Integrating a Community Cumulative Impacts Framework in the Implementation of AB 617 and SB 673

CARB Chair's Seminar

May 17, 2021

TRACKING CALIFORNIA
INFORMING ACTION FOR HEALTHIER COMMUNITIES

Berkeley UNIVERSITY OF CALIFORNIA College of Natural Resources

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Three Project Elements

- **Capacity-building training and technical assistance** program to support community-based air quality monitoring under AB 617;
- **Community-engaged evaluation** of AB 617 implementation;
- Leveraging data sources and **applying novel methods to derive new geographic indicators of cumulative impact and community vulnerability** that can be integrated with or supplement existing spatial tools such as CalEnviroScreen (CES).

Study Team

Element 1 -Capacity-building/Training

- Tracking California (Paul English, David Chang)

Element 2 -Community-engaged Evaluation

- UC Davis (Jonathan London)

Element 3 -Novel Indicators and Methods for Cumulative Impacts Analysis

- UC Berkeley (Rachel Morello-Frosch)
- UCLA/SFSU (Lara Cushing)
- University of Southern California (Manuel Pastor)
- Occidental College (James Sadd)

Introduction to Community Air Monitoring Network/Project Workshops

Reflections, lessons learned, and recommendations

David Chang, Project Coordinator

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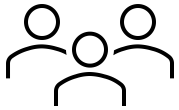
Background and purpose behind the workshops

Background

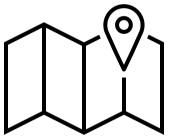
- In response to air pollution concerns and the lack of air monitoring information available in Imperial County, Tracking California worked with partners and residents to establish a real-time air monitoring network of 40 PM monitors.

- Building on this experience and a previous workshop, we were contracted to conduct 3 day-long, in-person workshops in different regions within California
    - Southern California
    - Central Valley
    - Northern California

Purpose of the workshops



Target community members and CBO's with an existing interest in developing their own **community air monitoring network (CAMN)**



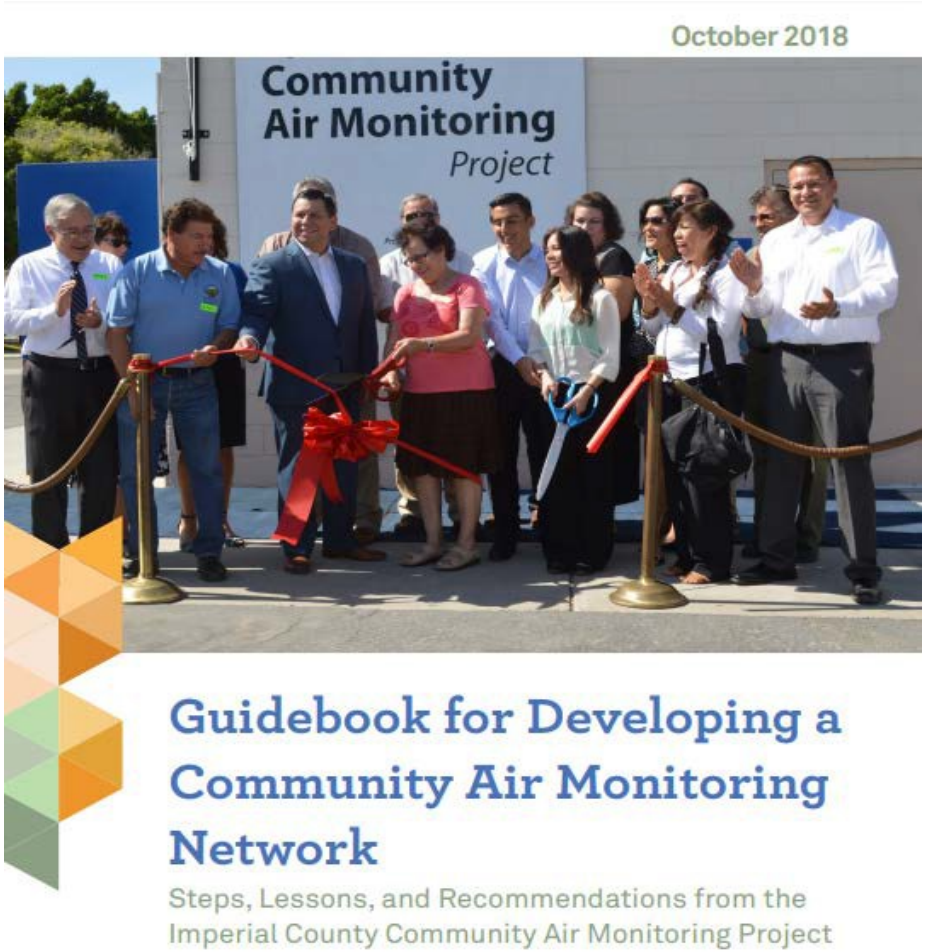
Provide participants with a roadmap they could use to decide if a CAMN was the right decision for them

Outline different steps, decisions, personnel, financial and technical resources to get started

Hear from local community groups who have led successful air monitoring projects in their region

Not intended to be a hands-on workshop to build monitors

Guidebook for Developing a Community Air Monitoring Network

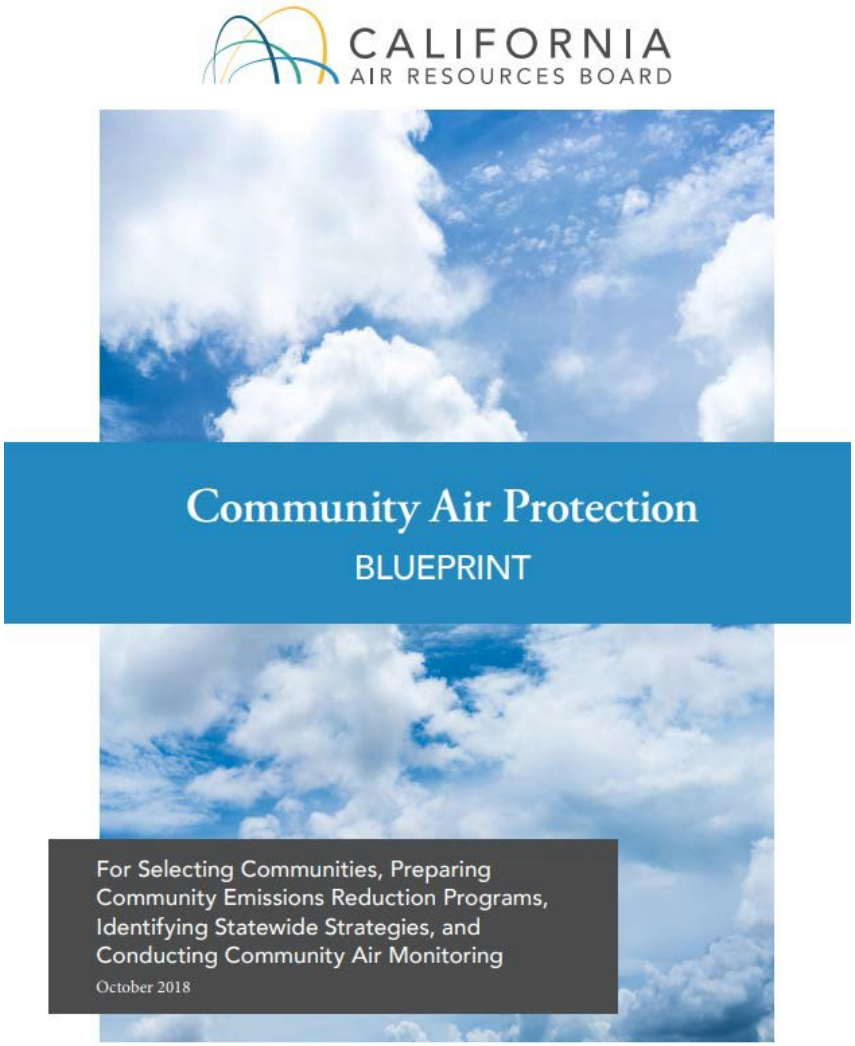


Community Air Monitoring Plan Elements

CARB has defined 14 planning elements that air districts, communities, and others should include in community-specific air monitoring plans developed under the AB 617 Program. The elements fall into three key areas:

(1) determine the air pollution concern the community air monitoring will address
(2) describe how the community air monitoring will be conducted
(3) identify how the data will support action to reduce air pollution within the community.

Described in more detail in Appendix E.
https://ww2.arb.ca.gov/resources/documents/final-community-air-protection-blueprint-appendix-e



Working with community partners and deciding on workshop format

Why work with a community partner?

Many community-based organizations have been and continue to be leaders in conducting air monitoring and have their own expertise, experiences, and perspectives.

We wanted to work with a local partner who could:

- highlight commonalities and differences from our own experiences in air monitoring with the Imperial Project
- connect participants with a community organization knowledgeable about local air quality issues within the region
- had relationships with local members/organizations, and could help us with logistics on the ground

Community partner's role

- Plan and review workshop curriculum, agenda, materials
- Conduct outreach/recruitment of participants and guest speakers
- Co-facilitate workshops
- Assist with local logistics – arranging meeting space, refreshments, simultaneous translation

What was the process of planning ahead of the workshops?

Survey

- Target audiences
- Workshop format
- Core content areas
- Breakouts/region specific topics

Monthly calls

- Similarities across workshop formats
- Overlapping lessons learned to share across workshops
- Insights as co-facilitators

Weekly calls

- Coordinate logistics, outreach, recruitment with partners
- Identify additional guest speakers
- Develop tailored agendas and materials

CAM workshops

- Facilitation alongside local partner and Comite Civico del Valle

Sample Agenda

Workshop in Fresno

9:10	Welcome and agenda review
9:30	Introduction to community air monitoring
10:05	Planning a community air monitoring network
10:35	Getting started
10:55	Break
11:05	Choosing a Monitor & Ensuring Data Quality
12:15	Q&A
12:30	Lunch and demonstrations
1:15	Setting up monitors and communicating data
1:45	Using data and sustaining the network
1:45	Q & A
2:15	Break
2:25	Panel: Monitoring in the Valley
3:45	Wrap up and closing remarks
4:00	Adjourn

We convened 3 workshops between 04/19 – 09/19

- **Southern California Workshop**
  - 15 participants in attendance as well as observers
  - transnational effects of air pollution
    - Panel speakers: Jenny Quintana (SDSU), Guillermo Cornejo (artist), Javier Quiñones (UAVC), Luis Olmedo (CCV)

- **Central Valley Workshop**
  - 28 participants in attendance as well as observers
  - methane monitoring of oil/gas, dairy, and pesticide monitoring
    - Panel speakers: Emily Marquez (PANNA), Michelle Wong (Tracking CA), Genevieve Gale (CCAC)

- **Northern California Workshop**
  - 35 participants in attendance as well as observers
  - differences in setting up community air monitoring projects and how these began from needs assessment, partnerships, data collected, action planning
    - Panel speakers: Fern Uennatornwaranggoon (EDF), David Holstius (BAAQMD), Melissa Lunden (Aclima), Richard Grow (retired EPA), Azibuike Akaba (BAAQMD)

Participant Evaluations

Summary

While there weren't many critical comments, suggestions to improve the workshop format to included:

- more breaks
- interactive or hands-on activities
- panels

Majority of participants felt the sessions were helpful and that new content was provided.

Comments where respondents selected "somewhat" and "no" indicate they had already learned the information or had experience in the topic area.

Participants felt region specific panels were helpful and informative for workshops in San Ysidro and Fresno

Only 8 evaluations were returned from 35 participants in Oakland which made it difficult to make conclusions. However there was appreciation for "partnership agreements" component.

Select Reflections from the workshops

- There was information that I knew but was just explained in more detail, in a sense, it was like review and that just clarified certain things I did not know well. Furthermore, I learned a lot of new information that I wondered about but did not have answers to them and now I do.

- Thanks - this was great. I especially appreciated the examples and reflections from Imperial and San Ysidro projects after each section. Excellent presenters and examples. For a long workshop, could have benefitted from a break in the morning - chance to stretch, regroup, lots of information; challenging to digest it all without a break.

- There was a lot of in-depth explanations, detailed presentations and thorough discussions regarding who to notify and getting answers from experts

- This was great. I think maybe follow up with what this data can be used for to reduce air pollution would be good, but honestly this was a very full workshop, and I learned a lot.

- Full of information I can take back to my neighborhood and lots to think about and motivating statistics

Challenges and lessons learned

Challenges we encountered

- WOEIP's air monitoring projects were quite different from the other community projects
  - A lot more customization and planning
  - Different model of community-based air monitoring and partnering approach
- Outreach and recruitment beyond individual organization's network was a challenge for some partners – difficult to reach broader geographic areas
  - We had to tap into other resources (CARB and CCV) to help with recruitment
  - Limited travel funds for those who could attend from longer distances
- Not enough time to cover content and sharing equal time with partners
  - Day-long training approach made it difficult to include more interactions, panels, and breakouts
- Limited funds for partners

Considerations for working with partners and format of future workshops

- Have clear processes and agreements with partners to prevent disagreements between participants and co-hosts
- Include more workshops across the state so additional participants can attend or host virtual workshops
- Budget for partners to be involved at an earlier stage in the project/planning and budgeting enough for participants who traveled far distances
- Hold workshop over multiple days to allow for deeper connections to content and to allow for hands-on/interactive opportunities

Conclusions and future opportunities

Closing reflections

- Through this workshop, we were able to accomplish our learning objectives of providing new information and increasing knowledge on how to start a CAMN.

- Workshops can be an **initial step** to supporting communities starting air monitoring projects but there are many other ways to support communities in their efforts that shouldn't be overlooked:

    - Ongoing technical assistance
    - Funding for air monitoring
    - Access to reference instrumentation
    - Support with air district interactions
    - Mapping regulatory monitors for colocation purposes and transparency around process
    - Ensuring quality control of data
    - List of recommended monitors and information about costs

Future workshop topics identified from evaluations

Following resources/topics would be helpful to provide in future workshops.

- Potential funding sources, resource guide on financing air monitoring projects
- List of monitoring technologies to consider, comparisons of low-cost monitors
- Community factsheet on actions an individual can take to protect health
- Spanish-language resource packet to engage residents in air monitoring
- List of current community air monitoring projects, contact information
- Air quality data sources, how to access data

Other considerations/topics:

- Hands-on workshop on using monitoring equipment or building custom monitors
- Quality assurance and quality control procedures
- Data interpretation and analysis
- How to outreach to monitor hosts, particularly schools
- Youth-led air monitoring projects

Thank you!

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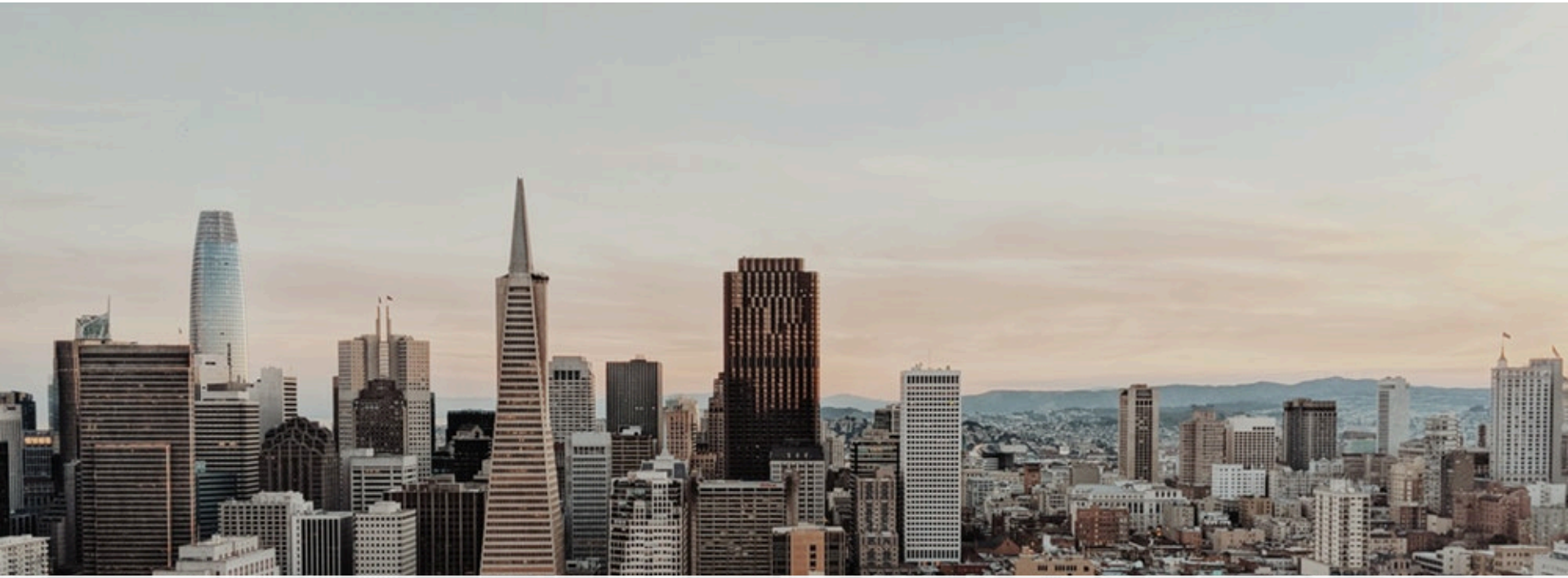

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AB 617 Community Engagement Evaluation

CARB Seminar

May 17, 2021

Jonathan K. London. Ph.D.

Team: Peter Nguyen, Mia Dawson, Katrina Manrique

UC Davis

Purposes of the Evaluation

1) Assess the successes, challenges and lessons learned about community engagement in AB 617 implementation
2) Assist CARB, Air Districts, Community Steering Committees and other stakeholders to improve future implementation of AB 617
3) Share lessons learned about AB 617 model with wider audiences

Methods

- Surveys
  - All Stakeholders (CSCs, Air Districts, CARB, Consultation Group)
    - Initial survey: November 2018-January 2019
    - Follow up survey in February-March 2020
      - Spanish and English
- Interviews
  - All 10 CSCs and Air Districts
  - 66 Interviews conducted (including 3 Spanish-language)
  - In-person and by phone
  - Spring 2019-Winter 2020
- Participant Observation of all 10 CSCs (Spring- Fall 2019)

Study Limitations

1. Formative evaluation: focus on community engagement process not outcomes (summative)
2. Interviews/ Surveys/ CSC observations before most final CERP adoptions
3. Modest survey response rate (25%)
4. Does not include a technical assessments of the CERPs
5. No assessment of Air Grants or Tracking California air quality monitoring workshops

Assessment Overview

- AB 617 is a bold but incomplete experiment in environmental justice (focusing on the most over-burdened places and honoring local power and voice)
- The results have been uneven, with some successes in developing community-informed clean air plans but problems in process (power-sharing) and impact (value-added actions)
- Lessons learned include the need for a true community power; more aggressive, measurable, and enforceable actions; and a more explicit racial justice approach
- Whether AB 617 will be transformative is an open and crucial question

Evaluation Key Findings

AB 617 Element	Major Successes	Major Challenges
Community Air Protection Blueprint	Community Air Protection Blueprint lays out a robust framework for the implementation of the legislation.	The Blueprint does not provide sufficient guidance on community engagement.
AB 617 Consultation Group	The Consultation Group provided crucial support for the development of the Community Air Protection Blueprint.	There has been some lack of clarity about the purpose of the group after the development of the Blueprint. Advocating for funding for AB 617 been suggested as a potential role.
	The Consultation Group's diverse membership was appreciated by the members.	Clarity on advice to CARB was challenging at times due to the wide range of perspectives.
Community Selection Process	The community selection process has included 10 communities with the worst air quality in the state.	Communities perceived themselves to be in competition with each other.
	There were innovations in the number of community-driven and community/ Air District collaboration.	Some district-led processes did not achieve potential for community collaboration.

Community Steering Committees	Most CSCs achieved a robust composition of residents, community organizations, businesses, and local governments.	There was a significant degree of conflict within the CSC members, especially between residents/ community organizations and business representatives.
	Most CSC improved the level of collaboration throughout the process.	There was a significant degree of conflict between the CSCs and Air Districts in many sites.
	The addition of outside facilitators helped in many CSCs.	Some facilitators approaches did not fit the needs and context of the CSCs and in some cases had to be replaced.
	Spanish translation increased – to some degree participation of mono-lingual Spanish speakers.	Some mono-lingual CSC members continued to feel marginalized during the process and a number dropped off the CSC.
	Community organizations provided crucial capacity-building for residents in many CSC.	Many of the presentations by Air Districts, CARB and outside consultants were not accessible to residents. This improved somewhat over time but often with significant investments by community organizations. Youth membership was limited in all but two CSCs and in general young people's voices were missing.
		There was some confusion about how much meeting outside of the formal CSC meetings were permissible.
		These additional meetings took a great deal of time and effort from residents and community organizations.

Community Air Monitoring Plans (CAMPs)	There was great interest of residents in the monitoring devices and processes.	Some of the monitoring presentations were not accessible to residents.
		Some of the monitoring areas did not include targets of concern for residents.
		Time constraints limited the value of the CAMPs for informing the CERPSs.
Community Emissions Reduction Plans (CERPs)	The CERPs include a range of community-priorities such as mobile sources, land use, pesticides, community-benefit investments.	This positive result was uncertain until the end of the process and achieved through extensive negotiations between the CSC and Air Districts and often with the support of CARB.
	There has been unprecedented engagement of other agencies (cities, counties, and the Department of Pesticide Regulation).	As noted above.
	There was some integration of public health as a goal and focus of strategies.	There was a call for a greater focus on public health outcomemetrics and strategies in the CERPs.
Community Air Grants	The CAGs provided important resources to build capacity in current and potential AB 617 communities.	There were some grants made to larger community organizations that spurred concern in smaller grassroots organizations.
Environmental Justice	There was a strong emphasis on environmental justice and social equity in the legislation, Blueprint and many CSCs.	There was some unevenness in realization of EJ principles, in particular in the ability of Air Districts to open space for CSCs to define their own agendas and action priorities.

Community Engagement:
Ranging from Low to High by Community

CSC Leadership Continuum

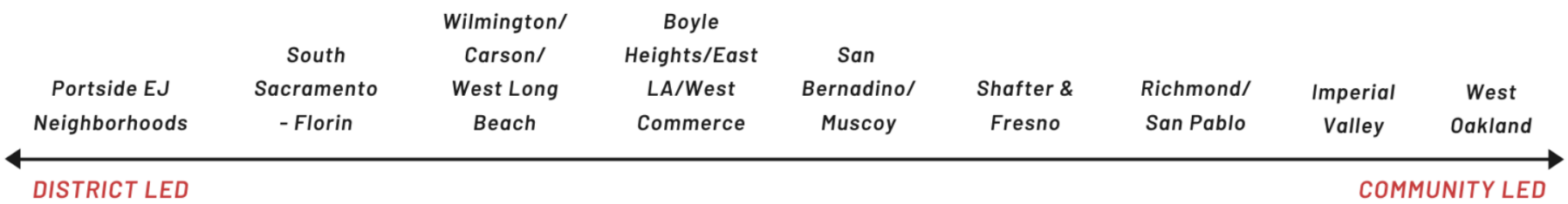

Figure 3: CSC Power Continuum

→ Who decides on setting the agenda and facilitating meetings?
→ Who decides on CSC membership? process? boundary setting? CAMP activities? CERP strategies? Budget allocation?

CSC Process:
More Community Power Needed

Resident Critique of CSC Process

We residents and community members speak for ourselves. We don’t need to be prescribed solutions. We need to find community-based solutions and community-driven solutions. So that was our motto coming in and at the very, very beginning, the very first meeting, it was shut down essentially. They're saying, "Well, we'll give you the voice that you need. And we'll tell you what you guys need." The residents felt that and they understood that. It was going to be a very tough battle. – Community Resident

Air District Critique of CSC Process

"The Steering Committee, at least some, really think that AB 617 in some way provides the Committee with full authority to basically explore, identify, and then implement essentially whatever they would like to do. I think this has evolved over some time with the blueprint and we are all rowing in the same direction for the most part. The roles are more clearly understood. The air district is, ultimately, we have to take to our board the CERP, they are the ones who approve the CERP and then CARB ultimately approves the CERP. It's not the SC. They are more in an advisory role." (Regional Air District)

Challenges of Typically Marginalized Populations

Youth:
“I have seen that some of the younger people have made suggestions, but the administrators simply disregard them. It has gotten to a point where younger people stopped coming to the meetings and witnessing that makes me sad, I would like to see them come back. They had great perspectives to offer.”

Non-English Speakers:
“I think as a Latina, -- because I have definitely experienced this myself-- sometimes you just feel embarrassed. Maybe it’s the thought of speaking Spanish in general, or knowing that someone is going to have to translate it into English too.”

Facilitator's Ideal CSC Process

"Supporting a team of community leaders in co-designing and co-leading the process has also proved crucial; incorporating transparency at every stage of the process (explaining decisions upfront, providing as many opportunities as possible for participants to ask questions and provide input, conducting live polling and displaying the results and counts in real time, acknowledging mistakes and learning curves for all parties including those made by government agencies and the community co-lead team, etc.), paid stipends.

Blueprint:
Valuable But with Room for Improvement

Blueprint: Variable Satisfaction

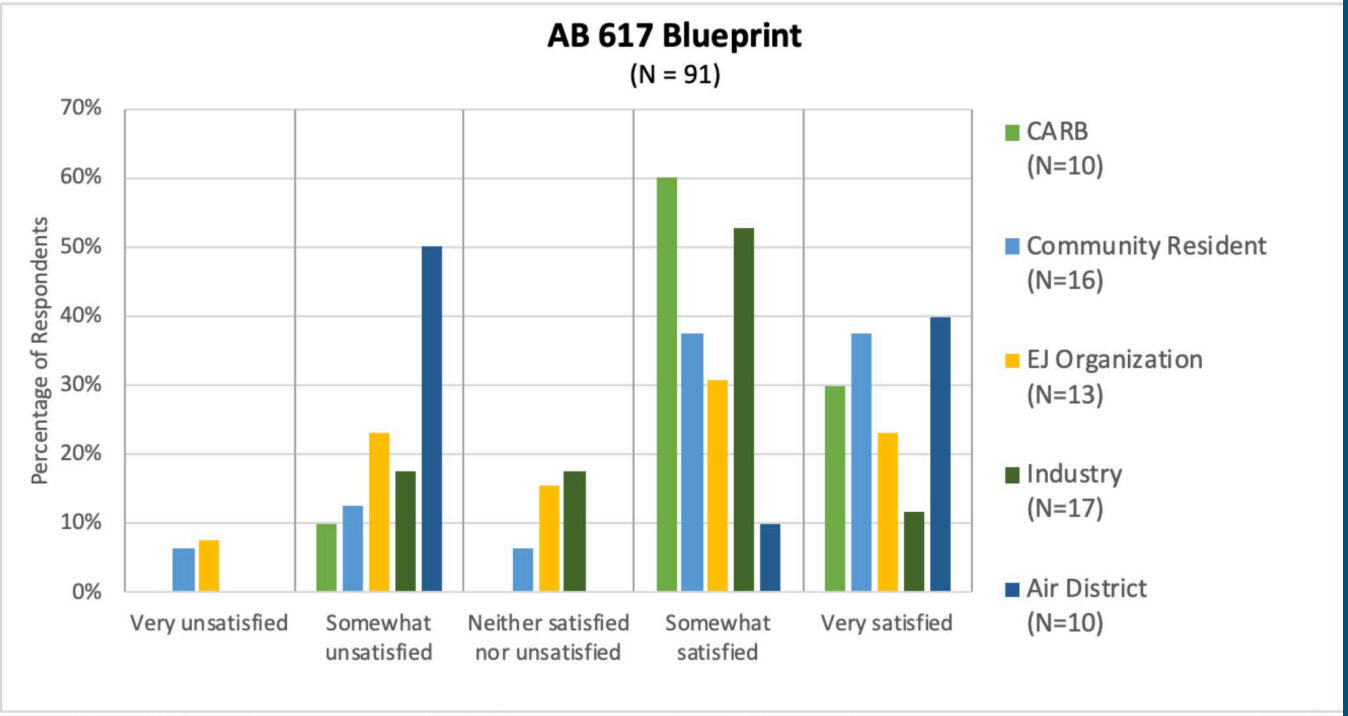

Figure 1: Level of satisfaction with the AB 617 Blueprint in providing sufficient guidance on community engagement by stakeholder group (2020 Survey; n=91).

Air District Critiques of Blueprint

The Blueprint contains some useful suggestions on community engagement, but it is far too rigid and assumes a "one size fits all" approach. It also has many requirements that are burdensome on air districts with little to no community benefit. It seems that air district efforts would be better applied to other things that actually improve the CERPs or CAMPs and their implementation. (Regional Air District)

Community Organization: Advice on Blueprint

The Blueprint is too vague where it needed to be the most in depth. For example, soft language terms of "to consider” to “guide", did not give the Air Districts enough direction on true robust engagement with community. The language was left up to individual interpretation. Also, there needs to be more clarity and language regarding jurisdictions and land use issues and methods for solutions to get agencies to work together with concrete actions.” (Community Organization)

CAMPs:
A Problem of Timing

CAMPs: Uneven Assessment

	Community Resident (N=10)	EJ Organization (N=10)	Industry (N=16)	Air District (N=10)	CARB (N=4)
Very Unsatisfied	0%	0%	0%	10%	25%
Somewhat Unsatisfied	0%	50%	6%	20%	25%
Neither Satisfied nor Unsatisfied	20%	30%	38%	0%	0%
Somewhat Satisfied	40%	10%	50%	40%	50%
Very Satisfied	40%	10%	6%	30%	0%

Table 6: Level of satisfaction for the development process for the CAMP in your community by stakeholder group (2020 survey; n=50).

CAMPs: Problem of Timing

“I think it was a total mistake, the timelines that they created. Four months just to go over the process, and then we're finally going to be able to start delving into monitors and all that. So, I think that a more realistic timeline would have been 18, if not 24, months. Because right now, I just feel that they are putting the cart before the horse because we are going to have to draft the emission reduction plans just to meet the timeline of October without even knowing what the monitors are going to tell us, because the monitoring is not happening until the beginning of the summer, so June or something like that. We're not going to have really data of that until a year after.” (Community Organization)

CERPs:
Initial Concern/ Eventual Improvement

CERPs: Variable Support

		Very Unsatisfied	Unsatisfied	Neither Unsatisfied nor Satisfied	Satisfied	Very Satisfied	Total
1	Community Identified Actions	4%	14%	22%	29%	31%	51
2	Extent to which it includes an appropriate mix of incentives relative to rules, regulations, and enforcement	6%	18%	24%	25%	27%	51
3	Extent to which it goes above and beyond Air District commitments	4%	16%	22%	39%	20%	51
4	Extent to which it is sufficient to make significant efforts in improving air quality	6%	16%	24%	33%	22%	51

Table 7: Level of satisfaction regarding the CERP for your community (2020 Survey; n=51).

Draft CERPs: Community Concerns

“Currently, the CERP overwhelmingly focuses on education, outreach and enforcement - strategies that are necessary and important parts of the plan. However, they must be matched with subsequent emission reduction goals and health outcome targets. A community health assessment must be required to measure the existing health standards baseline in order to have quantifiable goals and targets. (Community Organization)

Community CERP Perspective: Qualified Support

But I think at the end of the day, if the air district, our local air district, approved it and there's rather some positive changes in there, we hope that the state signs off and says, "Here's your blessing." Can and will they make changes? We hope so. There's still some stuff that we want to tweak and we want to improve. But at the end of the day, if the residents walk away with justice served, I think they would be proud of themselves, very proud of themselves. Do they get everything they wanted? No, but they got a lot of what they asked from the very beginning.” (Community Organization)

Views on CARB:
A Call for More Proactive Engagement

Community Perspectives on CARB

“It's the involvement of CARB. So, I think through this legislation, it was almost like-- they were like, “This is Air District's duty." And all you see is blue shirts doing the entire thing, guarding the whole thing. And what's CARB doing? They're in the back of the room. And for us, it was especially concerning because we are a community where most of our pollution come from mobile sources. Air District, as much as they want to do something, can't because of their jurisdictional limitations.” (Community Organization)

Facilitator View of CARB

“CARB staff needs to provide more direct resources and guidance to the Air Districts and CSC members for the development of the CERPs. We have CARB staff attend our meetings: they usually sit in the audience and rarely engage in a constructive way. We have had them present at two meetings so far, one on SEPs and on the CAPP Blueprint/CERP process and have not found their engagement helpful. They should be doing more and hire more proactive staff with more experience on community engagement. Their guidance should focus on the development of the CERP and providing resources to empower the participation of SC members to provide more direction to the APCD staff.”

Overall Assessment: General Support

Overall Assessment by Group: General Support

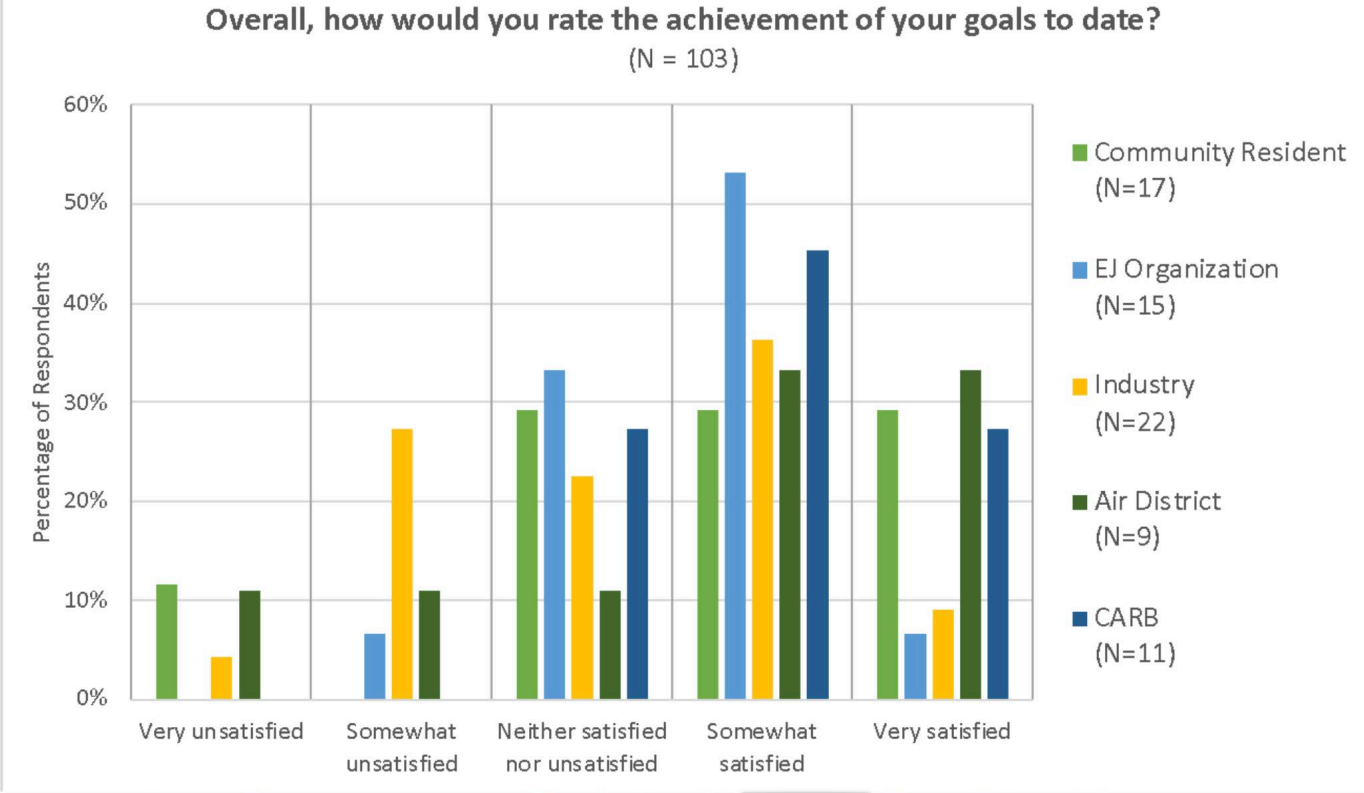

Figure 9: Level of satisfaction in meeting your goals to date by stakeh Screenshot *(Survey 2020; n=103).*

Factors that Facilitate / Challenge Success

- Type of Air Quality Issue, Underlying Drivers, and Community Context
  - Cookie cutter approach can't work (Ports, pesticides, passenger cars, urban/rural/suburban)
- Historical Relationships (Air Districts and Community)
  - Continuum: BAAQMD (collaboration) / South Coast and SJV (long-standing conflicts)/ Imperial (new but positive relationship)
  - Power of industry (Ports; Oil/Gas; Agriculture)
- Capacities (Air Districts, Residents, Advocates)
  - Cultural sensitivity, working on structural racism (Air Districts)
  - Technical (residents)

Factors that Facilitate / Challenge Success

- Community Engagement & Decision-Making Power
  - Mismatch between community input/ engagement and community decision-making
- Structure and Process of the CSCs
  - Leadership models (co-hosts/ co-leads/ district-driven/ district-led)
- Timeline for each Step in the Process
  - Challenge of using CAMP data for CERPs
- Role of CARB
  - Call for more pro-active engagement
  - Inadequacy of the Blueprint for community engagement

Recommendations

1. Sustain the AB 617 Consultation Group with broader charges of revising the Blueprint

2. Develop an improved Blueprint focused on community engagement with best practices, resources, and tools

3. Improve the community selection process

Recommendations

4. Improve the management of CSC processes

5. Improve the development of the CAMPs

6. Improve the development of the CERPs

7. Support on-going funding for AB 617 at sufficient levels for current and future communities

Evaluation Reflections for CARB

1. How can CARB manage a state-wide but placed-based process?
    - How much standardization relative to customization
2. How can CARB build its capacity to take on new roles?
    - Pro-active conflict resolution, capacity-building, science communication
    - New relationships with Air Districts (more consistent and active engagement)
3. How can CARB uphold values of environmental justice and racial equity?
    - Training for CARB and Air District Staff
    - Civil rights framework (Title VI)

Assessing Longer-term Impacts

1. How do CAMPs and CERPs integrate into Air District plans and planning processes?
2. How does CAMP and CERP implementation integrate with other entities (e.g., cities and counties)?
3. How does the 617 process change the relationships of community organizations with Air Districts?
4. How does the 617 process change the relationships of CARB and Air Districts?
5. How do the CERPs improve air quality/health in disadvantaged communities?
6. How well are the stakeholders using lessons learned to improve over time?
7. How does this vary/ change across the 15+ sites?

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Element 3 -Novel Indicators and Methods for Cumulative Impacts Analysis

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UCLA Fielding School of Public Health

USC Dornsife
Dana and David Dornsife College of Letters, Arts and Sciences

In consultation with DTSC and CARB, developed new metrics and approaches for CI assessments

- Utilized CalEnviroScreen 3.0 scores and percentiles as relative metrics of cumulative environmental health impact and community disadvantage in relation to DTSC facilities.
- Developed additional community metrics not currently included in CES that could be used to supplement cumulative impacts assessments that decision-making related to AB617 and SB673.
- Provided statewide data layers of all novel metrics and dasymetric mapping of populations for CARB's Office of Community Air Protection and DTSC
- Provided data layers specific to DTSC hazardous waste facilities

DTSC Hazardous Waste Facility (HWF) Dataset:

We defined HWFs using polygons instead of a single point:

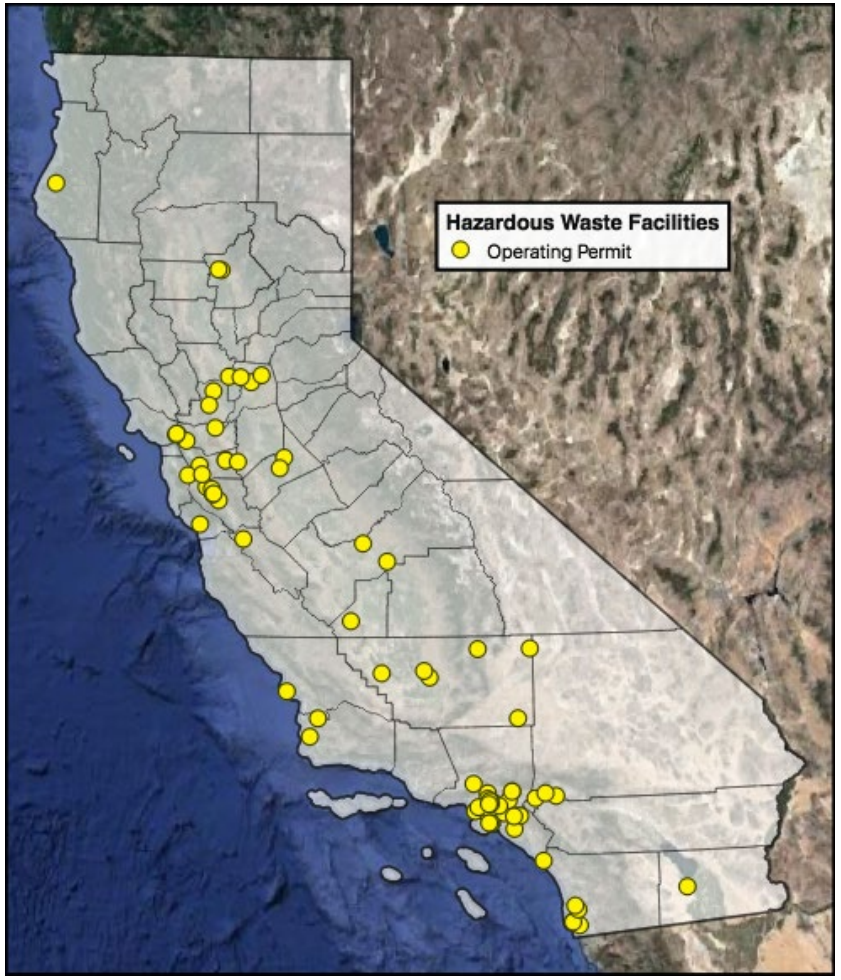
- ***Entire-facility and waste-specific boundary polygons*** were delineated in two ways:
  - 1) Entire property boundary
  - 2) Area within property boundary permitted to process or store hazardous waste

- ***High-resolution population distribution data****:* We applied novel dasymetric mapping techniques to improve community-level cumulative impact metrics particularly the locational accuracy of populations in rural areas, where census geographic units tend to be larger and populations more dispersed within them.

- ***Population-weighted metrics:*** After applying dasymetric mapping methods, community metrics (e.g. mean CES score, % people of color) were calculated using population-weighting rather than area-weighting to better reflect cumulative impacts experienced by populations living near HWFs.

Location of Hazardous Waste Facilities (HWF) Regulated by DTSC

- Supplied by DTSC in the form of a geospatial point shapefile, with single points representing the approximate location of each HWF.
- Contained coordinates for 82 sites. Five omitted that are no longer operating and after consultation with DTSC leaving N= 77.
- Used HWF operating permit documents in combination with parcel data to better delineate facility boundaries and to determine the specific locations of waste stored within each facility boundary.

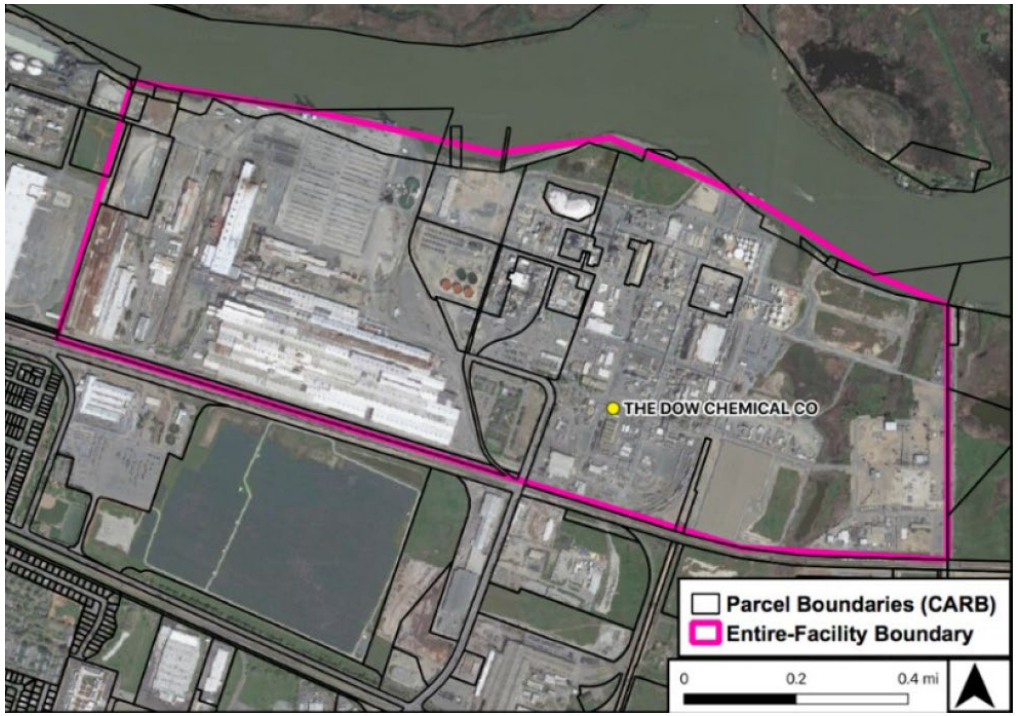


Defining HWF Boundaries

- **Step 1 –** Review HWF operating permit document with relevant maps and figures showing the facility location and boundary.
- **Step 2** – Validate coordinates of DTSC's HWF point location based on address and permitting documents.
  - Adjusted incorrect locations using permit and site address information.
  - Locations on Google Maps were cross-checked with the permit documents before correcting the point location
- **Step 3** – Intersected verified/corrected HWF point locations with the statewide parcel dataset. If parcel looked to agree with the facility boundaries depicted in the permit, we used this parcel as the final site boundary polygon.
- **Step 4** – If parcel boundaries identified in Step 3 did not match facility boundaries depicted in the permit, we selected different or additional parcels to match the facility boundaries depicted in the permit.
- **Step 5** – If no clear depiction of the facility's property boundary in the permit document, we conducted online searches and reviewed satellite imagery from Google Earth, to visually estimate property boundaries, and manually drew the final boundary polygon.

Defining HWF Boundaries Using Parcel Data

Facility boundary exactly matches a single parcel



Facility boundaries span multiple parcels and require manual drawing of its boundary

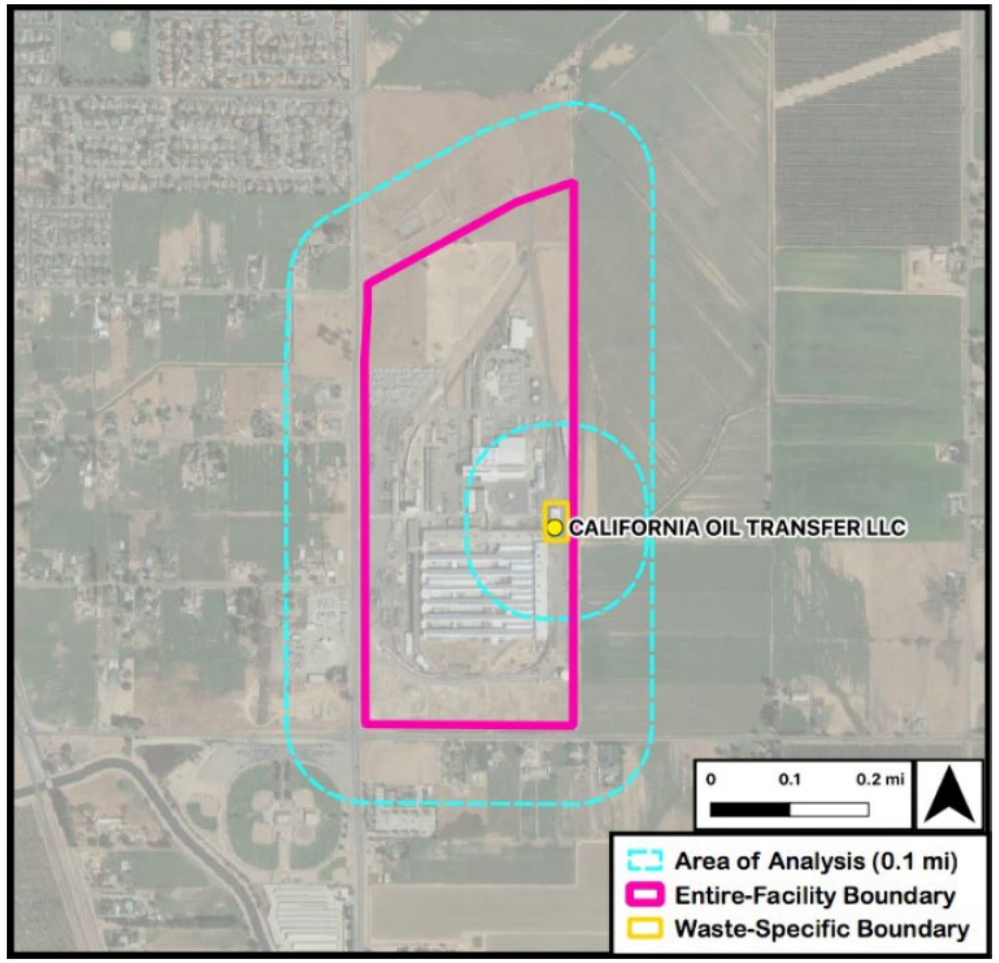
Waste specific and facility specific boundaries

Step 1 – Reviewed operating permit documents for all HWFs including relevant maps and figures showing the specific permitted location of waste within each facility.

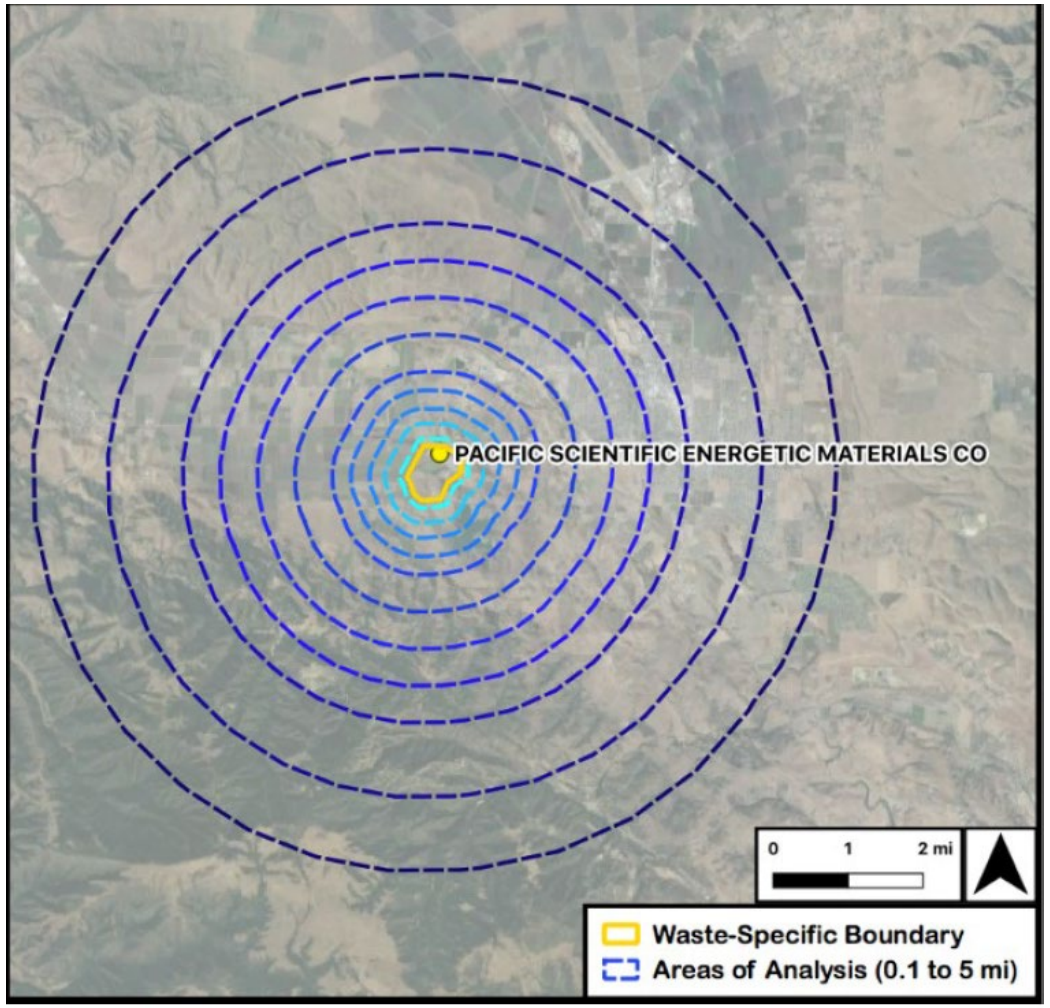
Step 2 – Manually drew polygons around the waste sites within the facility.

Entire-facility and waste-specific polygon boundaries for sites within the Chevron refinery complex in Richmond, CA

Areas of Analysis (AoAs): To characterize communities near each HWF, we considered 13 different buffer distances from 0.1 to 7 miles



AoA (0.1 mi) around both the entire-facility boundary and the waste-specific boundary at a facility in Stanislaus County



AoAs from 0.1 to 5 mi around a site's waste-specific boundary in San Benito County

Dasymetric mapping to improve population location of populated areas

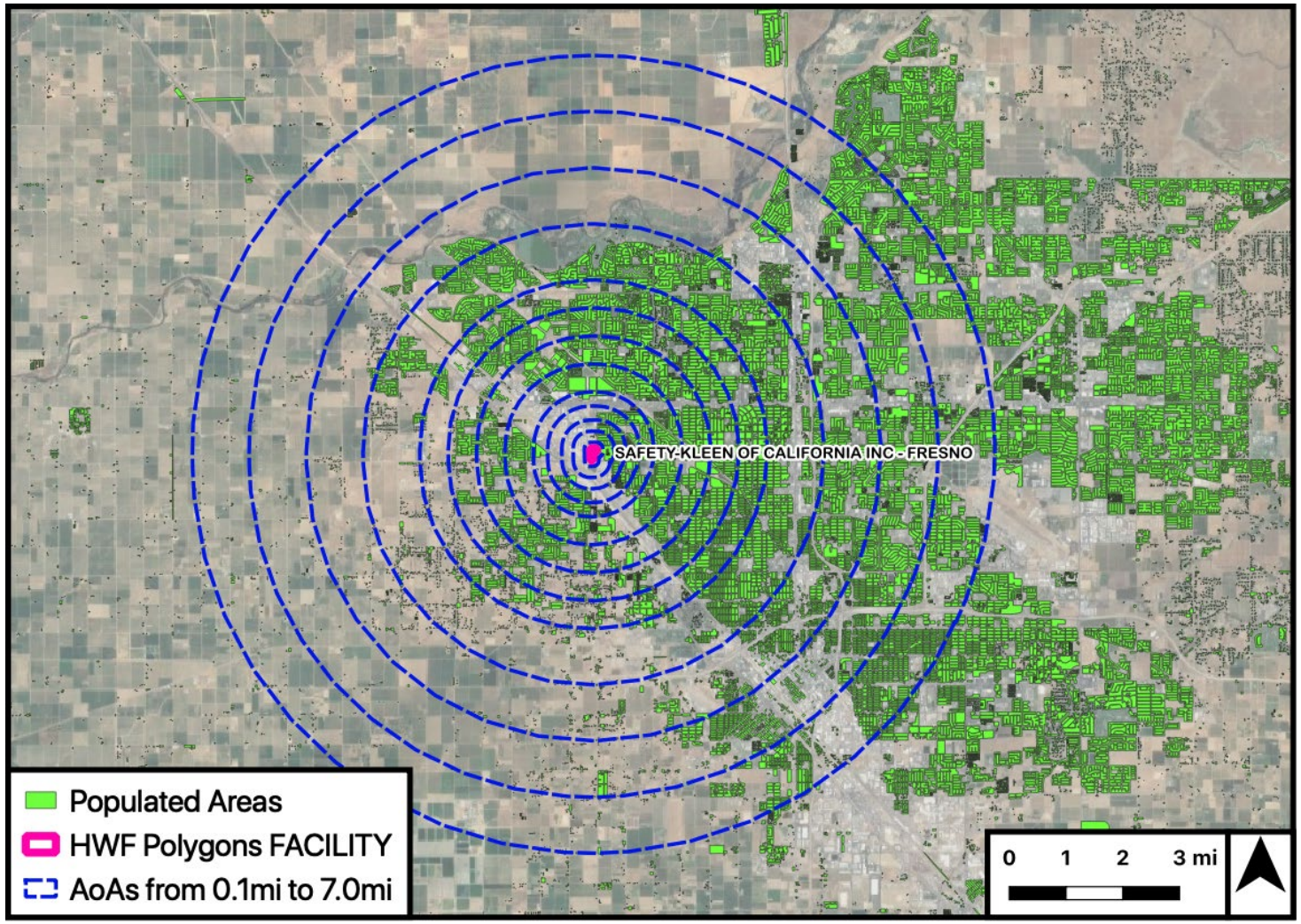
Step 1: Residential parcels within census blocks identified and used as boundaries of populated areas within each block-- excluding open space and non-residential areas. Applied to census blocks containing 91.8% of the state's total population.

Step 2*:* Populated census blocks with no residential parcels, individual building boundaries identified using Microsoft's building footprint dataset. Applied to blocks containing 7.9% of the state's population.

Step 3: For blocks with remaining 0.3% of the state's population, with neither residential parcels nor building footprints, no downscaling was applied

The result was a statewide map of populated areas downscaled within census blocks.

Example of populated areas downscaled within census blocks



- AoAs from 0.1 to 7mi drawn around the waste-specific polygon at a facility in Fresno.
- Green area represents populated areas that were included in the analysis

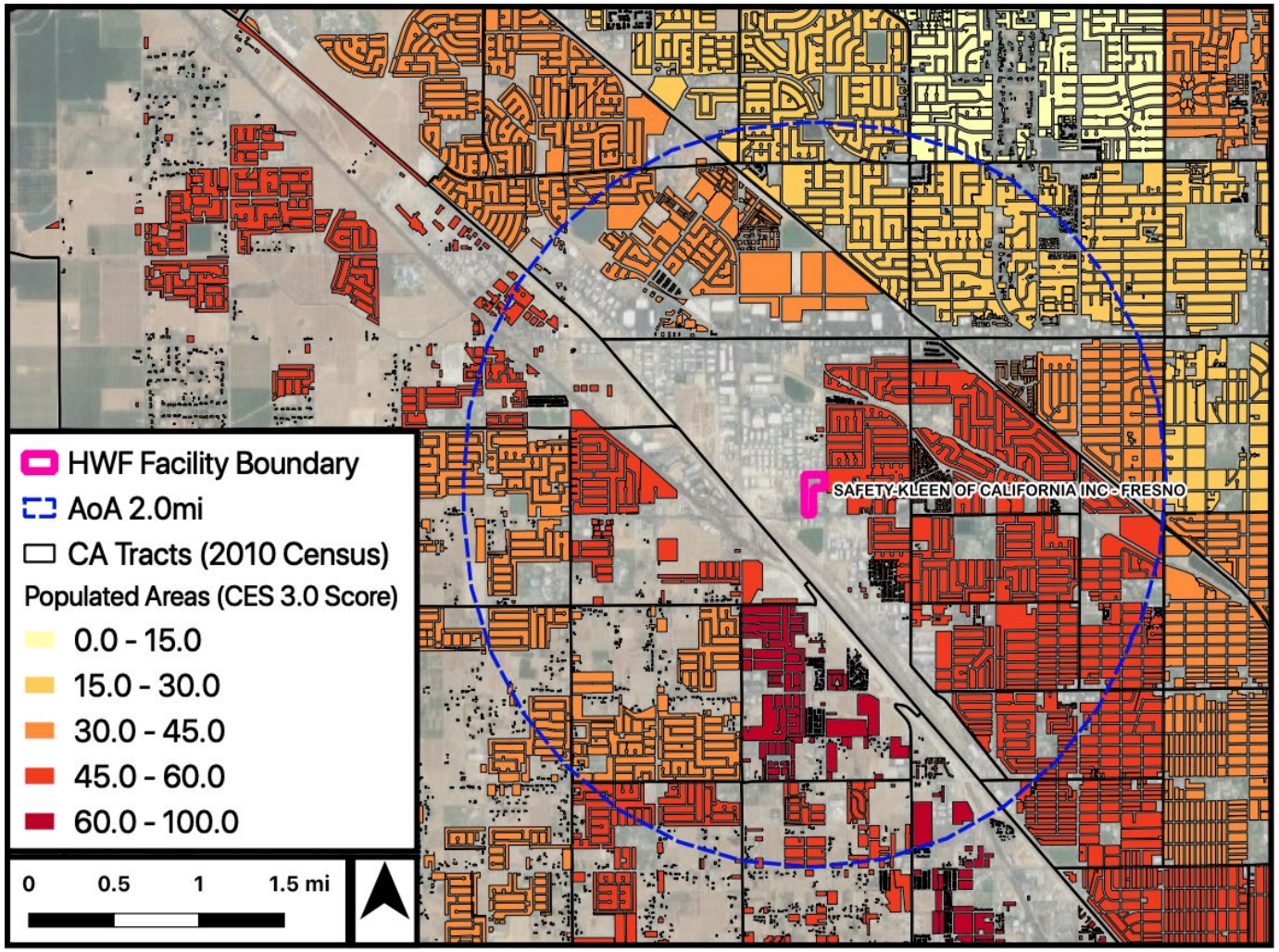
Statewide Environmental Hazard and Vulnerability Metrics

Metric	Data Source
CalEnviroScreen 3.0	OEHHA
Avg. Voter Turnout [2012 & 2016 general elections]	UC Berkeley Statewide Database
Proportion of Non-White Residents	2017 American Community Survey (ACS)
Oil & Gas Wells presence & proximity (active and new wells)	2019 CA Dept. of Conservation (DOGGR)
Domestic Drinking Water Wells	2018 CA DWR (Online System of Well Completion Reports)
Sensitive Land Uses [parks, prisons, senior care facilities, childcare/daycare facilities, hospitals, schools, all]	Various

Sensitive Land Uses

Metric	Source
Parks	Lightbox parcel data, GreenInfo Network, USA Parks
Schools	California Department of Education & GreenInfo Network/Stanford Prevention Research Center
Health Care Facilities	2019 CDPH
Childcare Facilities	2018 California Department of Social Services
Senior Care Facilities	2019 CDPH
Prisons	2019 ESRI Open Data site from the Homeland Infrastructure Foundation - an "online community" of the federal Department of Homeland Security

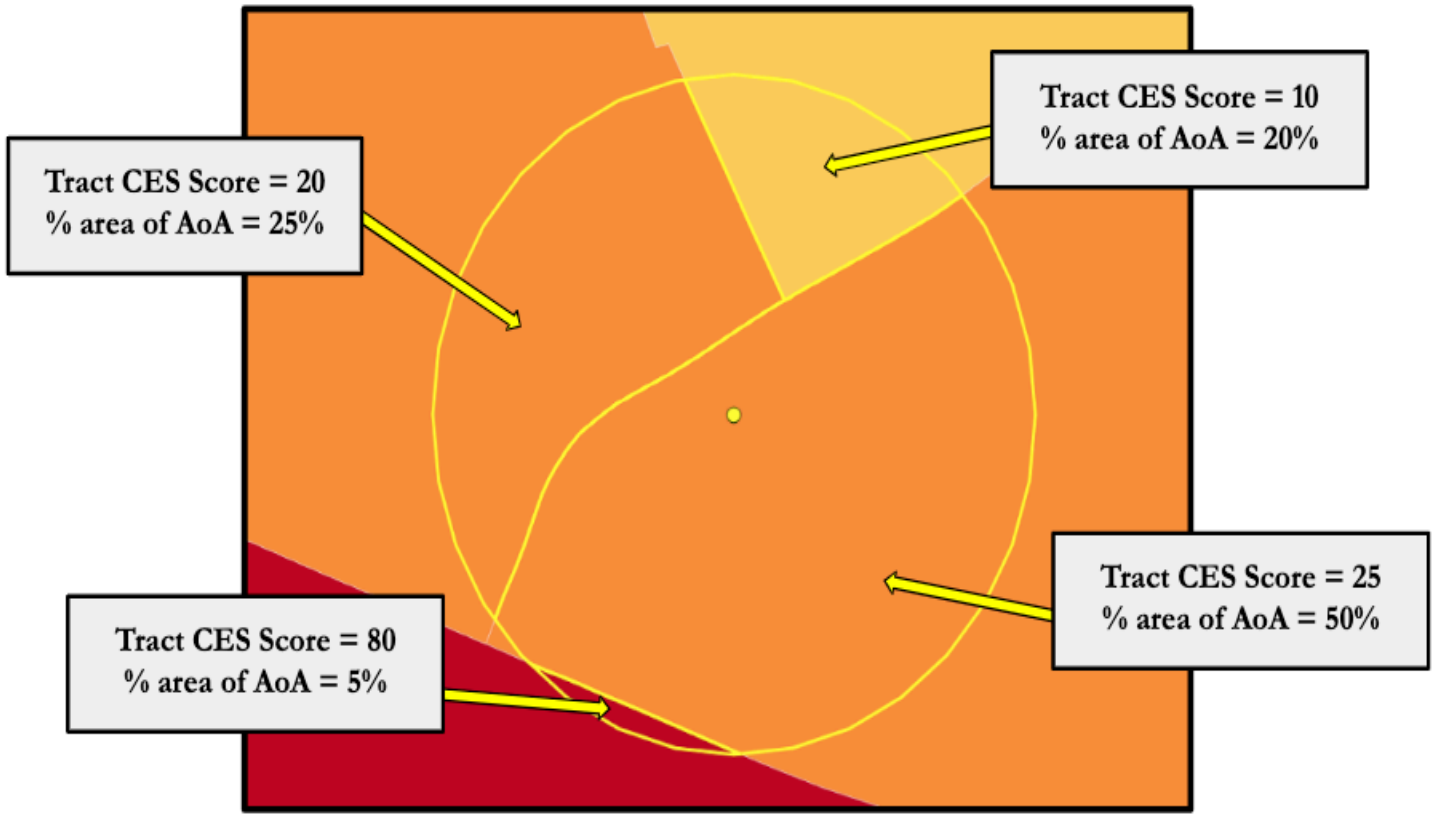
Allocation of CES scores to downscaled populated areas



- Map of tract-level CES 3.0 scores near the Fresno Safety-Kleen facility.
- Populated areas assigned CES 3.0 score of the tract that contains them
- Can derive Max/Min within AoA based on CES scores of populated areas

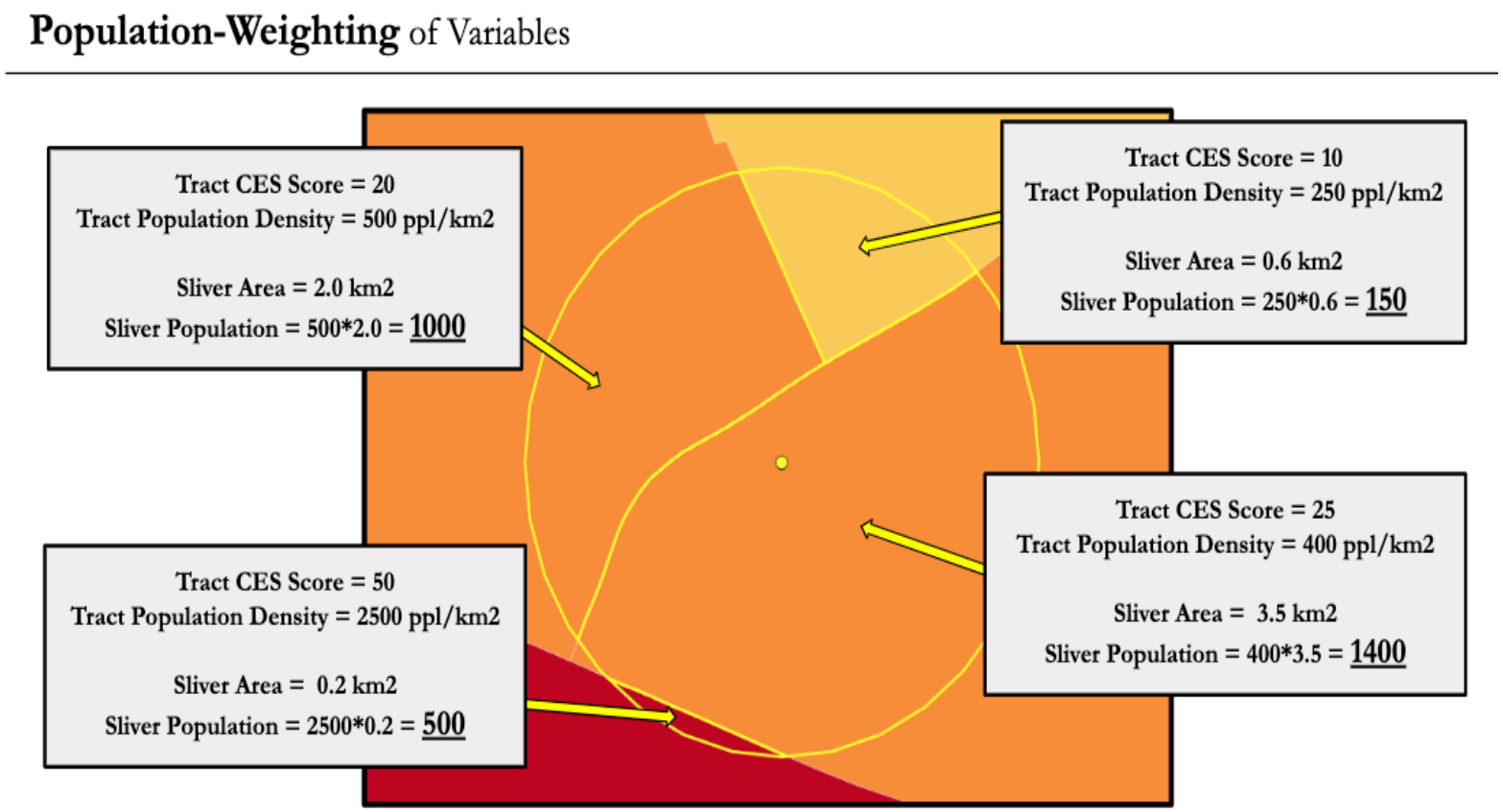
Area-weighting of variables within an Area of Analysis (AoA)

Area-Weighting of Variables



Area-weighted CES Score = 20*(0.25) + 10*(0.20) + 25*(0.50) + 80*(0.05) = **23.5**

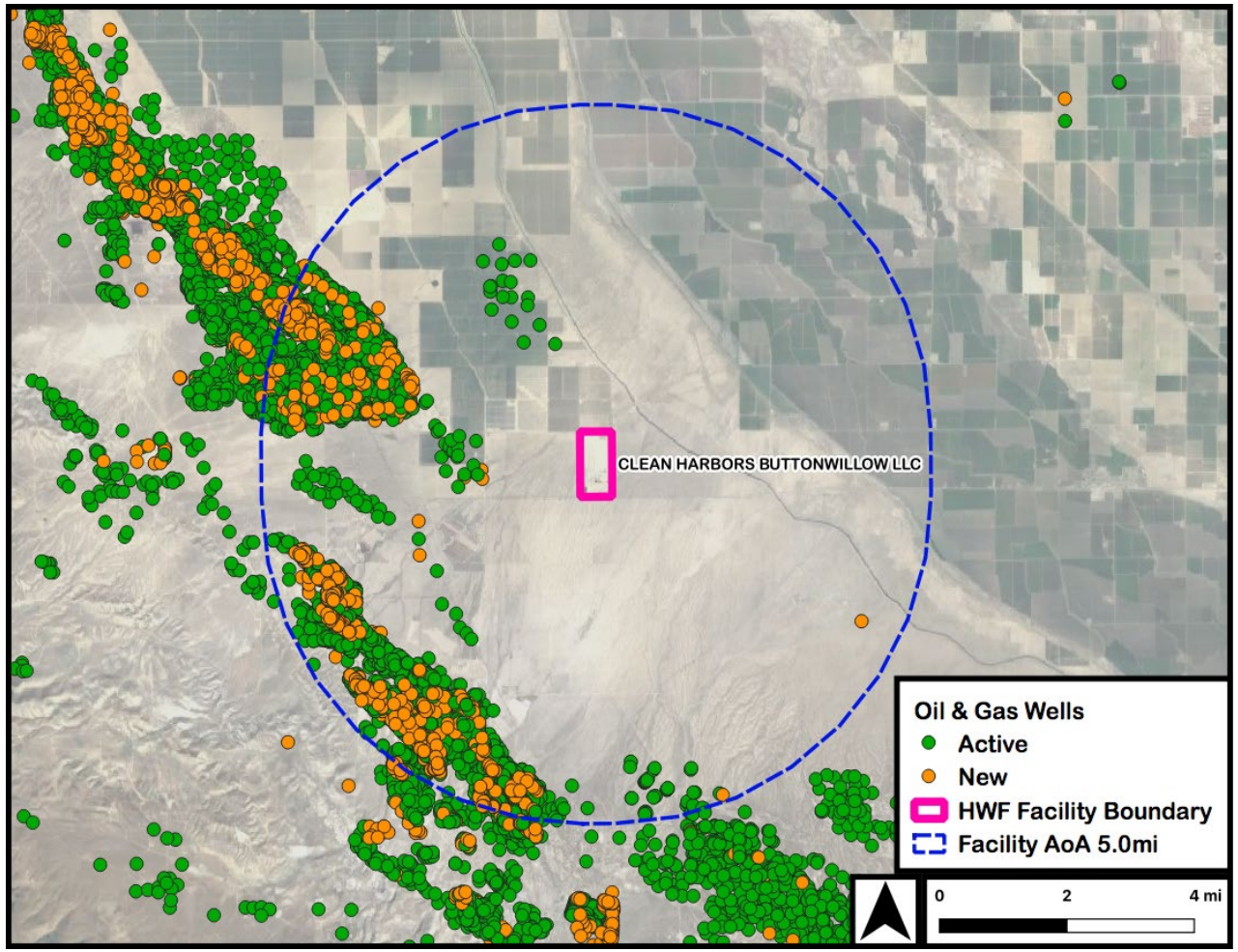
Population-weighting of variables within an Area of Analysis (AoA)



Total AoA Population = 1000 + 150 + 1400 + 500 = **3050 people**

Pop.-Weighted CES Score = 20*(1000/2830) + 10*(150/2830) + 25*(1400/2830) + 80*(500/2830) = **34.1**

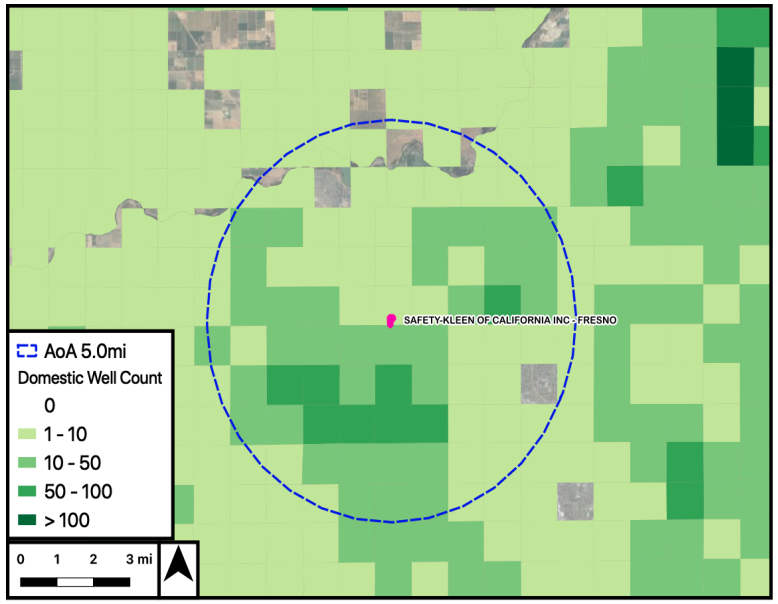
Sensitive Land Uses (SLUs)



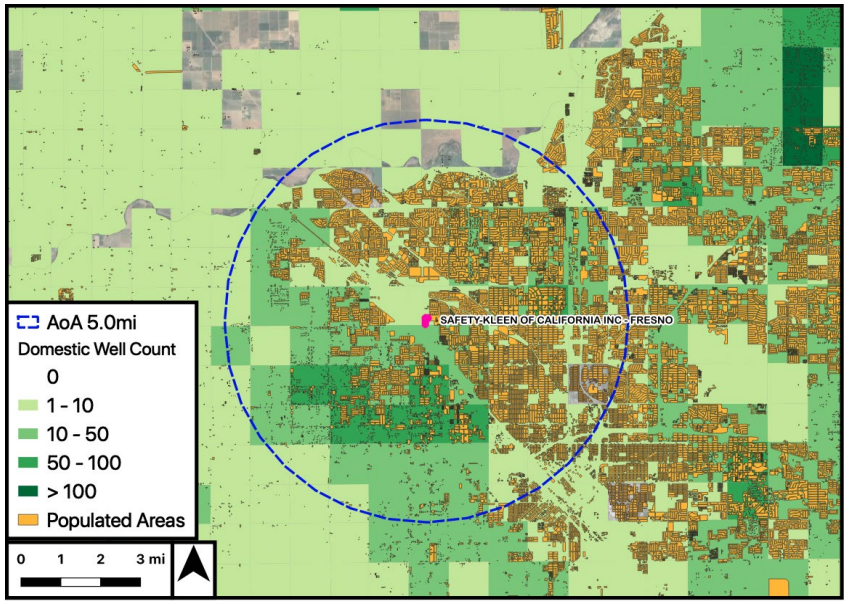
There are 5174 active or new oil and gas wells within the 5.0mi AoA surrounding the Clean Harbors facility in Buttonwillow

- Counts of SLUs within each AoA estimated using point or polygon geometries of each SLU type.
- If a point or *any part* of a SLU boundary polygon intersects an AoA, it is counted as being in the AoA.
- All SLUs summarized as simple counts, with a total count for all six SLU types reported

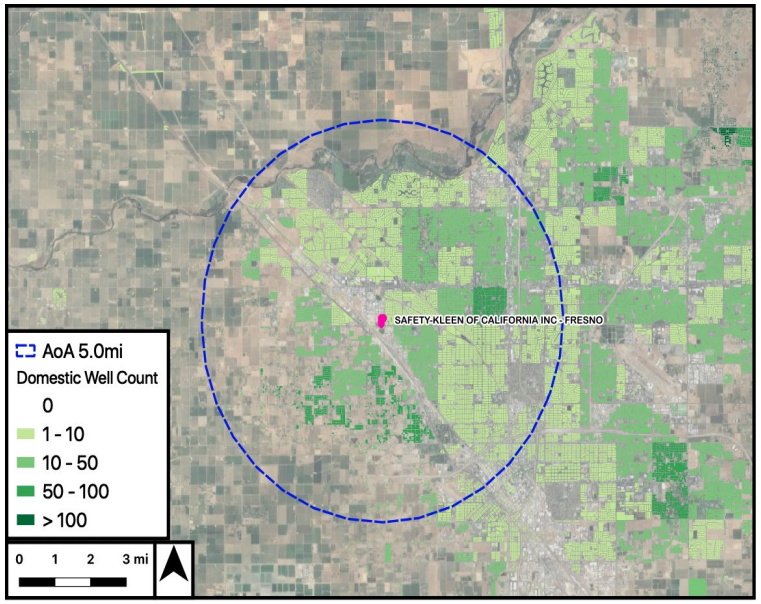
Area-weighted and population focuses domestic well counts



Domestic well sections surrounding Safety-Kleen facility in Fresno with well sections with 0 wells removed



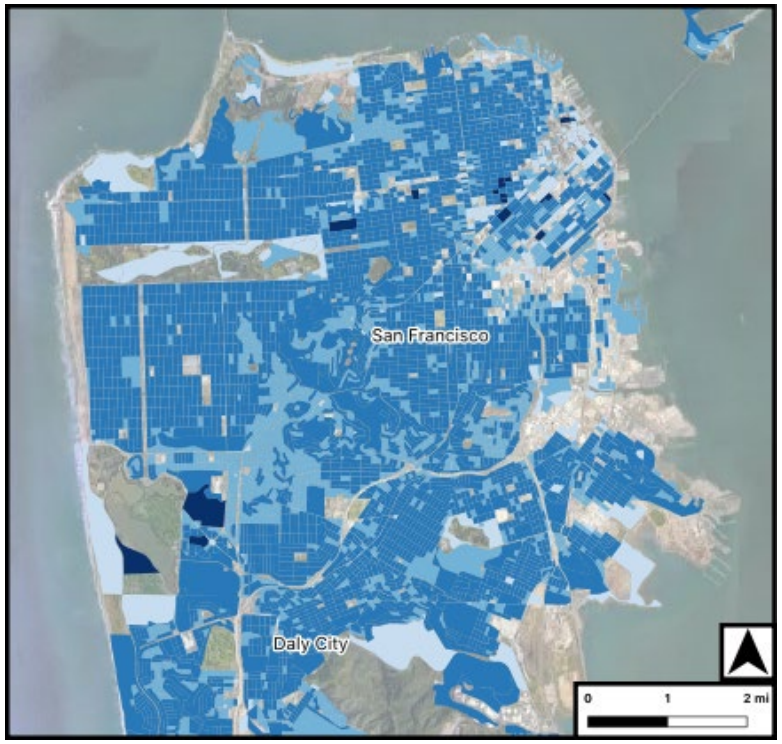
Populated areas intersected with domestic well sections



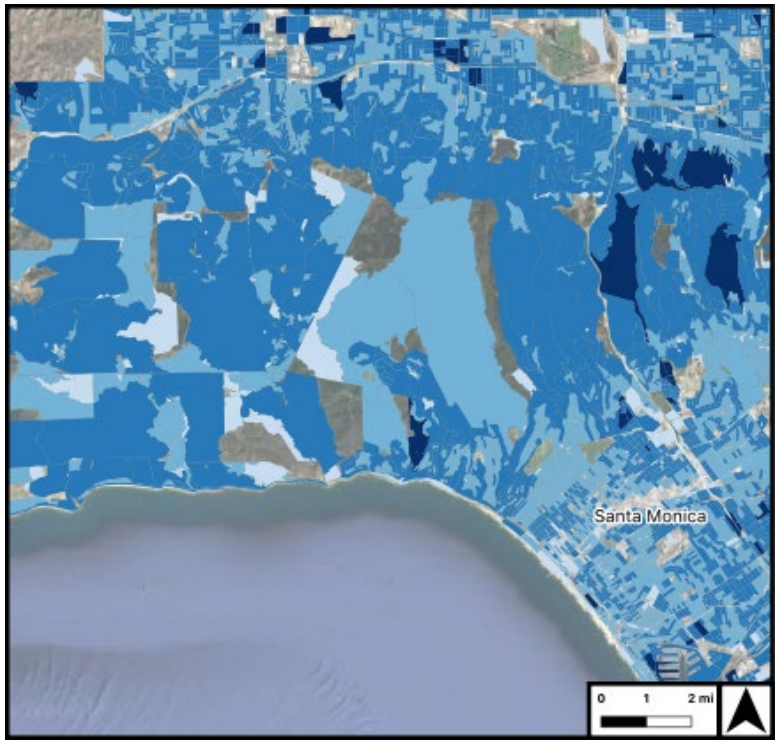
Domestic well counts assigned to populated areas within sections and intersected with the AoA.

Extras

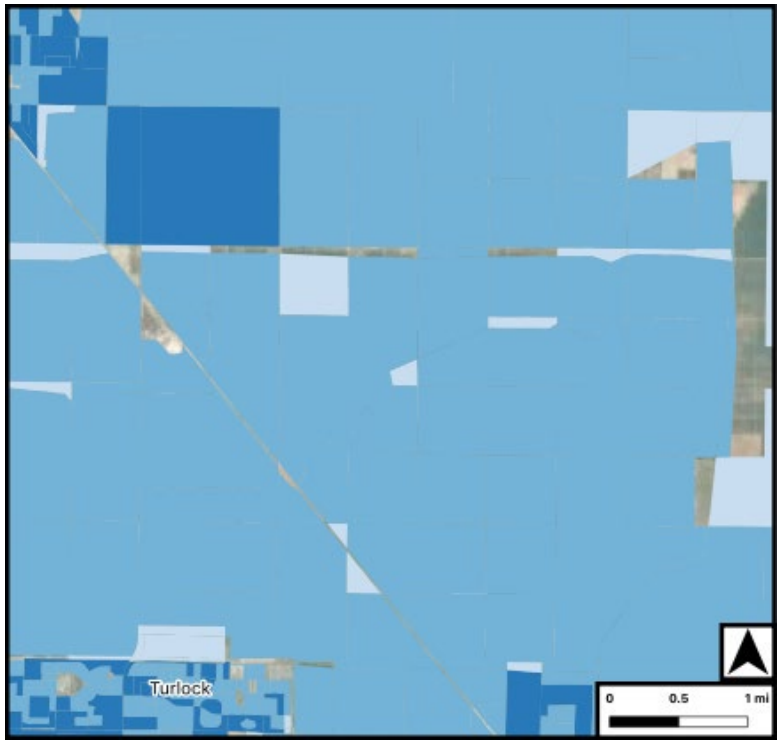
Census Population Data



San Francisco



Near Los Angeles

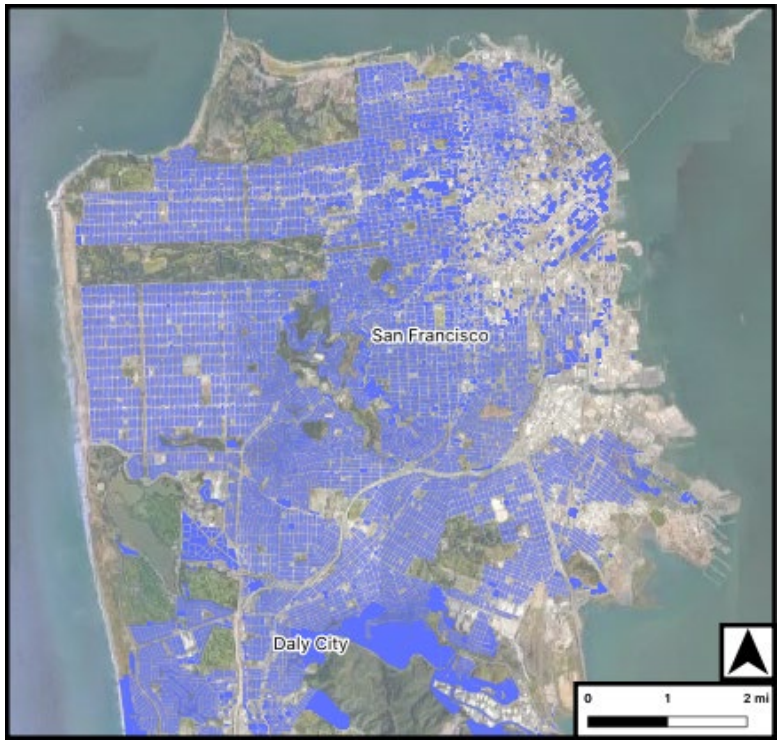


Near Turlock

2010 Census
Block Populations

1 - 10 **10 - 100** **100 - 1000** **1000 - 10000**

Residential Parcel Data



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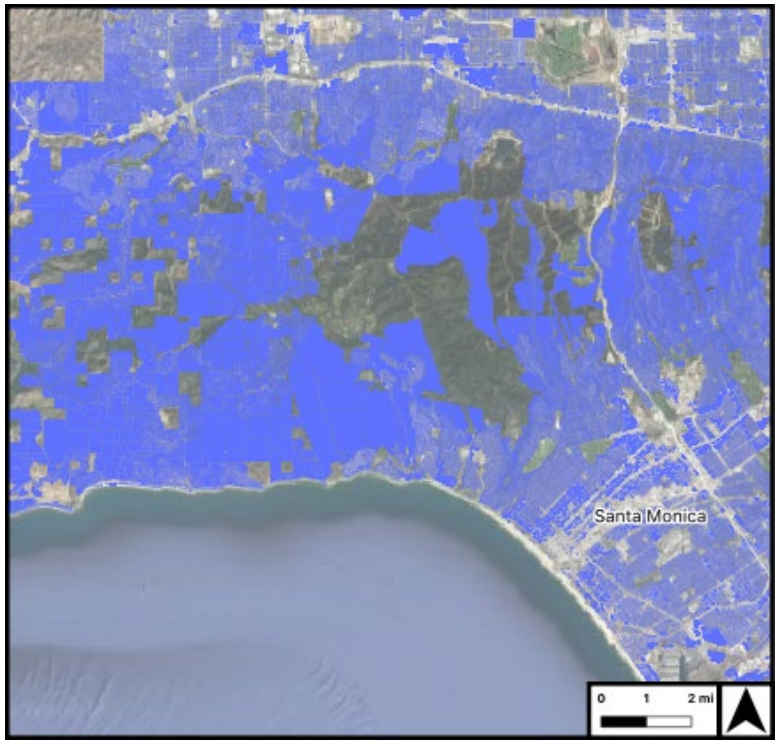
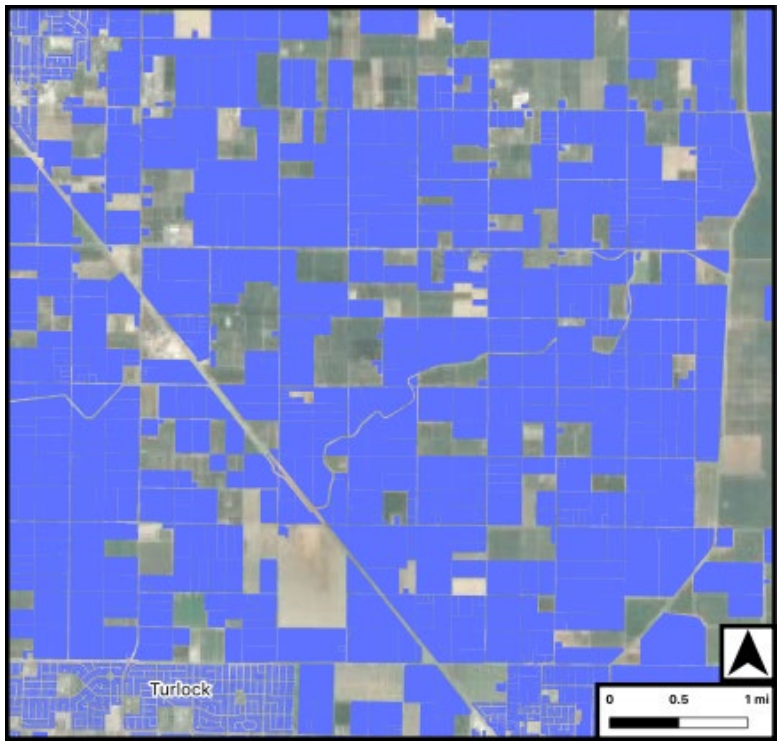
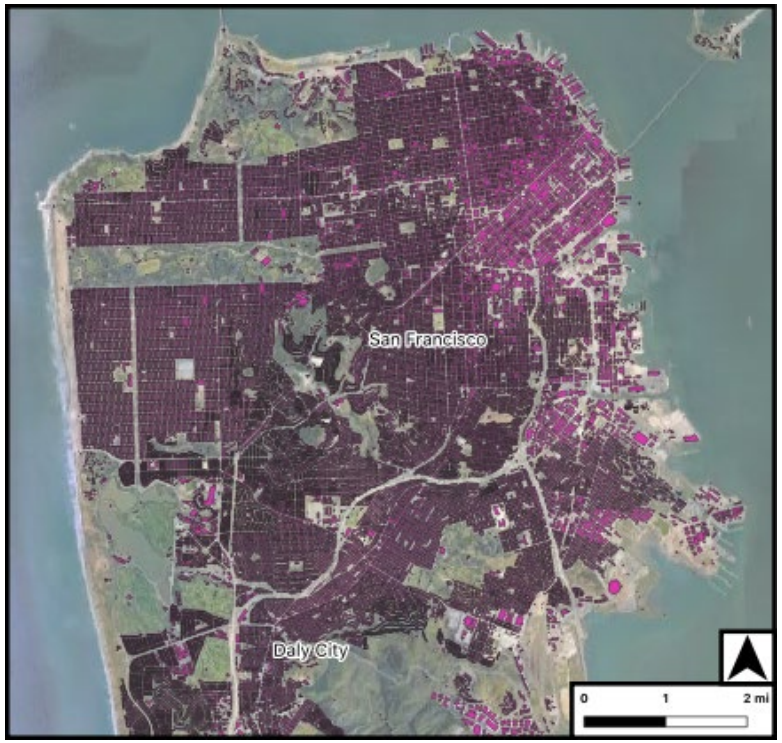


Near Los Angeles



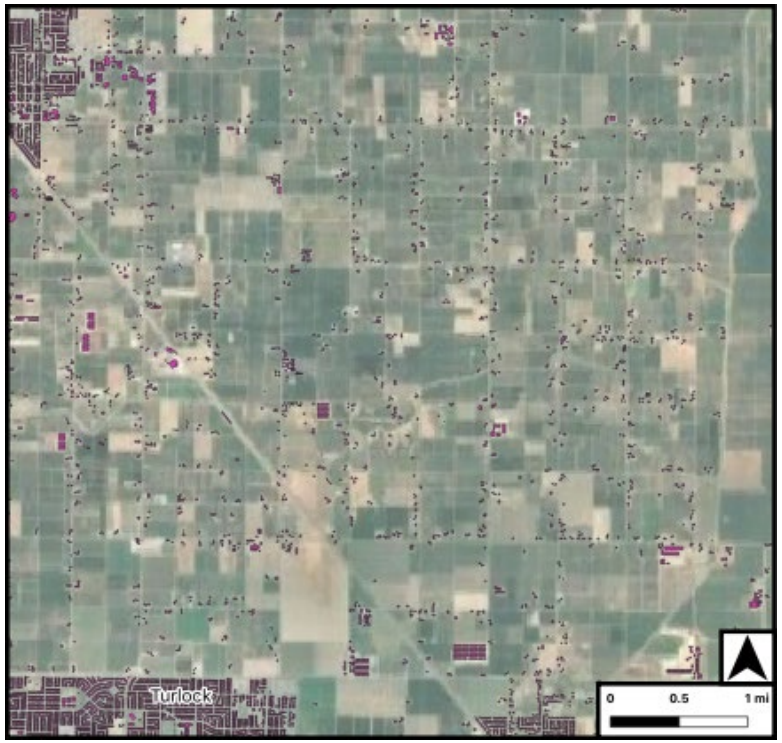
Near Turlock

Rem. Sensed Buildings Data



San Francisco

Near Los Angeles



Near Turlock

Recommendations for enhancing cumulative impacts analysis to inform decision-making

CARB & DTSC:

- Include data related to oil and gas production to supplement cumulative impact metrics in CalEnviroScreen
- Enhance information on sensitive land uses that incorporates spatial information on the number and density of domestic drinking water wells
- Supplement CES with sensitive land use (SLU) indicators that include locations that are inhabited or frequented by populations likely to be susceptible to the adverse effects of environmental hazards (parks, schools, childcare facilities, health and senior care facilities, and prisons)
- Integrate indicators of civic engagement capacity and racial/ethnic composition (Racial/ethnic composition and voter turnout)
- Improve locational accuracy of rural populations, using dasymetric mapping techniques.

DTSC:

- Improve locational accuracy of HWF sites in public use data sets, and enhance precision of where waste processing activities occur on large sites.
- Conduct sensitivity analyses when assessing cumulative impacts associated with HWFs and nearby environmental hazards, vulnerable populations, and sensitive land uses

Thank you!

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Our mighty team:

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