



*The mouth of Pinole Creek at San Pablo Bay. Credit: Ann Moriarty.*

## Transforming a creek's plight into community action

AGU's Thriving Earth Exchange facilitates urgent community discussions about the Pinole Creek Watershed's future imperiled by trash

California's Pinole Creek Watershed comprises 15 square miles of Contra Costa County (one of California's original 27 after statehood in 1850), situated northeast of San Francisco. Its two main cities, Pinole and Hercules, sit adjacent to a number of unincorporated areas such as the Briones Agricultural Preserve and the East Bay Municipal Utility District, which treats wastewater from nine area cities including Alameda, Albany, Berkeley, El Cerrito, Emeryville, Kensington, Oakland, Piedmont, and Richmond.

The creek and its nearly 50 small tributaries flows 10 miles west from its headwaters in the Briones Hills, a low mountain range comprising chaparral, riparian, and primarily oak woodland habitats. It's an uncommon idyll within the Bay Area that resisted development amid Contra Costa County's growth, averaging 55% per year

between 1920 and 1990 (and at one point growing 197% between 1940 and 1950—arguably the posterchild for America's postwar boom). But, Pinole and its creek hasn't resisted the collateral damage of this growth. Trash, in particular, has been an ongoing challenge for residents hoping to keep the creek clean.

"Pinole Creek is an important asset for us, but trash is a big problem," says Ann Moriarty, a local resident and a community leader for a recent project of AGU's Thriving Earth Exchange focused on drawing attention to the deleterious impact of trash thrown from nearby roads by cyclists, drivers, dog walkers, and hikers alike.

The biggest obstacle to solving the trash problem, says Moriarty, is people. "It's behavior change—a greater behavioral change of people, and that's the biggest obstacle. If our innate behavior doesn't change, then the creek will not be 100% trash-free because there are always people being thoughtless."

### Convening community and setting goals

The area around Pinole, itself, with a land area of just over five square miles, is home to about 20,000 people in 6,745 households. The creek traverses the city alongside ranches, houses, shopping areas, schools, and parks. What local residents call an "alarming amount of



Pinole Creek and its nearly 50 tributaries flows 10 miles west from its headwaters in the Briones Hills and comprises 15 square miles of Contra Costa County, California. Credit: Friends of Pinole Creek Watershed.

trash” goes beyond the odd plastic bag or bottle—it also includes furniture like chairs and window casings, as well as truck parts and car tires. In 2014, local residents formed Friends of the Pinole Creek Watershed to address the trash problem and create opportunities for greater public awareness in partnership with other organizations and community groups such as the Contra Costa Resource Conservation District, the City of Pinole, the Earth Team representing Pinole Valley High School student interns, and the East Bay Municipal Utility District.

The Friends of the Pinole Creek Watershed describe themselves as “a community of unsung heroes that gather trash as they walk along the creek,” which—by all reports—is a weekly effort. They applied to AGU’s Thriving Earth Exchange in 2019 as an appeal for help, not just in convening residents in an organized way around the trash problem, but to identify ways to make their voices louder—and generate greater awareness among city officials and school-age children alike, as well as within the local business community.

At Pinole and in dozens of communities around the country, AGU’s Thriving Earth Exchange serves as a connector and facilitator to bring together communities who have self-identified concerns, fellows who organize and administer community-based projects that address those concerns, and experts who can address the specific scientific issues that come to bear on the projects. The Thriving Earth Exchange trains and convenes fellows during the

course of their projects, offers limited monetary support, and provides opportunities for fellows to create awareness of the scientific challenges that projects raise and, ideally, help solve, as well as opportunities for fellows to share their work.

This project, “Engaging community to protect the Pinole Creek Watershed: Assessment of trash impacts to promote a thriving ecosystem,” began in the fall of 2019 and concluded in June 2022 with the publication of a report detailing 15 lessons for other community groups hoping to gather and debate solutions for problems in their areas. The lessons are a mix of homespun encouragement and practical tips for consensus-building toward common goals. Identify project leaders who are accountable to regular (and focused) meetings, be flexible in your expectations of others but firm in your commitment to the project, don’t neglect the long-term vision, and definitely don’t forget about humor and humility—prescriptive and pragmatic, but still providing a loose framework for adaptation.

“The heart of this project was getting members of the Pinole community engaged,” says Todd Harwell, the project’s Community Science Fellow who is currently a post-doctoral scholar at the Center for Community and Citizen Science at the University of California, Davis. Harwell’s method for engagement was to propose the group work backwards by identifying outcomes such as the report, as well as the report’s intended audiences. “Then we took a step back and asked what activities would facilitate that

outcome,” he says. “During that phase, I acted as a filter, doing my best to keep things moving as they generated the ideas that would become the final vision.”

### **Working backward to go forward**

One of Harwell’s jobs as a community science fellow was to facilitate communication within the group along with Win Cowger, the project’s Community Scientist, and an Environmental Scientist at Long Beach, California’s Moore Institute for Plastic Pollution Research. Harwell and Cowger spent most of their time listening to the group’s needs before proposing pathways for the project to align with community science outcomes. “They all wanted bigger change, and we were able to come together to identify an evidence-based and science-based process as the key to solving the challenge, which included data sets that the project’s leaders could use to make the case for the creek’s challenges.”

The project’s three overarching goals included (1) Identify and understand sources, paths, and impacts of litter entering Pinole Creek (2) Engage people of all ages in trash monitoring and litter cleanup, thereby fostering a sense of environmental stewardship that endures well beyond project participation and (3) inform policy development for the creation of a city-wide creek protection ordinance.

What does bigger change look like, to quote Harwell? Besides its benefit to other communities, the Pinole Creek report exists as a resource for Moriarty and advocates to encourage greater focus on the creek’s future (not to mention addressing the behavioral aspect of littering) among municipal authorities.

Besides Moriarty, Harwell, and Cowger, Watershed Conservation Manager for the Contra Costa Resource Conservation District, Lisa Anich, local environmental justice advocate Itzel Gomez, and Pinole Councilmember (and former Pinole Mayor) Norma Martínez-Rubin provided leadership for the project, which was sponsored by the Gordon and Betty Moore Foundation. Additional support was provided by the Moore Institute for Plastic Pollution Research, The McPike Zima Charitable Foundation, and University of California, Riverside.

### **A cleaner future for Pinole Creek**

Aside from the project’s outcomes and the report’s utility for other creekside communities, Moriarty believes it represents a rallying point for extra-governmental action to curb littering.

“The city can only do so much to deter littering. No law is going to stop a person sitting in his car and deciding to toss a beer bottle out of the window,” she says. “It’s up to us as residents to agree on the problem, organize ourselves, and be good stewards of a landscape that means so much to us. AGU helped us do that here.”



*“Pinole Creek is an important asset for us, but trash is a big problem,” says Ann Moriarty, a Pinole, California resident and a community leader for a recent project of AGU’s Thriving Earth Exchange.*



*Closer to Pinole, the creek is surrounded by residential and commercial development, whose activity accounts for most of the trash found in its waters. CC BY-SA 4.0 Coro.*



*The area around Pinole, itself, with a land area of just over five square miles, is home to about 20,000 people in 6,745 households. CC BY-SA 3.0 Coro.*

Making the case for behavioral change is the foundation for what's next. The Pinole Creek team identified four distinct products its members believe will help in that effort. They include (1) a map of the watershed identifying locations where illegal dumping and litter are common, and a characterization of the trash and water quality at each site, (2) a community-engaged water quality monitoring plan for testing creek health, (3) a report for students, residential, and commercial communities summarizing social and ecological impacts of litter in Pinole Creek, and (4) a report for local government presenting science-based recommendations for trash-reduction programs and the creation of a city-wide creek protection ordinance.

But, the Friends of the Pinole Creek Watershed see these products as opportunities—rather than ends in-and-of-themselves—to engage partners, such as the Contra Costa Resource Conservation District, the City of Pinole, the Earth Team representing Pinole Valley High School student interns, two local elementary schools, and the East Bay Municipal Utility District. The planned roster of joint events includes public outreach for community cleanup events, school presentations, water quality testing training, nature walks that help residents understand the scope of the trash problem, and outreach to local businesses to get them to see the positive impact they (and their customers) can have on the creek's future.

“The success of this project, for me, was about engaging in this process to get to a point where our activities would be sustainable by members of the community,” says Harwell. “We’re not going to clean up the creek tomorrow or tomorrow, necessarily, but we definitely got to a place where we had generated awareness and concern at the city council level.”

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“Engaging community to protect the Pinole Creek Watershed: Assessment of trash impacts to promote a thriving ecosystem” is a project of AGU’s Thriving Earth Exchange, which advances community solutions to some of the most vexing environmental challenges. Thriving Earth Exchange helps scientists, community leads and sponsors work together to conserve natural resources, mitigate climate change and create awareness of natural hazards and their impacts on communities.

Learn more at [thrivingearthexchange.org](http://thrivingearthexchange.org).