Air Watch
Bay Area

A community resource and a model for accessible data

Air Watch Bay Area presents information on air quality from real-time air monitors near Bay area oil refineries. Bay area residents can add their first-hand observations of air pollution—including smells and flares—to the project's public repository of information on air quality via the website's reporting function or the Air Watch app.

Air Watch Bay Area is a model for public access to data from air monitoring at and near refinery fencelines. It also highlights the need for public investment in infrastructure to make monitoring data accessible and relevant to communities concerned about air pollution.

This overview highlights what make the website and app effective in raising public awareness and empowering community members who are dedicated to change. The strengths and weaknesses of these tools point to steps that future projects should take to improve upon the Air Watch model, and the resources needed to do so.

# What Makes Air Watch Bay Area Effective

Air Watch Bay Area is a uniquely useful tool for communities concerned about air quality. The following qualities should be part of any project to make air monitoring data accessible and meaningful to communities.

DIVERSE DATA SOURCES AND TYPES

Air Watch Bay Area incorporates several kinds of data from multiple sources, including:

» Privately operated fenceline and community monitors (through fenceline.org)

» Community-owned real-time monitors (Awair and PurpleAir)

» On-the-ground observations by the public of smells, flares, spills, and other pollution events

Unlike many websites related to environmental quality, airwatchbayarea.org doesn't merely broadcast data to users. It welcomes data from them as well. By incorporating user-generated content, the site values residents' first-hand experiences equally with measurements from official sources like fenceline.org.
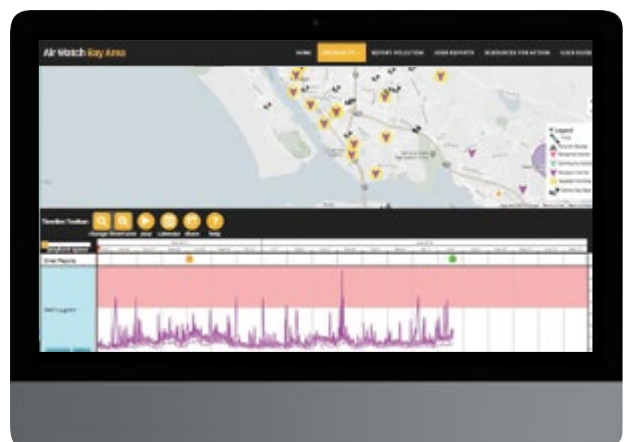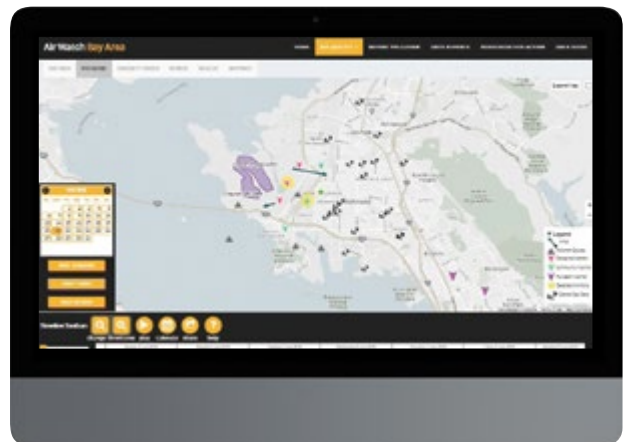
ABOVE: *Locations of air monitors, industrial facilities, and schools, as shown on airwatchbayarea.org. The graph shows fluctuations in air monitor readings over time.*

HISTORICAL AND COMPREHENSIVE

Air Watch Bay Area captures data and uses them to build information over time. Users can easily scroll back in time to review past monitor readings and user reports, so it's easier to spot trends, make comparisons, and put what happened yesterday or last week into a larger context.

VISUAL

Maps orient users to the locations of monitors, industrial facilities, communities, and schools. Animations show how pollution levels change with wind direction, offering clues about where pollutants originate and who exactly they put at risk.

COLLABORATIVE

Air Watch Bay Area is a joint project of members of several refinery-impacted communities, social scientists, software engineers, data scientists, and designers. Each of these perspectives was necessary to make the site and app valuable to Bay area residents.

OPEN

Being an open-source platform means that the project's code is available for other individuals, organizations, and communities to adopt or adapt for their purposes. User reports and historical monitoring data are available for direct download—there's no need to file a request!

CONNECTED

Concerns about air quality are inseparable from concerns about permitting, enforcement, health, and the power of industry. Air Watch Bay Area directs users to resources for learning about the broader politics of air quality, contacting government officials, and connecting with other concerned citizens working to protect the environment.

Obstacles to Overcome

The most significant challenges for Air Watch Bay Area to overcome were structural issues related to how air quality is measured and managed. Obstacles at this level will always be difficult for small coalitions or community-led projects to overcome. Successful efforts to make fenceline monitoring data useful to community members require cooperation from regulators and data experts alike, as well as greater public investment in infrastructure for data access and storage.

COORDINATING MULTIPLE SYSTEMS

The Air Watch Bay Area website used a variety of techniques and workarounds to integrate data. While some sources of monitoring data come with an application programming interface (API) designed to make transferring data easy, the majority do not. To facilitate the use of data by multiple platforms and users, APIs should be standard for publicly available air monitoring data.

Ideally, Air Watch Bay Area would share user reports directly with environmental regulators who have the authority to act on them. However, the design of the Bay Area Air Quality Management District's (BAAQMD's) online reporting system prevents Air Watch Bay Area from passing user reports along to the agency, and BAAQMD offers no access to the pollution reports it receives from the public.
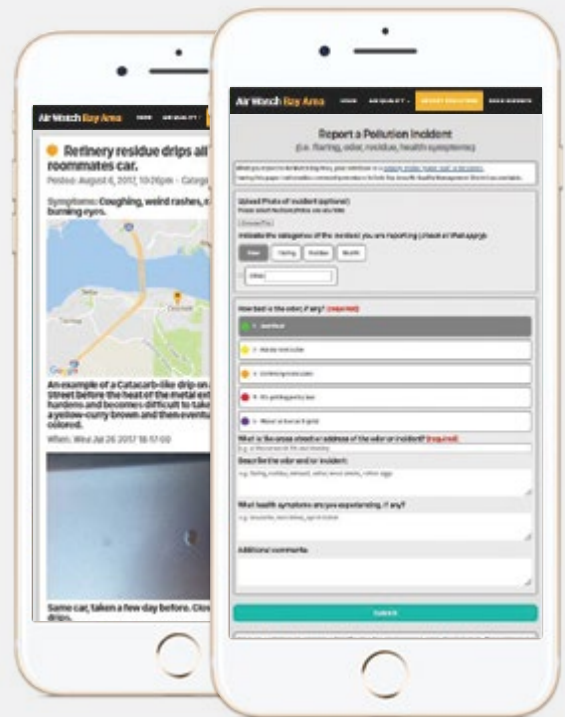
ABOVE: *User reports submitted through the Air Watch app appear on the website, creating a publicly available record.*
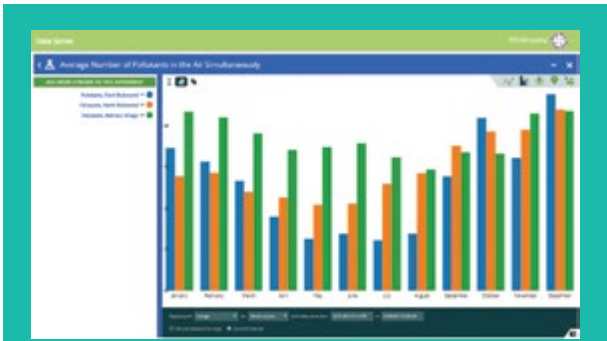
A NEW METRIC FOR COMMUNITIES ON THE FRONT LINES?

People living near oil refineries sometimes say they're breathing "toxic soup." An analysis of community monitoring data from Richmond, CA, shows that, between a quarter and half the time, residents are breathing four or more chemicals at detectable levels. Quantifying the regularity with which residents are exposed to several chemicals in combination is one example of the kind of information real-time monitoring could yield, if there were more resources dedicated to interpretation.

ABOVE: *The project team used Data Sense, designed by Intel Labs, to analyze millions of data points from air monitors — too much to handle in a spreadsheet.*

ABOVE: *Servers at the CREATE Lab at Carnegie Mellon University store the monitoring data and user reports that appear on airwatchbayarea.org.*

CONVERTING DATA TO INFORMATION

Comparing real-time monitoring data to standards and screening levels is not adequate to provide a broader understanding of what the data say about air quality and how it effects the health of those living in, working in, and visiting the community. There is much more to learn, such as about fluctuations in pollution levels, trends over time, and relationships between multiple chemicals in the air. This requires data analysis by skilled programmers and data scientists, working in collaboration with individuals who can help identify metrics that would represent air quality as communities experience it.

STORING AND MAINTAINING DATA

The Air Watch website and app rely on large computer servers to store its data, user reports, and photos, and to ensure the site's functionality. The project rents and borrows server space—and, along with it, the expertise to administer and maintain these servers. For Air Watch Bay Area to continue to curate data and expand its usership, the program would require dedicated hardware and permanent staff members to manage the site and the app.

MAKING DATA ACTIONABLE

Monitoring is most valuable to communities when it leads to actions that improve local air quality. Increasing access to data in the ways described here is necessary but not sufficient to ensure that monitoring will influence regulatory actions that affect air quality, including citing refineries for violating their permits and deciding whether to approve new permits. Policy change would be necessary to better integrate monitoring into regulators' efforts.

Strategies for Success

Real-time air monitoring is becoming more widespread in the U.S. and around the world, and the public increasingly expects relevant data to be widely available. To ensure meaningful public access that can improve air quality, health, and environmental equity, the Air Watch Bay Area team recommends that initiatives do the following:

VALUE EXPERIENTIAL DATA

Take advantage of first-hand observations of sights and smells from individuals, which can be useful in augmenting measurements from air monitors. Program managers should equip data platforms to receive information from the public as well as relaying information to them.

DESIGN SYSTEMS IN INTERDISCIPLINARY TEAMS

Include community members, activists, social scientists, and data scientists—in addition to regulators, monitoring specialists, and software developers.

INVEST IN CREATING AND MAINTAINING DATA SYSTEMS

Ensure that community groups do not have to bear the burden of maintaining servers and websites that create meaningful public access to monitoring data. Larger institutions (such as agencies and foundations) that undertake projects with longer time frames should make long-term investments in infrastructures for accessing and interpreting data from monitoring.

ADOPT BEST PRACTICES FOR OPEN ACCESS

Use widely accepted techniques for making code and data available to the public (for example, use application programming interfaces [APIs] and version-control platforms such as github for open source code).

STRIVE FOR NEW KNOWLEDGE

Use the wealth of data generated by real-time monitoring to advance our understanding of environmental health in fenceline communities. Incentivize researchers to use the data, treat community members as partners in their investigations, and innovate methods and metrics that lead to greater insight.

CREATE PATHS TO ACTION

Design pathways to generate monitoring results and user reports that can influence decisions made by regulatory agencies about permitting, enforcement, and strategic initiatives. Agencies should identify mechanisms for considering this information, and communicate them to residents, as part of their mission of environmental protection.

Heavy chemical fregrance.
Posted: January 25, 2018, 12:05pm - Category: odor

Symptoms: (no symptoms)

PROACTIVE POLLUTION PREVENTION

Air monitoring is a reactive response to air quality concerns caused by existing pollution sources, and providing public access to air monitoring data is a necessary part of any strategy for protecting communities from industrial pollution. Proactive strategies are also necessary, however. Regulators and lawmakers should adopt pollution prevention measures that communities are already fighting for, including limiting refinery emissions and ending investment in new fossil fuel infrastructure.