Citizen Assisted Monitoring of Air and Water Quality in the Rio Grande Valley

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The pitch

I am asking Valley residents, local organizations, and funders to help launch a citizen-led air and water monitoring pilot. We need to know what reaches the places where people breathe, work, fish, and draw water, and relate actions performed at the source to monitor reduced exposure.

The pilot would look at agriculture, food processing, packaging, and other industrial operations, including freight corridors, wastewater discharges, and waste sites. We would start with one Arroyo Colorado reach and one industrial or mixed-use corridor in the Lower Valley. Existing measurements and local observations would guide where we place acquired equipment.

Naturalists, birders, anglers, and nearby residents already know these places and return to them. Trained volunteers would make routine observations, collect scheduled samples, and use kits already on site when a plume, runoff event, or bloom occurs. A location-coordination app named DropPoint would document precisely where and when each sample was taken and connect it to the lab result and any agency response.

Residents along the Houston Ship Channel built their own air-monitoring network because they couldn't get timely, usable information from the state about what they were breathing. When they reported strong chemical odors, a response could come after the odor had already passed. After the 2019 ITC fire, residents and local organizers recruited homeowners, businesses, and churches to host monitors and made the readings public. The Texas Tribune Article

Mexican American families helped build the Houston Ship Channel more than a century ago. Generations later, residents along that same channel had to build their own monitoring network to find out what they were breathing. They were left with questions the state should have helped answer long ago. How many people were getting sick or dying early because of the pollution?

Brownsville residents face a similar gap. TCEQ's East 6th Street station measures fine particles continuously, but it checks for chemicals such as benzene using periodic samples at one location. That leaves residents with little information about a short release that occurs between samples or reaches a neighborhood away from the monitor. A resident-led Valley network can help fill that gap by putting monitors where people live, documenting pollution events as they happen, and publishing the results. We can also establish a neighborhood health baseline from the beginning so residents can see whether cleaner air and water are followed by better health. [1–3]

TCEQ monitoring assessment · TCEQ air toxics review

What support is needed

Help equip six pilot sites for 90 days. Fund reusable equipment, collection media, consumables, sample transport, and laboratory analysis so volunteers can contribute their time without buying supplies. We need local hosts, a lab to help design the sampling, and partners who can help recruit and train collectors.

At the end of the pilot, publish the monitoring map, validated results, and a record of what agencies were asked to investigate and how they responded. Keep revisiting the same sites so residents can see what changes.

Pilot Design and Field Operations

Proposed starting scale: 12 trained volunteers, three air sites and three water sites, and a 90-day field period after setup. Confirm locations, methods, and costs with site hosts and the laboratory before deployment.

Choose sites from evidence already available

Air. Use TCEQ records, Brownsville's Clarity network, available PurpleAir readings, wind history, and resident reports to identify a recurring hotspot. Select a background location and two potential downwind receptor sites near homes, schools, or other occupied places. Classify each site against the actual wind at collection time. Consider industrial emissions, truck traffic, processing, waste handling, and agricultural drift when choosing the first target. [4–5]

Water. Use existing watershed records to select an upstream comparison point, an accessible drain or tributary, and a downstream receptor along a reach of the Arroyo Colorado. Choose the reach based on coverage gaps and whether the layout can help distinguish runoff or discharges. Consult the watershed partnership and Texas Stream Team. [6–7]

Stage kits and establish a baseline

Give each location a permanent DropPoint[10] site ID. Record coordinates, access instructions, a reference photo, sampling height or depth, kit inventory, and a backup collector. Stage lab-supplied media, labels, seals, instructions, and return packaging with designated hosts. Check storage conditions, expiration, batteries, and pump calibration before deployment.

Collect scheduled baseline samples in both media. Use existing continuous air readings where suitable and add a particle monitor where the site lacks coverage. Select chemical tests based on the suspected source and lab methods. For water, consider nutrients and a targeted pesticide panel, including herbicides. Add industrial analytes, PFAS, or cyanotoxins where the site history and lab method support the choice.

Collect while the event is happening

Air trigger. Use a site-specific particle spike, a recurring odor under the relevant wind direction, or a known operating window. Predefine when to start and how long to sample with the lab. Collect paired comparison samples where feasible. A particle spike can trigger chemical sampling.

Water trigger. Use forecast rainfall, a rise in flow, a visible discharge, or a bloom report. Sample at the earliest safe opportunity within the planned window and record rainfall, flow conditions, and time since the event began. Use trained partners for fish tissue sampling when the exposure question warrants it.

Collectors work at approved locations with safe access. For a fire, spill, or other emergency, follow official instructions and collect only when the site is safe and accessible.

Data Quality Public Reporting and Health

Document each sample from collection to result

Link the site ID and sample ID in DropPoint. Record collector, collection times, medium, method, kit or cartridge lot, weather, instrument readings where applicable, and sample handoffs. The laboratory specifies container, preservation, holding time, flow checks, blanks, and duplicates. Keep original records and lab reports, including reporting limits and qualifiers. Test the DropPoint workflow and use lab custody forms with the same sample IDs.

Publish what was found and what happened next

Show dated observations, screening readings, and validated laboratory results with their status visible on the public map. Include the method, units, reporting limit, and applicable benchmark when available. Publish locations at a scale that protects private hosts while preserving exact coordinates for repeat sampling and authorized review.

For a result that warrants follow-up, record the agency notified, referral date, response, and subsequent measurements. Use wind or flow, paired samples, and available operating or application records to evaluate likely sources. Where findings may bear on compliance, ask the responsible agency what evidence it needs and document any confirmatory sampling or action.

Measure whether conditions improve

After source controls, changes in practice, or cleanup, repeat the same sampling at comparable times and under similar wind or flow conditions. Report measured concentrations before and after, and how often spikes recur. Where a cleanup is involved, record when work began, what was physically removed or contained, and what follow-up samples showed.

Ask UTRGV or a public-health partner to help define exposure areas and comparison neighborhoods at the outset. Seek aggregate baseline data on asthma-related emergency visits, selected cancer diagnoses, age-adjusted deaths before 75, and years of potential life lost. Use multi-year rates where counts are small. Analyze health trends over a longer period alongside exposure trends and relevant changes in the communities. Texas DSHS accepts requests for aggregate vital statistics. [8]

Evaluate the first 90 days

Report sites active, scheduled visits completed, events sampled, samples accepted by the lab, results published, and agency responses received. Note which triggers worked, which locations need better coverage, and the cost per usable result. Use that record to decide where to add sites and which measurements to continue.

Launch Partners Budget and Sources

Get the pilot ready

Weeks 1–2. Convene Valley Master Naturalists, birders, anglers, and residents. Invite the Arroyo Colorado Watershed Partnership, Texas Stream Team, a laboratory, and UTRGV or another public-health partner. Identify one local volunteer lead for each medium. [6–7, 9]

Weeks 3–4. Confirm site access and existing coverage. Choose the first chemicals and sampling triggers with the lab. Secure quotes, confirm supply funding, stage kits, and run a dry test from alert through lab delivery.

Next 90 days. Run both air and water sampling, replenish kits after each use, review results as they arrive, and post the pilot report and agency follow-up log.

Fund the supplies and testing

Use a six-site sponsor request. Price reusable pumps, monitors or calibration equipment where needed, protective housings, water kits, and spare equipment per site. Price cartridges, bottles, blanks, seals, sample transport, and lab analysis per collection. Reserve part of the lab budget for events and repeat tests. Collect vendor and lab quotes before putting a dollar amount on the ask.

For initial quotes, allow four routine rounds plus capacity for two event rounds at the three sites in each medium. At one primary sample per site per round, that is up to 18 air samples and 18 water samples, plus lab-specified quality-control samples. Continuous sensor readings are additional. Adjust the schedule after the lab confirms what each test requires.

Sources and local contacts

1. TCEQ benzene results at Lynchburg Ferry
2. Texas DSHS East Harris County cancer assessment
3. England Environment Agency PFAS river assessment
4. TCEQ regional air monitoring reports
5. Brownsville Air Quality Sensor Network
6. Arroyo Colorado Watershed Partnership
7. Texas Stream Team training and partner inquiries
8. Texas DSHS vital statistics requests
9. Texas Master Naturalist chapters in the Valley
10. DropPoint precision location coordination system