oakland
- Two fourth grade classes at Glassbrook Elementary School in Hayward.

Thanks to the support of the Alameda County Fish and Game Commission, KIDS for the BAY achieved the following goals:

- 151 students increased their knowledge of watershed science and became stewards of their local watershed environment
- 151 families learned how to reduce pollution to the local watershed and protect wildlife from the harmful impacts of plastic pollution
- Six teachers increased their confidence in using the watershed as an educational resource
- The WAP was integrated into the curricula and culture of three partner schools.

Student participants in the WAP included an average 78% under-resourced, low-income students, 97% students of color, and more than 57% English Language Learners.

PROGRAM HIGHLIGHTS

Watershed Lessons

Watershed Investigations and Scavenger Hunts

Students in Teacher Lily Gee's class at Lincoln Elementary School were excited to kick off their Watershed Action Program with a watershed scavenger hunt to help them explore their school campus and observe and record both living and nonliving aspects of their local watershed. Students noticed animal and plant life around their school campus. "I saw cosmo flowers and a few were growing really tall! One was bent and drooping. I noticed they are very fragile flowers," observed Tyson. "I usually see crows and seagulls on campus. Maybe we can't see a lot of them right now because there are too many kids on the playground," Sejal guessed.

In addition to identifying living or *biotic* elements of their playground, the student Environmentalists demonstrated an increased awareness of human-made elements including storm drains. Students also noticed signs of pollution, which could potentially harm their campus ecosystem. "Is litter pollution? What about clothes? We saw two different sweatshirts on the ground. I think animals could get trapped in them," shared Marika. "We saw one storm drain that was circular and one that was a square grate," said Zeke. "There was trash inside the storm drain. I think it will eventually end up in the bay and the ocean if we don't pick it up," added Sejal. After exploring their school campus and identifying elements of their environment, from plants and animals to sources of pollution, the young scientists demonstrated an increased awareness of and appreciation

for their local watershed and wildlife.

Plastic Pollution and its Impact on Aquatic and Marine Life
Students from Glassbrook Elementary School in Hayward studied the path that stormwater pollution travels on to become marine plastic pollution. They examined the critical role the storm drain system plays not only in transporting stormwater, but also in transporting waste and pollutants to aquatic environments. They learned how the system channels rain and contaminants from streets to local creeks and the San Francisco Bay and subsequently to the Pacific Ocean. Noelani shared, “I have seen those storm drain openings near my house with lots of trash inside. They will never get cleaned unless we do something about it!”

Students learned the differences between the storm drain system and the sewer system. They discussed important ways to be stewards of both by picking up litter that could end up in storm drains and keeping sewer pipes unclogged. Cristian exclaimed, “You can’t flush wipes? I did not know that!” The Glassbrook Environmentalists were very concerned about how extensively pollution can spread throughout a watershed and eager to learn how to reduce pollution at the source.

To further explore the consequences of pollution, students studied images of organisms impacted by plastic marine debris. Examining sea lions entangled in fishing nets and the polluted stomach contents of an albatross, they were overcome with shock and sadness. “What happened to that turtle? It definitely doesn't look healthy,” Sofia wondered. Lilianna asked, “Can pollution make animals go extinct? We should take better care of our environment so that doesn’t happen!”Amisaday asked, “If there is so much plastic around us, doesn't it hurt us as well?” The class explored the concept of *microplastics* and learned that plastic trash continues to break down into tiny, sometimes microscopic, pieces of plastic that can travel up the food chain and become stored in our own bodies. The class was saddened to learn that this problem impacts entire food chains and threatens the health of our local communities. Inspired by this discussion, students couldn’t wait to take immediate action to reduce marine plastic pollution by leading a trash cleanup on their school campus!

The young Environmentalists made initial predictions of the types of pollution they would find. Outside, Josue noticed a seagull diving down to eat something on their campus from a yard away. “Don't eat that, it could be plastic!” He exclaimed, shooing the bird away before realizing it had been trying to eat a banana peel. “Well, that bird should probably not be eating this either!” he said, picking it up and putting it in the trash can. Rainwater filled a nearby flowerbed. Food wrappers and plastic bits floated on the surface. Amisaday carefully plucked the bits of trash out of the water with her tongs. “Yuck!” she exclaimed, “It’s like pollution soup! This can’t be good for all the wildlife and plants that live in this garden.” Stephany proudly showed KftB Educator Yvette Diaz Samayoa her trash bag, filled to the brim with trash pollution. “We found a whole abandoned lunch on the field, with styrofoam plates and paper napkins and food!” she shared. Students recorded the types and amounts of trash they found to gather data about the trash pollution issue and its impact on their school. “We found SO much plastic!” Ryan exclaimed.

Back in the classroom, students discussed the findings from their cleanup and survey, and brainstormed solutions to the trash pollution problem on their campus. "There was more trash than I thought! I think we need more trash cans in the yard. Maybe they are too far away and people get lazy," said Esteban. All the young Environmentalists agreed that preventing pollution from entering our environments is a much better option than cleaning it up later. They shared insightful and creative ideas about practicing the Five Rs (Reduce, Reuse, Recycle, Rot and Refuse) to create less waste. "I love to use old packages for arts and crafts! I think everyone should, so it doesn't go to waste!" suggested Dayana.

Discovering Bay Organisms & Adaptations
After studying the local watershed and the issue of trash pollution, the young scientists at Lincoln Elementary School continued their environmental exploration by learning about the diverse life forms that make the San

Francisco Bay estuary their home. They started the lesson by reviewing the concept of food chains. The class made complex connections about how an orgnaisms' anatomy and adaptations determine its place in the food web. "Camouflage means an animal has to hide from predators to survive," explained Diana. "I wonder if two animals can be predator and prey for each other?" Frederick asked. Students also discussed the resources that a watershed provides for wildlife and people. Simon exclaimed, "The watershed gives us freshwater to drink!" Christy added, "Saltwater areas like the Pacific Ocean give us food."

Teacher Celeste McBride's class investigated specimens from the producer and consumer levels. The class warmed up their observational skills by examining samples of bull kelp and sea lettuce. Angela noticed, "The processed sea lettuce smelled like sushi, or food I would eat. The bull kelp smelled more intensely like the ocean. "We even tried to listen to it and it sounded like a flapping flag!" Selihom shared, "The kelp felt like mucus, I think it is an adaptation to help it stay hydrated and survive." KftB Educator Grace Bedecarre led the class in fun ploga (play-yoga) movements to mimic seaweed adaptations, including a holdfast, float and blades. The class was amazed to learn how important bull kelp was as a source of oxygen and a vital food supply for marine species.

Next, students explored striped bass fish and Dungeness crab specimens from the San Francisco Bay and learned more about the brackish water environment in the bay. The class carefully inspected the striped bass teeth and the red underside of the gills. "It is so cool to open the mouth, see its tiny teeth and think about how it would eat," said Yuma. "I noticed these fins are really sharp. Maybe they can be used as defense?" suggested Tului. These hands-on explorations helped students understand adaptations that help bay organisms survive. The young scientists also considered their own roles in the food web and larger ecosystem. Close encounters with San Francisco Bay wildlife inspired students to care for and protect the unique environments they live in and depend upon.

Environmental Pledges

As their watershed lessons drew to a close, student Environmentalists at Lincoln Elementary School made personal environmental pledges to continue leading a lifetime of environmental stewardship. "A pledge is a promise that you'll take action," Ellie explained. "I'm going to collect bottles and cans for recycling money. Hopefully, this will stop trash pollution from hurting animals and the environment!" Jaylen pledged. "I made my poster about helping the environment to save the animals. We get a lot from animals and nature, like food and shelter," Adeline shared. The young scientists at Lincoln and Glassbrook Elementary Schools learned valuable lessons and felt empowered to protect the local watershed and become stewards of the environment. They not only gained knowledge about the impact of pollution on animals and the environment, but also developed a sense of responsibility to do their part to protect local wildlife and environments, and to share their knowledge with others.

Environmental Action Projects & Field Trips

Glassbrook Elementary School: Jobs in the Watershed

Students learned about possible careers involved with watershed management on San Francisco Public Utilities Commission (SFPUC) restoration lands at Sheep Camp Creek in Sunol as part of the KIDS for the BAY partnership with Avila and Associates Engineers.

Avila biologists Naomi and Cynthia instructed the fourth graders to spray their shoes with disinfectant before entering the site and explained that doing so prevents the introduction of sudden oak death to the protected area. After a short nature walk, the Glassbrook Environmentalists met their guest instructors for the day: biologists, engineers and scientists from Avila and Associates, and received their very own field journals. "What does a biologist do?" asked KIDS for the BAY Educator Grace Bedecarre. "In class, we learned that biologists study animals!" student Andrea exclaimed. "A biologist helps the environment!" added Aisha. "Today, you are all

restoration biologists!" explained Ms. Grace. "Write down all of your findings and observations throughout the day, or draw pictures of the plants and animals you observe." Damian noticed something along the trail and hurried to draw a picture in his field journal. "There is a frog right here in a hole in the ground!" he exclaimed. His classmates excitedly gathered around to observe.

At the first station, volunteers Naomi and Heritiana introduced the restoration site's star residents: the endangered California red legged frog and tiger salamander. Volunteer Naomi explained the importance of the Avila restoration work. "We protect these species because they provide food for many other species! If we didn't have these frogs, we wouldn't have our birds! They help support this entire ecosystem." The biologists explained how they collect and record data to evaluate the success of their work to restore and maintain the habitat to keep its endangered residents healthy. Heritiana demonstrated how to use Geographic Information Systems (GIS) mapping technology to record data about a particular habitat. The young scientists had the opportunity to map different sections of the restoration site. They learned how to use a compass to find north and mapped a route around a prickly patch of thistle.

The biologists led their group over to the cow water trough onsite to explain the land's shared use with ranchers. The students stared at the murky water with a thick layer of algae and aquatic plants growing on the bottom of the trough. "I can't tell how deep it is because there are so many plants!" noticed Jacob. As the students observed the trough, they noticed other forms of life; it was home to a hidden ecosystem of aquatic invertebrates! "I saw swimming beetles and water striders," said Ximena. Dragonfly nymphs in different stages of molting clung to the side of the trough. The class witnessed adult dragonflies emerge from their nymph-stage exoskeletons right before their eyes! Dennis helped a newly winged creature onto his fingertips. "I want to make sure it doesn't get wet and fall back into the water!" he explained. Dennis kept the creature comfortable during its transformation, watching its orange wings unfurl and stretch out before it flew away.

Volunteer Cynthia kicked off the birding station activities by asking the young scientists, "Why do the birds matter? Why do we conserve their habitat?"

> "The birds matter and we should conserve their habitat because they bring music to the world and add color to the sky!"
> **Guadalupe, Fourth Grade Student, Glassbrook Elementary School, Hayward.**

Biologists Joya and Cynthia pointed out a nearby turkey vulture nest and a baby owl nest on either side of the field. They set up a viewing scope, where each student got a special look at the fluffy great horned owl fledglings in their oak tree home. "That is so cool! I have never seen owl chicks before!" said Diego. "I think there are owls living in all the trees! When you see owl pellets on the ground that's how you know one lives there," said Ximena. While her classmates were taking their turn on the scope, Andrea noticed a spotted shell on the ground. The young Glassbrook scientists inspected it, noticing it was cracked and empty. "Something must've hatched from it! It's bigger than the eggs you buy in the grocery store!" exclaimed Dayan. Volunteer Cynthia told the class, "I believe it might be a duck egg. A predator might have carried the egg up here from the creek."

After observing the birds through the scope, the group joined Melissa at the biology station to learn another method to gather information about birds; dissecting owl pellets. The students parsed out small rodent bones from clumps of fur and used a diagram to identify the bones they found. Anothony found both pieces of a gopher's jaw. He placed them together to show the intact skeleton. The students placed the hair and miniscule bones they found under microscopes to get a closer look.

The Avila & Associates volunteers opened students' eyes and minds to the wonders of the natural world and the importance of watershed restoration work. The Glassbrook students learned about the important roles that

biologists and environmental engineers play in protecting the delicate ecosystems that make our local habitats unique, and how all organisms and ecosystems, big or small, are worthy of protection, conservation, and care. The Glassbrook Environmentalists were grateful for their time outside and the chance to participate in real-life science. Some even began to consider pursuing environmental action and restoration in their future careers!

> "We are so proud to partner with KIDS for the BAY, a fabulous and impactful organization for environmental education and stewardship. Participating in the "Jobs in the Watersheds" program is such a joy, sometimes I'm not sure who enjoys it more, the students or our staff! The enthusiasm, curiosity, knowledge, and delight the students show during our field trips leaves such an impression on our staff, we are raving about it for days afterward. And the KftB staff are superstars and wonderful to work with."
> **Melissa Kent, Biologist, Avila and Associates Consulting Engineers, Inc.**

Read more about the 'Jobs in the Watershed' Action Project on our blog page.

Lincoln Elementary School: Natural Pesticides Action Project
Young Environmentalists at Lincoln Elementary School learned about the impacts of pesticide use and how to make natural, environmentally friendly pesticides. Students created and distributed their own natural pesticides and created posters to illustrate the impacts of harmful pesticides on ecosystems. Each group of students received one jalapeno, four cloves of garlic, soap, and water. The students began by chopping garlic and Jalapenos, and excitedly shared about their own experiences making cultural foods. "I love chopping and cooking," said Zara. "My mom makes a dish where she takes out the insides of the Jalapenos and then replaces it with meat. We eat a lot of garlic in our cooking!" Benjamin shared.

Each student created and decorated their own natural pesticide recipe card with parchment paper and markers, and poured some of their natural pesticide into a spray bottle to take home. Ryan noted, "Jalapenos are spicy, so maybe that is why this is a good bug repellant: it burns their mouths if they try to eat the plant." Frederick exclaimed, "This smells so strong! I bet it is going to work!" Zhihao shared, "I have a garden at home! I can't wait to try this in my garden!"

Students also made posters about pesticides in the environment. The class discussed what makes a poster effective. "If it had beautiful images on it like a sunset" Houwei proposed, prompting the class to agree to use lots of colors and bold writing in their creations. The class also wanted to make their environmental messages memorable, "The Mr. Clean commercials got stuck in my head because they have catchy words, " Sejal remembered. "My poster shows two sides of the earth, one with pollution and one without," Beyond shared. "I made my poster about the ban of DDT and how harmful it is for wildlife and people," said Alex. The young Environmentalists couldn't wait to hang their posters around their school to teach others about the harmful effects of chemical pesticides and safe alternatives, to protect local fish, wildlife, and communities of people

Glassbrook Elementary School: Sunol Regional Wilderness Field Trip
The Glassbrook students couldn't wait to embark on a bus field trip to explore the Alameda Creek habitat at Sunol Regional Wilderness. "Do you know where we are today?" KftB Educator Grace Bedecarre asked the class. "We're in the wild!" Jacob exclaimed. "Yes, we're at the Sunol Regional Wilderness. This area is less developed and it's preserved to maintain the environment and local ecology," confirmed Ms. Grace.

The class walked down to Alameda Creek, noting how the flowing water shaped the landscape. Some areas of the creek were dry, while pockets of water remained, indicating the creek pathway at its peak in winter. Kneeling beside one of these pockets, Amisaday observed, "The water looks different when it's still. There's more green growing in it. It's slimier." The students then moved to where the creek was flowing. As they watched small fish swimming in the creek and a butterfly fluttering above, one student remarked, "It's so

beautiful here!" Students examined pictures of water striders and other aquatic invertebrates, and discussed their unique adaptations. "I've seen dragonflies before, the bright red ones. Before our last field trip, I didn't know they started their lives in water." The students split into groups to find and record natural objects in the creek habitat. Avila Volunteer Cynthia pointed out a slug that was camouflaged among the fallen leaves. The class also encountered a snake coiled at the base of a tree trunk. "A snake! What kind is that?" asked Anthony. Joya replied, "Garter snakes can be distinguished by rattlesnakes by their head shape and of course, by the signature sound rattlesnakes make." Kiely observed. "We should give the snake space. It looks angry. It's probably scared."

Inside the visitor center at Sunol Regional Wilderness, the students explored various exhibits and nature artifacts. "It says crows can read stop light signals," Yasmin remarked, amazed. "It says there's a plant that can be used as soap! What is soap made of?" Jayden asked.

To conclude their trip, the students embarked on a nature walk armed with scientific tools, binoculars and interpretive guides. Each group received a flower guide categorized by color. At the start of their observational hike, they spotted their first flower. "Is this mustard? It has yellow flowers," one student wondered. Students also investigated yarrow, owl clover, monkeyflower, and the California poppy. "Thank you for everything, this program has been amazing!" exclaimed Teacher Fanny Camacho. The Glassbrook Elementary School students promised to continue to do their part to protect wildlife and the local watershed!

Lincoln Elementary School: Crab Cove Field Trip

At Crab Cove, KIDS for the BAY students in Ms. Gee's class at Lincoln Elementary School in Oakland explored rocky shoreline habitat and met unique bay organisms. The investigation helped students get up-close and personal encounters with green shore crabs, isopods, snails and acorn barnacles–a first time experience for many! Students uncovered a fascinating hidden world by using field microscopes to observe tiny plankton. "The plankton are so small that they need their own fishing net!" said Yanglin. The Lincoln Environmentalists observed a variety of seabirds, ducks and geese with binoculars. "Those ducklings can move quicker than I thought! I wonder how old they are," pondered Isabella. Sejal discovered a crab exoskeleton or *molt* and asked, "Can I show this to everyone?" Ms. Grace helped Sejal educate her classmates about her discovery. "I love this!" said Felix. "This is the best field trip ever! I found so many crabs. My favorite part was investigating the rocky shore."

<u>Student Program Reflections:</u>

> "I want my parents to see how much I've learned about protecting the environment in our assembly."
> Ethan, Third Grade Student, Lincoln Elementary School, Oakland
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> "If I wanted to convince someone to take care of the environment I would say, 'If you like seafood, you should care. If you want to see any cool fish and crabs, or even if you want to have a shell collection, you should care."
> Yingman, Third Grade Student, Lincoln Elementary School, Oakland
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> "I learned that the San Francisco Bay estuary is unique and special, which has made me more passionate about helping take care of it."
> Yuma, Third Grade Student, Lincoln Elementary School, Oakland
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> "Some people want more factories for money but it is more important that we have what communities need, like schools and parks. We should have less factories. I want to take care of the Earth because I already didn't get to see it like it was in the olden days, when there were lots more plants and animals."
> Angela, Fourth Grade Student, Glassbrook Elementary School, Hayward.

PROFESSIONAL DEVELOPMENT FOR PARTNER TEACHERS

KftB partner teachers increased their confidence and skills in teaching environmental education by observing and participating with our Educators as they led the watershed lessons and activities. Teachers were thrilled with how much their students learned.

> "My students are more aware of all the litter in our yard at school. They are also more aware of the wildlife in our city. The kids were very engaged with the hands-on model of the bay, labeling it and putting 'pollutants' in it. They also loved doing the trash cleanups."
> Claudia Hung-Haas, Third Grade Teacher, Lincoln Elementary School, Oakland

2024-2025 SCHOOL YEAR

In the current school year, we are excited to have already begun school visits to teach engaging, hands-on lessons and connect students to their local watershed environment. Our students are diving into hands-on watershed science activities in the classroom, connecting with their local environment in watershed scavenger hunts outside, and conducting school campus and neighborhood trash cleanup projects to prevent litter from entering the storm drain system. This school year, two classes at Highland Community School and two classes at Emerson Elementary School in Oakland will be participating in the "Waste Reduction Education" Action Project, where students will engage in an in-depth exploration of waste reduction and management, implement their own behavior changes for reducing waste at school and at home, create educational posters and educate their peers, families, and school communities about solutions for reducing waste and trash pollution. Students at Burbank Elementary School in Hayward will be completing the "Jobs in the Watershed" Action Project at a protected habitat in Sunol, as part of our partnership with SF Public Utilities Commission and Avila and Associates Consulting Engineers, Inc., to explore careers in watershed management and environmental stewardship.

We also plan to lead nature-based bus field trips where students will study and explore a bay or creek habitat. WAP spaces this school year filled faster than ever, with partner teachers eager to work with KIDS for the BAY. It is inspiring to know that so many teachers are committed to incorporating hands-on environmental education into their curricula. With the support of our funders and donors, we continue to deliver engaging and equitable environmental education programs to our under-resourced partner schools.

ORGANIZATIONAL UPDATE

In the 2023-2024 school year, KIDS for the BAY partnered with **173 teachers and 4,593 students** in our environmental education programs.

- **4,593 KftB student leaders** created and shared informational posters, videos and environmental pledges at special presentation events to teach their families and school communities about the importance of protecting the local watershed and the San Francisco Bay to keep these environments clean and healthy. They also made and distributed green pesticides for school gardens, and led safe bay fish cooking presentations to teach their families how to reduce intake of toxins and protect their health. In addition, student leaders completed creek restoration activities including planting projects and ivy removal.
- KftB student rangers cleaned up **2,447 gallons of trash from their local watershed environments, including school campuses, local parks, creek, bay, delta and ocean habitats**
- KftB student environmentalists **completed 6,245 environmental stewardship hours**, cleaning up and protecting the environment we all share, and educating others about protecting the environment

Student participants included more than 84% low-income students, 94% students of color and 54% English Language Learners.

New Partnerships

KftB has recently entered exciting new partnerships with the Richmond Outdoors Coalition and Oakland Goes Outdoors to increase the impact of our work in Richmond and Oakland schools. We are also working on a new partnership with East Bay Municipal Utility District - Wastewater Division to bring a special focus on drinking water resources, wastewater treatment and pollution reduction to our school based programs.

Addressing Corporate Responsibility for Plastic Pollution in Our Watersheds

KIDS for the BAY students have addressed individual and collective responsibility for the plastic trash found in our watersheds during trash cleanup projects for many years. We are excited to be a bigger part of the solution to reducing plastic pollution and microplastics by addressing corporate responsibility and tracking the brands of plastic trash our students collect during their watershed lessons. By sharing our students' data with Earth Island Institute, our fiscal sponsor, KftB students are helping to bring the first major lawsuit of its kind against the biggest plastic polluting corporations, urging them to find alternatives. Read more…