IVAN Community Air Monitoring Network

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Imperial County, California

Imperial County Burdens

Exposures

- PM 2.5 concentrations
- Ozone concentrations
- Diesel PM emissions
- Drinking water contaminants
- Pesticide use
- Toxic releases from facilities

Environmental Effects

- Cleanup sites
- Groundwater
- Impaired water bodies
- Solid waste sites and facilities
- Hazardous waste facilities and generators

Sensitive Populations

- Prevalence of children & elderly
- Asthma emergency department visit rate

Socioeconomic Factors

- Educational attainment
- Linguistic isolation
- Poverty level
- High unemployment rate

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Air quality is a community priority

- Failure to meet PM1o standards
- Among highest rates of asthma in CA
- Residents needed more local and accessible air quality data

NIEHS "Research to Action" grant

- 4 year project (Jan 2014 – Oct 2017)
- Establish a **community air monitoring network**
- Use data for action

Main project partners

- Comite Civico del Valle
- California Environmental Health Tracking Program
- University of Washington (Dr. Edmund Seto)

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Regulatory network

Ensure compliance with state and federal air quality regulations

Community network

Provide accessible, understandable, and timely information on local air quality (PM2.5, PM10)

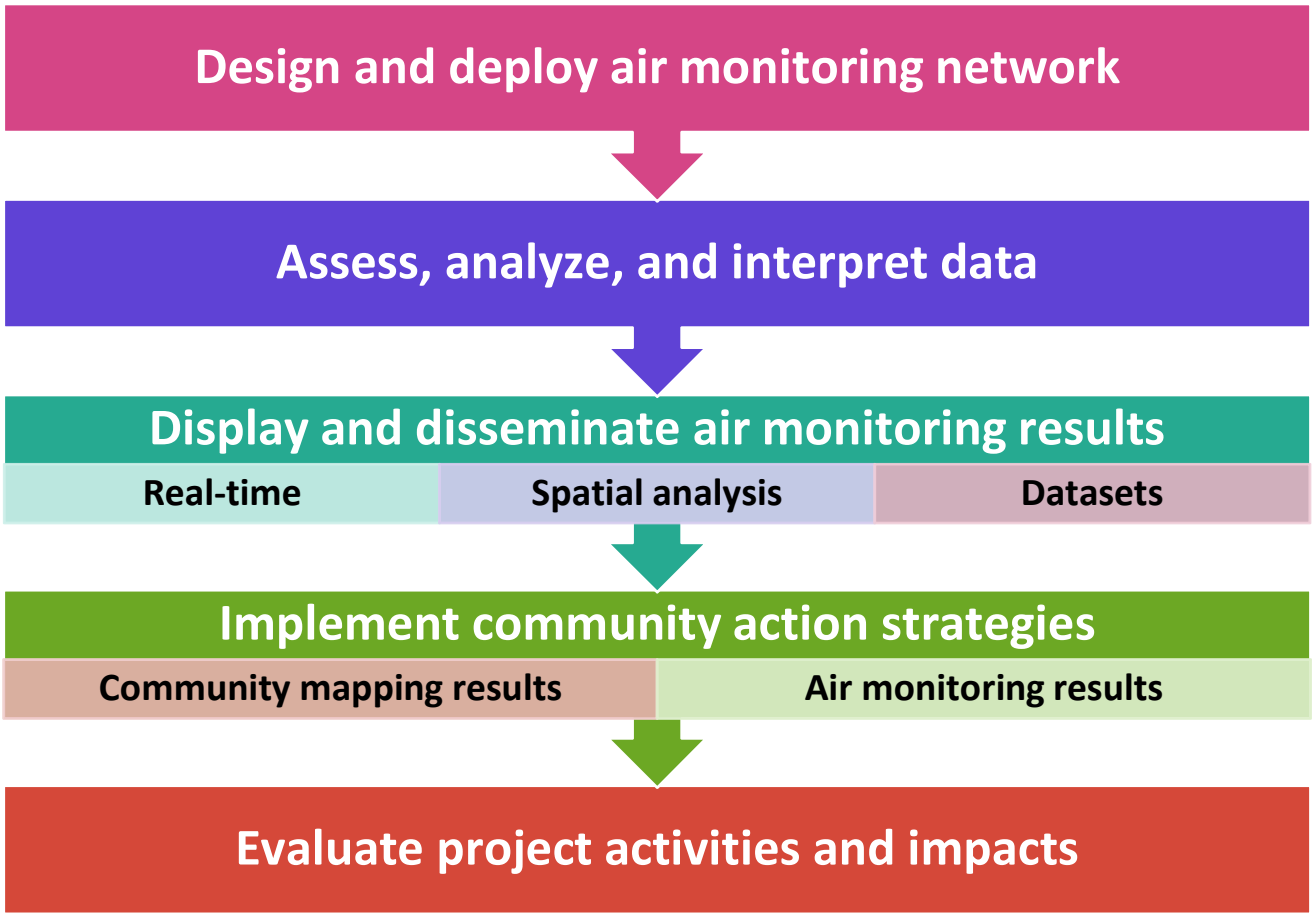
Developed, operated, and owned by community

Complements regulatory network

Community participation structure

Comite Civico del Valle	• Project co-investigator • Initiate, design, implement activities • Maintain monitors and website
Community Steering Committee (CSC)	• Guide project activities • Represent project
Community residents	• Collect data • Host air monitors • Plan and conduct action strategies

Overview of project activities



Community Air Monitors:
Sensors for ***non-regulatory*** air monitoring

Customized low-cost optical particle counter

+

Small computer & other env sensors (e.g., temp and RH)

+

Some will be colocated with met stations (EPA)

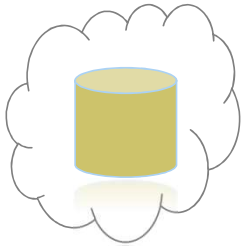
+

Wireless Networking

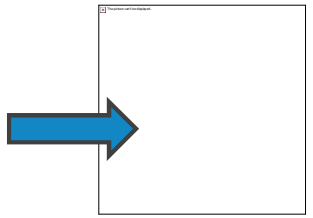
+

Robust Enclosure

+



Internet Database on the Cloud with data available on the web



Real-Time Air Monitoring Data

System designed by Graeme Carvlin, PhD student UW
Deployed and maintained by Comite Civico del Valle

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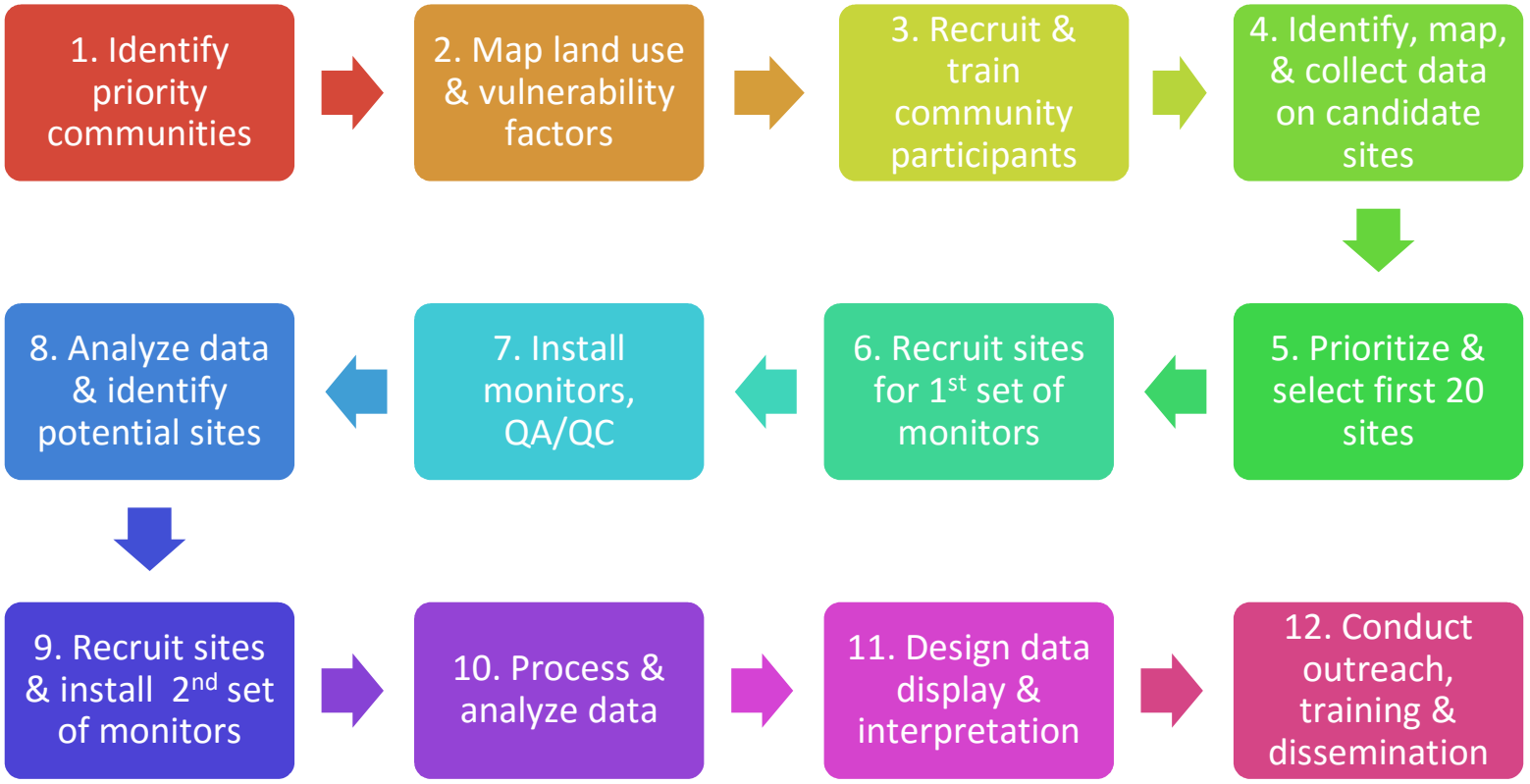
Network Design:
Incorporating community and scientific priorities



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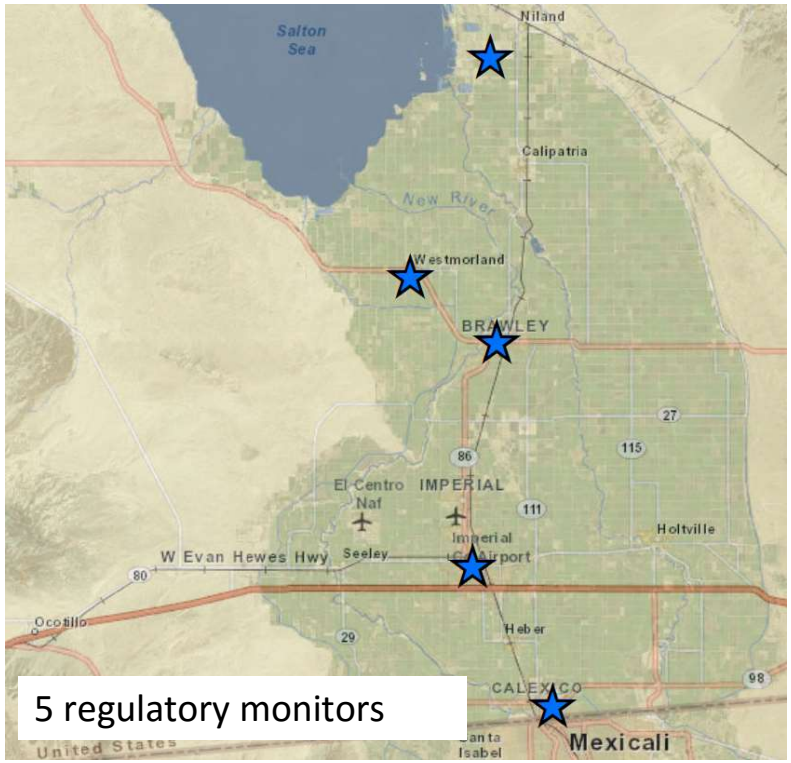
Network Deployment: Community capacity enables successful installation and maintenance

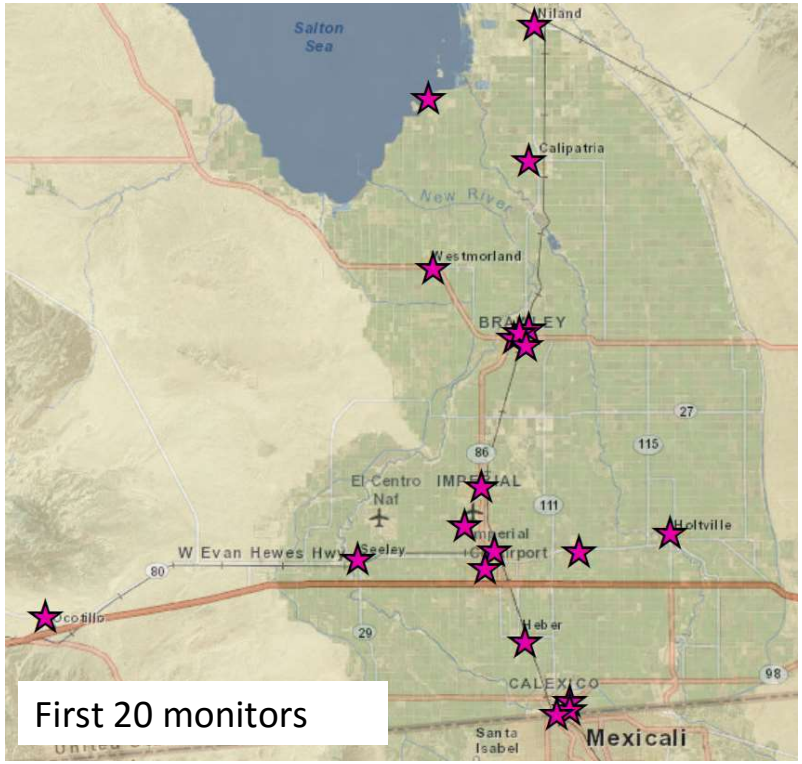
Community capacity and resources support installation of monitors

- CCV staff – personal example
- Air monitor hosts
- Brawley Union High School students and staff- metal shop example

Increasing community capacity promotes sustainability

- Training for monitor installation and maintenance
- Increased awareness leads to support and potential growth





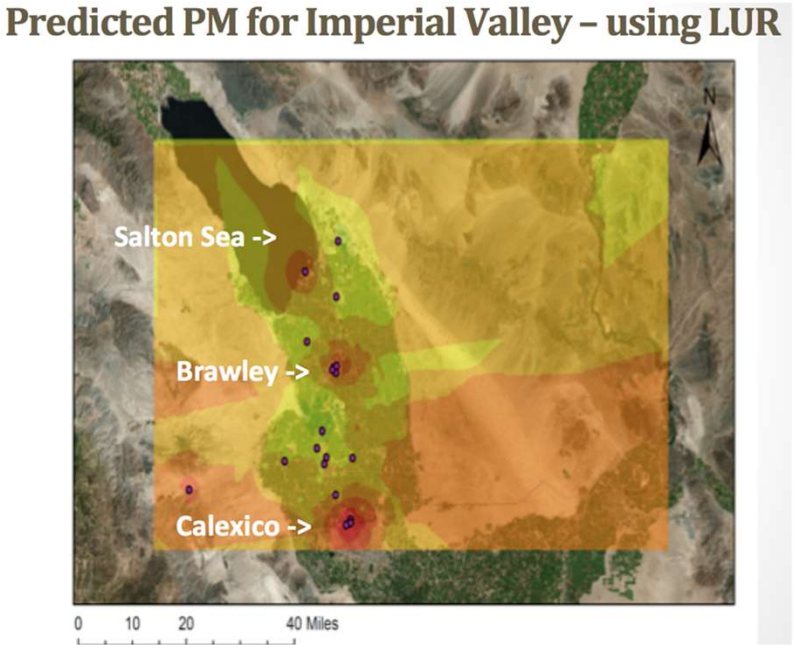
The sites selected for the first 20 monitors

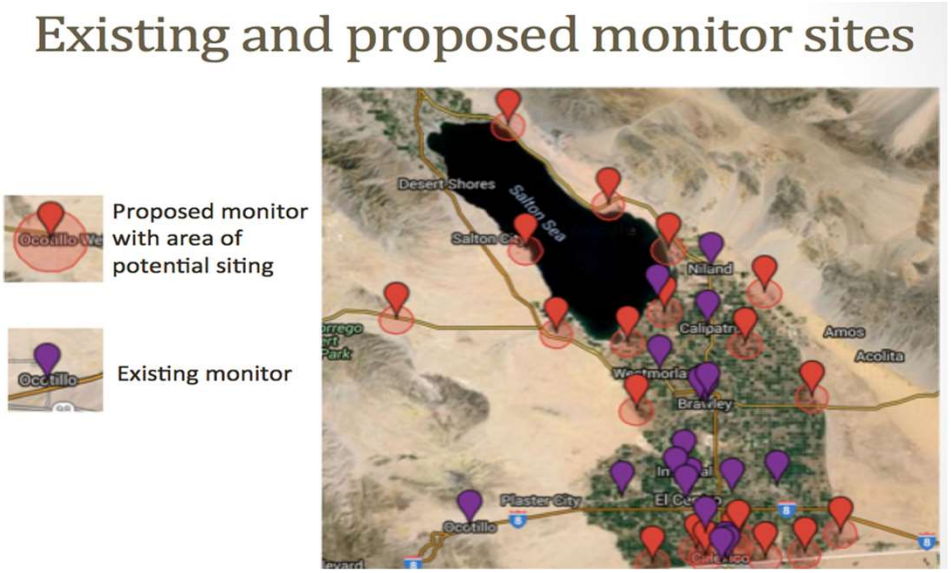
- **14** public schools (including a colocation with a regulatory monitor)
- **2** government buildings
- **2** private residences
- **1** business
- **1** national wildlife refuge (colocation with irrigation district monitor)

Assessment of data quality

- Lab and field validation of monitors
- Colocation with government monitors (CARB and IID)
- Colocation with EBAMs (CARB)
- Technical workgroup of air quality stakeholders
  - Includes local air district, California Air Resources Board, US EPA

Preliminary analysis to predict PM





What is Land Use Regression (LUR)?

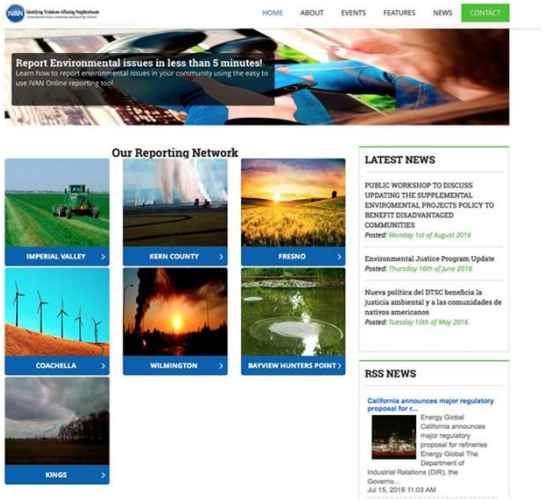
- Uses data from existing monitors
- Uses other data, from local pollution sources to geographic features
- Predicts pollution levels where we don't have monitors
- Can help us decide where more monitoring data are needed
- **Results of this initial LUR used to identify locations for last 20 air monitors**

Data Display and Dissemination:
Imperial County IVAN
Community Air Monitoring Network

- **Identifying Violations Affecting Neighborhoods (IVAN)**
  - Innovative crowdsourcing mapping tool
  - Designed by/for residents to report EH violations
  - Expanded to 7 communities in CA

- **Modified to enable data collection for project**
  - Mobile website
  - Custom forms to assess candidate sites
  - Submit location, photos, videos, etc.

- **Display real-time air monitoring data**
  - Needs assessments and focus groups informed metrics, messaging, and design
  - Users will be able to sign up for alerts and scheduled reports



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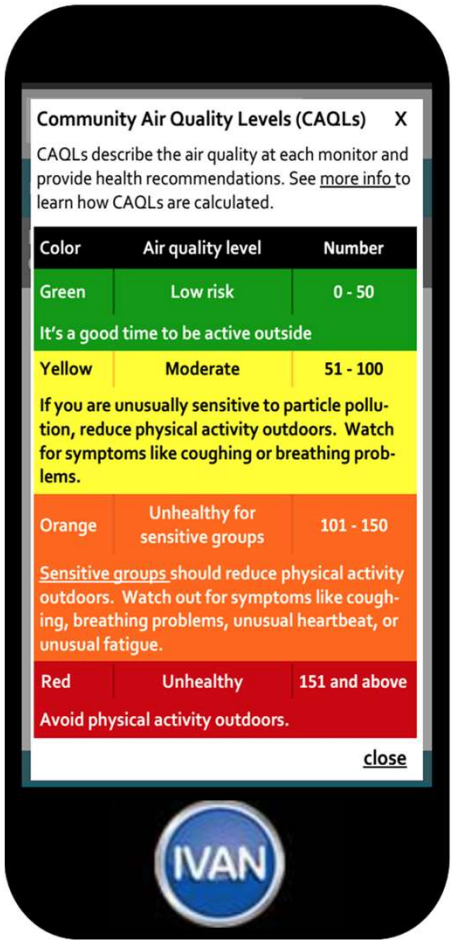

Data Visualization

- Conversion of Dylos particle count concentrations (#/0.01ft^3) to particle mass concentrations (µg/m^3), then convert to a health-relevant indicator
- To avoid confusion with US EPA's AQI, we will call the indicator something other than AQI.
- We currently have the ability to report 5-min, 1-hour, and 24-hour average data. We are evaluating whether the 5-minute data would be useful to display.
- It is possible to display the data on a map (for now, just the site locations) and as a time-series

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Translating research to action with **community engagement** and **citizen science**

Research

- Evaluate performance of low-cost monitors
- Identify air pollution hotspots and trends
- Assess use of mobile web platform to collect and disseminate data
- Evaluate how monitors facilitate community action

Action

- Engage community and build capacity to participate in scientific process
- Disseminate air quality information to support individual and community actions
- Design and implement action strategies to improve air quality and public health
- Ensure sustainability and community ownership of network after project ends

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Acknowledgments

- Community Steering Committee
- Community participants
- Comite Civico del Valle staff
- California Environmental Health Tracking Program
- University of Washington
- National Institute of Environmental Health Sciences

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