

EHSC Community Research Priorities

Updated October 2022



Photo by [Tim Mossholder](#)

About

The **UC Davis Environmental Health Science Center** (EHSC) supports translational environmental health research in collaboration with community stakeholders in California's Central Valley, home to 4 million people and one of the most agriculturally productive regions in the nation. Central Valley residents also face high rates of poverty, racialized and disproportionate exposure to environmental hazards, and limited access to health care.

One mechanism EHSC uses to center those most directly impacted by environmental health issues in our work is the compilation and promotion of **Community Research Priorities**.

These Community Research Priorities synthesize high priority, policy-relevant research needs identified by our stakeholders.

Who created the Community Research Priorities?

The Community Research Priorities were co-developed by EHSC's Community Stakeholder Advisory Committee (CSTAC) and Community Engagement Core (CEC).

Twice a year, the CEC facilitates a meeting between EHSC member faculty and the CSTAC, which is composed of environmental justice organizations and public agency representatives from across the state of California. The spring meeting is focused on revising the Community Research Priorities to reflect emerging issues and shifts in the policy landscape, and on identifying potential university-community research partnerships to support in the coming year.

Who are the Community Research Priorities for?

The Community Research Priorities were developed with environmental health science researchers in mind.

EHSC provides support to environmental health researchers at UC Davis in a variety of ways, including two small grants programs, training and capacity building, and facilitation of community-university research collaborations under a Community-Engaged Research model.

For those who are interested in applying for funding through EHSC, please take a look at our [Seed Funding](#) and [Pilot Projects Program](#). We also recommend that you review the [current National Institute of Environmental Health Sciences \(NIEHS\) Strategic Plan](#), as many of the community priorities relate directly to [Theme 2: Promoting Translation - Data to Knowledge to Action](#).

How can I learn more or get involved?

Academic researchers – please connect with the EHSC's [Community Engagement Core](#) to learn more about how you can collaborate with community-based organizations around these topic areas.

Community organizations – please reach out to EHSC's [Community Engagement Core](#) if you are interested in getting involved in guiding or participating in research at EHSC.

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Acknowledgements

Community Stakeholder Advisors

This document was compiled by the EHSC Community Engagement Core in collaboration with the EHSC's Community Stakeholder Advisory Committee. Special thanks to all those who generously shared their time and expertise throughout the process. We are thankful to be part of this community.

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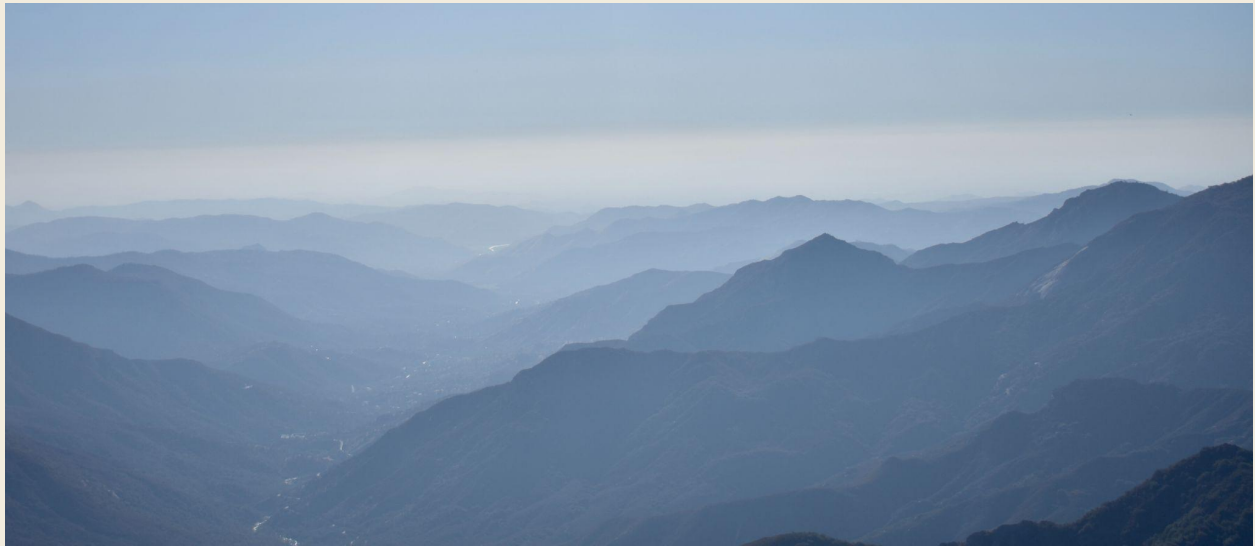
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Native Lands Acknowledgement



This work was produced within the unceded territory of California that is home to nearly 200 tribal nations. We humbly acknowledge and honor the original inhabitants of the various regions where this work has taken place.

The Environmental Health Sciences Center is based in Sacramento and Davis, on unceded lands stolen from Native peoples to form the University of California campuses.

To the original inhabitants of this land:

To the Nisenan people, To the Southern Maidu to the North, To the Valley and Plains Miwok/Me-Wuk peoples to the south of the American River, To the Patwin Wintun peoples to the west of the Sacramento River, To the people of the Wilton Rancheria surrounding Elk Grove, To the Cachil DeHe Band of Wintun Indians of the Colusa Indian Community, To the Kletsel Dehe Wintun Nation, and To the Yocha Dehe Wintun Nation:

May we honor your ancestors who came before the colonizers and whose descendants still walk beside us today.

For the contribution of countless elders, activists, healers, families, loved ones, and Peoples in forming the history of the region where we reside today, we thank you.

In acknowledgement of the genocide and displacement of the indigenous peoples of California, we invite those who have benefited from the seizure of Native Lands to consider taking part in a form of financial reparation:

- [Nisenan Ancestral Homelands Reciprocity Program](#)
 - [Sacramento Native American Health Center](#)
 - [News from Native California](#)
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Research Priorities by Issue Area

EHSC's Community Stakeholder Advisory Committee (CSTAC) is composed of community-based organizations, public agency representatives, and environmental health researchers who share a commitment to **promoting environmental justice through evidence-based health protective policies** that reduce harmful environmental exposures and improve public health outcomes.

Each of the topics described below represents an area that CSTAC members have identified in which **environmental health research** is needed to support their advocacy efforts and improve public health policies.



Section 1: Air Quality

Ultrafine Particulate Matter

Policy Context

Ultrafine particles are produced in large numbers by combustion activities (including vehicle emissions & wildfire) but their extremely small size means that they are currently unregulated by state and federal mass-based air quality regulations (PM 2.5 and PM 10).

An ultrafine particle is defined as having a diameter of less than 100 nanometers (nm). The average size particle from vehicle emissions is 25 nm, which is one million times smaller than a single particle of PM 2.5 dust. These ultrafine particles are undetectable using traditional optical particle counters (like PurpleAir), but are more mobile in the human body than larger particles, and thus may pose a greater risk to human health.

Research Needs

Research that supports the establishment of a health protective regulatory framework for ultrafine particulate matter, such as:

- Research to develop and utilize innovative methods to measure ultrafines in the environment and to assess their health impacts, particularly in overburdened, marginalized communities.
- Research on effective mitigation strategies to reduce exposure to ultrafines and improve related public health outcomes.

CSTAC members working on this issue

- **California Office of Health Hazard Assessment:** [Press Release: Study Finds Long-term Exposure to Ultrafine Particle Air Pollution Associated With Death From Heart Disease](#)

References and Additional Reading

- [1] [IQAir Overview of Ultrafine Particles](#)
 - [2] [The Health Effects of Ultrafine Particles \(Schraufnagel 2020\)](#)
 - [3] [Ultrafine Particles: Unique Physicochemical Properties Relevant to Health and Disease \(Kwon 2020\)](#)
 - [4] [Ultrafine Particulate Matter Study in the San Francisco Bay Area, Part 1: Study Plan \(2010\)](#)
 - [5] [Ultrafine Particulate Matter Emissions Inventory Prepared for the San Francisco Bay Area \(2012\)](#)
 - [6] [Bay Area Air Quality Management District Ultrafine Particulate Matter Program](#)
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Air Toxics

Policy Context

Air toxics (e.g., perchloroethylene, methylene chloride, dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds) are addressed through the [Clean Air Act](#), but are not currently included in the EPA's National Ambient Air Quality Standards ([NAAQS](#)), which only apply to six common air pollutants that the EPA refers to as "[Criteria Air Pollutants](#)." Some, but not all, Air Toxic emissions are regulated under the EPA's [National Emissions Standards for Hazardous Air Pollutants \(NESHAP\)](#). Both these lists are subject to periodic revision.

Research Needs

Research that increases knowledge of the health impacts of Air Toxics and how to mitigate any harmful effects, such as:

- Research on the health impacts of different Air Toxics individually, in complex mixtures, and cumulatively (over time).
- Research analyzing the usage and effectiveness of the EPA's Air Toxics Screening Assessment Tool ([AirToxScreen](#)) to improve public health outcomes.
- Research on effective strategies (regulatory, clinical, or behavioral) for reducing exposures to Air Toxics and/or mitigating the health impacts of exposure.

CSTAC members working on this issue

- **California EPA Office of Environmental Health Hazard Assessment:** [Air Toxics Hot Spots Reporting](#)
- **California Department of Pesticide Regulation:** [Toxic Air Contaminant Program](#)

References and Additional Reading

- (1) [Environmental Protection Agency's Summary of the Clean Air Act](#)
 - (2) [Environmental Protection Agency: NAAQS Table](#)
 - (3) [Environmental Protection Agency: Criteria Air Pollutants](#)
 - (4) [Environmental Protection Agency: Halogenated Solvent Cleaning: National Emission Standards for Hazardous Air Pollutants \(NESHAP\)](#)
 - (5) [Environmental Protection Agency's Air Toxics Screening Assessment](#)
 - (6) [California Air Resources Board's Air Toxic Program](#)
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Air Quality Notifications

Policy Context

While various public and private air quality notification systems exist (e.g., the [Air Quality Flag Program](#), [Spare the Air](#) alerts, and mobile apps like [AirNow](#), [PurpleAir](#), and [Breezometer](#)), little research has been done on how effective these tools are at improving public health outcomes - particularly in marginalized communities - and how they could be improved.

Research Needs

Research that supports the establishment of public air quality notifications that are timely, culturally appropriate, and effective in improving public health outcomes, such as:

- Research on how much and for how long different populations can be exposed to criteria and toxic pollutants before experiencing short and/or long-term health impacts.
- Research on effective, accessible, culturally appropriate health risk communications in heavily impacted and marginalized communities, including farmworkers and other outdoor workers.
- Research on safe, effective strategies to protect outdoor workers from exposure to poor air quality in high heat settings.
- Research on the utilization of air quality alerts in a policy context to protect outdoor workers and other sensitive populations.

CSTAC members working on this issue

- **Central California Environmental Justice Network:** [Community Based Air Monitoring + AB617](#)
 - **Comite Civico del Valle:** [IVAN Community Air Monitoring Network in Imperial Valley, CA](#)
 - **California EPA Department of Toxic Substances Control:** [Community Air Monitoring Plan Guidance \(2020\)](#)
 - **Californians for Pesticide Reform** Comment Letter: [Development of a statewide pesticide notification system](#). Also signed by CSTAC members **Central California Environmental Justice Network** and **Leadership Counsel for Justice and Accountability**.
-

References and Additional Reading

- (1) [AirNow's Air Quality Flag Program](#)
- (2) [SpareTheAir.org](#)
- (3) [AirNow.gov](#)
- (4) [PurpleAir | Real-Time Air Quality Monitoring](#)
- (5) [Breezometer Air Quality Map](#)
- (6) [Environmental Protection Agency GIS Map of The Air Quality Flag Program](#)
- (7) [Air Quality Information for the Sacramento Region](#)
- (8) [AirNow Mobile App](#)



Oil and Gas Setbacks

Policy Context

California does not currently have setback requirements for oil and gas drilling, unlike most other oil-producing states. Community advocates have been working for years to establish these setbacks, including [AB 345](#) in 2019 and [AB467](#) in 2021, both of which died in committee [[3](#), [4](#)], and [SB 1137](#), which was passed and signed by the governor in 2022 but has not yet been enacted. SB 1137 is currently the subject of a referendum attempt that could delay or prevent its implementation ([6](#)).

Development of SB 1137. In 2021, the Department of Conservation's Geologic Energy Management Division (CalGEM) convened a national [Public Health Science Advisory Panel](#) to review the scientific evidence on the public health implications of oil and gas production. Following [their report](#), which found consistent evidence of harm within 1 kilometer of drilling operations, CalGEM released [draft public health regulations](#). These regulations proposed a 3200 foot setback from sensitive locations (residences, schools, businesses, health care facilities, and other residential and long term care facilities including prisons) within which no new operations could be developed and additional emissions monitoring would be required of existing operations. It is estimated that 30% of California's current oil and gas production takes place within the 3200 foot setback, and critics of the rule say it needs to do more to phase out existing production within the setback to protect public health ([10](#), [11](#)).

The setback regulations developed by CalGEM were [expected to take effect in 2023](#). However, in August 2022 California Governor Gavin Newsom [asked the legislature to consider adopting a law establishing the setbacks](#), rather than continuing through the lengthy regulatory process. The legislature subsequently passed [SB 1137](#), establishing setbacks as part of a package of climate legislation signed by the governor in September 2022. The law was set to go into effect on January 1, 2023, however a [veto referendum has been filed](#), which has until December 4 to secure enough signatures to be included on the 2024 ballot.

In addition to state efforts, Los Angeles recently adopted an [Oil and Gas Drilling Ordinance](#) that would phase out oil and gas drilling in the city over the next two decades ([15](#), [16](#), [17](#), [18](#))

Research Needs

Research on the health impacts of oil and gas production with SB 1137 setbacks in place, such as:

- Research on the potential or actual health benefits of various engineering controls to reduce emissions from existing wells, particularly those within the 3200 foot setback of sensitive locations.
 - Research on the health impacts of SB 1137 implementation, including compliance assessment.
-

CSTAC members working on this issue

- **Central California Environmental Justice Network:**
 - [Support SB 1137 - Setbacks Must Be A Part of California's Pro-Worker Climate Agenda](#): A Letter from (GreenPeace USA) and Nayamin Martinez (Central California Environmental Justice Network) to the California State Legislature and Governor's Office
 - [Abandoned & Idled Wells Pose Significant Safety Threats to Frontline Communities Across CA After Decades of Neglect](#)

References and Additional Reading

- (1) [California State Assembly Bill AB-345: Natural resources: environmental justice: oil and gas: regulation of operations \(2019-2020\)](#)
 - (2) [Palm Springs Desert Sun: California bill to ban fracking dies, but other oil regulation measures win votes](#)
 - (3) [LA Times: California oil production limits stall in Legislature, leaving the issue to Newsom](#)
 - (4) [VC Star CalMatters Commentary: Has California given up its climate ambitions?](#)
 - (5) [California State Senate Bill AB 1137: Oil and gas: operations: location restrictions: notice of intention: health protection zone: sensitive receptors](#)
 - (6) [Inside Climate News: Oil Industry Moves to Overturn Historic California Drilling Protection Law](#)
 - (7) [California Department of Conservation's Scientific Advisory Panel for Oil & Gas Public Health Rulemaking](#)
 - (8) [CalGEM Questions for the California Oil and Gas Public Health Rulemaking Scientific Advisory Panel](#)
 - (9) [California Department of Conservation's Draft Rule for Protection of Communities and Workers from Health and Safety Impacts from Oil and Gas Production Operations](#)
 - (10) [LA Times Editorial: California should end oil drilling near homes](#)
 - (11) [FracTracker Alliance Press Release: Implications of a 3,200-foot Setback in California](#)
 - (12) [LA Times: New California oil drilling must be set back from homes and schools, Newsom says](#)
 - (13) [LA Times: Amid fight with oil industry, Newsom makes a last-minute pitch to harden California's climate goals](#)
 - (14) [California lawmakers OK buffer zones between new oil wells and homes, schools](#)
 - (15) [Los Angeles City Planning: Oil and Gas Drilling Ordinance](#)
 - (16) [LA Times Editorial: L.A. is right to phase out oil drilling, but communities can't wait 20 years - Los Angeles Times](#)
 - (17) [Los Angeles City Planning: Oil Ordinance Fact Sheet](#)
 - (18) [Los Angeles City Planning: Draft Oil Ordinance \(August 2022\)](#)
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AB 617 Implementation

Policy Context

The [AB 617 Community Air Protection Program](#) was passed in 2018 with the purpose of improving air quality in heavily impacted communities in California. It involves community-scale air quality monitoring and the development of air pollution emission reduction plans. The [California Air Resources Board](#) (CARB) manages the program for the state, and local [Air Districts](#) are responsible for implementation in consultation with Community Steering Committees made up of local residents, organizations, governments, and businesses. Many CSTAC members are closely involved with AB 617 implementation and are organizing to ensure quality community engagement and advocating for improvements to the regulation.

Research Needs

Research that determines if (and how) AB 617 implementation is improving public health outcomes in participating communities, such as:

- Measurement of changes to air quality associated with AB 617 implementation and/or specific mechanisms being utilized in participating communities.
- Analysis of changes to public health outcomes associated with AB 617 implementation, in particular using the health metrics currently [under development](#) by CARB.
- Examination of the role of land use (e.g., restricting certain land uses in already heavily impacted communities) as a public health intervention to improve air quality and associated health outcomes.

CSTAC members working on this issue

- **Central California Environmental Justice Network:** [Community Based Air Monitoring + AB617](#)
- **Comite Civico del Valle:** [IVAN Community Air Monitoring Network in Imperial Valley, CA](#)
- **Californians for Pesticide Reform:** [Advance Notice of Pesticide Use in Shafter, CA](#)
- **Leadership Counsel for Justice and Accountability:** [Eastern Coachella Valley residents, make the case for state help cleaning up your air](#)

References and Additional Reading

- (1) [California Air Resources Board: Community Air Protection Program](#)
 - (2) [California Air Resources Board Homepage](#)
 - (3) [California Air Resources Board: List of California Air Districts](#)
 - (4) [California Air Resources Board: Proposal Solicitation for Improved Assessment and Tracking of Health Impacts for California Communities Most Burdened by Pollution \(Funding Year 2021-2022\)](#)
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Wildfire Smoke

Policy Context

Wildfire is a major environmental health concern in California, where in recent years record heat and drought have increased their size, speed, and destructiveness. In response, billions of dollars of new investments are being made in [preventing](#) and responding to wildfires at both the state and federal level ([2,3,4](#)), including [SB109](#), which established a new [Office of Wildfire Technology Research and Development](#).

These large, rapidly spreading fires are now also crossing into more populated areas. As more industrial and household materials burn, [the composition of wildfire smoke is changing](#) and may include [toxic metals](#) and other contaminants.

Residents of California's Central Valley are particularly vulnerable to wildfire smoke exposure. Smoke from fires in the mountains can [collect and settle](#) in the Valley [for days or weeks at a time](#), leaving residents exposed in some cases for longer than those in the actual fire zone. Central Valley communities already face some of the [worst air pollution in the country](#) and many residents are low income, non-English speaking, and have limited access to mitigations like air purifiers, [HVAC systems](#), masks, or the option of staying or working indoors ([13,14](#)).

The region is also home to the [largest agricultural sector in the country](#), including [half of its agricultural workers](#), who work outside during fire season with minimal protections, while also facing [high rates of occupational illness and injury](#) and [limited access to health care](#).

Research Needs

Research on the impact of prolonged wildfire smoke exposure on the health of communities in the Central Valley, such as:

- Research on the environmental health impacts of wildfire smoke exposure on outdoor workers. Research on effective exposure mitigation strategies in high risk occupational settings, like agricultural field work and construction.
 - Research on the environmental health impacts of wildfire smoke exposure in communities also experiencing high levels of air pollution from other sources.
 - Research on effective wildfire smoke mitigation strategies in sensitive locations like schools, day care centers, prisons, nursing homes, and other institutional and medical settings.
-

CSTAC members working on this issue

- **Central California Asthma Collaborative:** [CARB-Funded Research Study on the Impacts of Repeated Short-Term Wildfire Smoke Exposure](#)
- **California Department of Public Health:** [Wildfire Smoke and Ash Impacts on Public Health](#)
- **California EPA Office of Environmental Health Hazard Assessment** Report: [Wildfire Smoke: A Guide for Public Health Officials \(2019\)](#)
- **Leadership Counsel for Justice and Accountability:** [Crucial and Critical: Invest now in Community Resilience, Public Health, and Emergency Response](#)
- **Central California Environmental Justice Network:** [California EPA grant to train farmworkers on the health impacts of wildfire smoke exposure.](#)

References and Additional Reading

- (1) [The Nature Conservancy: Stopping Megafires in California](#)
 - (2) [NBC News: California Gov. Newsom commits \\$15B to combat wildfire, drought and climate change](#)
 - (3) [AP News: US plans \\$50B wildfire fight where forests meet civilization](#)
 - (4) [USDA Press Release: Biden-Harris Administration announces \\$1 Billion in Community Wildfire Defense Grants from Bipartisan Infrastructure Law](#)
 - (5) [California State Senate Bill SB-109: Department of Forestry and Fire Protection: Office of Wildfire Technology Research and Development \(2021-2022\)](#)
 - (6) [GovReport: Legislature Approves New Office of Wildfire Technology Research and Development - The GovReport](#)
 - (7) [UC Davis Environmental Health Sciences Center: Wildfire research](#)
 - (8) [California Air Resources Board Report: New analysis shows spikes of metal contaminants, including lead, in 2018 Camp Fire wildfire smoke](#)
 - (9) [PBS News Hour: 'You can't just hold your breath.' Toxic smoke, fueled by wildfires, chokes California](#)
 - (10) [KOED: Breathing Fire: California's Central Valley Bears the Brunt of Harmful Wildfire Smoke](#)
 - (11) [EPA's List of Activities for Cleaner Air](#)
 - (12) [IOPScience Open Letter: Utilizing smart-meter data to project impacts of urban warming on residential electricity use for vulnerable populations in Southern California](#)
 - (13) [California Office of Environmental Health Hazard Assessment: CalEnviroScreen 4.0 \(October 2021\)](#)
 - (14) [California Department of Public Health: Climate Change & Health Vulnerability Indicators for California \(CCHVIs\)](#)
 - (15) [USDA/NASS 2021 State Agriculture Overview for California](#)
 - (16) [California Findings from the National Agricultural Workers Survey \(NAWS\) \(2015–2019\)](#)
 - (17) [PubMed: Injury and Illness Surveillance of U.S. Agricultural Workers](#)
 - (18) [Public Policy Institute of California Report: Health Care Access among California's Farmworkers](#)
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Section 2: Pesticide Regulation

Public Notification

Policy Context

As part of the state's effort to reduce air pollution in heavily impacted communities, in 2018, CA [AB617](#) established community clean air steering committees in 10 locations across the state - including one in [Shafter](#) - charged with developing [Community Emission Reduction Plans \(CERPs\)](#).

The 2019 [Shafter CERP](#) included a commitment from DPR to work with the Air District, California Air Resources Board (CARB), and the Kern County Agricultural Commissioner's (CAC) office to explore options for a public pesticide notification system in the Shafter area.

Pre-application notifications, known as NOIs (Notices of Intent) are currently reported to county ag commissioners and, in Kern, are also shared with other farmers. An EHSC Pilot Project was funded in 2021 to use these NOIs to develop effective, culturally appropriate public notifications of pesticide applications. However, to date the Kern County agricultural commissioner has [not complied](#) with an order from the DPR to make these NOIs public, stating that he believes it is beyond the jurisdiction of AB 617. This issue remains ongoing.

In part as a result of the inability to implement a notification system in Shafter, the state allocated [\\$10 million](#) in the 2021-22 California state budget to develop and implement a statewide [Pesticide Notification Network](#).

As of 2022, notification projects are being implemented in four counties (Ventura, Stanislaus, Santa Cruz and Riverside) to pilot pesticide notification strategies that could potentially be implemented statewide. Through UC Davis research partnerships with [Californians for Pesticide Reform](#) (CPR), the effectiveness of these pilots will be evaluated, community-friendly notification platforms will be developed, and community air monitoring will be conducted to coincide with announced applications - marking the first time researchers will be able to time air sampling in an area with known pesticide applications.

Research Needs

Research that builds an evidence-base for public notification in advance of pesticide applications as a public health intervention, such as:

- Research that builds the evidence-base for advance public notifications of pesticide applications based on public health risk, including - but not limited to - restricted materials (ex: any substances linked to cancers, harm to pollinators, etc., even if not restricted).
- Research on drift dynamics and public health
- Research on the health impacts of pesticides that are not currently restricted in California (which in some cases are banned in other states or countries).
- Research on the development of effective, culturally appropriate notification systems and risk mitigation strategies (possible models: [wildfire notification systems](#), [BeeWhere](#))

CSTAC members working on this issue

- **Californians for Pesticide Reform** Comment Letter: [Development of a statewide pesticide notification system](#). Also signed by CSTAC members **Central California Environmental Justice Network** and **Leadership Counsel for Justice and Accountability**.

Statements by EHSC-affiliated Researchers on the Need for Public Pesticide Notifications

- [Letter to Governor Newsom. June 21, 2021.](#)
- [Letter to DPR Acting Director Julie Henderson. December 6, 2021.](#)

References and Additional Reading

- (1) [California Air Resources Board: Community Air Protection Program](#)
 - (2) [San Joaquin Valley Air Pollution Control District: AB-617 Profile for Shafter, CA](#)
 - (3) [California Air Resources Board: 2018 Air District-Approved Draft Final Community Emissions Reduction Programs | California Air Resources Board](#)
 - (4) [San Joaquin Valley Air Pollution Control District Report: Shafter Community Emissions Reduction Program](#)
 - (5) [Press Release: State Orders Kern Ag Commissioner to Give Advance Notice of Pesticide Use in Shafter](#)
 - (6) [California Department of Pesticide Regulation's Budget Change Proposal for Pesticide Notification Network](#)
 - (7) [California Department of Pesticide Regulation: Updates on the Development of a Statewide Pesticide Application Notification System](#)
 - (8) [Californians for Pesticide Reform \(CPR\) Homepage](#)
 - (9) [CalFire: Ready for Wildfire App](#)
 - (10) [BeeWhere Program Homepage](#)
-

Rulemaking for 1,3-Dichloropropene (Telone)

Policy Context

1,3-dichloropropene (1,3-D; Telone) is a fumigant pesticide used as a preplant treatment to control insects, nematodes, and other organisms in a range of crops including nuts, berries, and grapes. It is a [Prop 65-listed carcinogen](#), a [Volatile Organic Compound](#), and a [Toxic Air Contaminant](#). It is the [3rd most heavily used pesticide in California](#) by weight. It is banned in [34 countries](#).

The California Department of Pesticide Regulation ([DPR](#)) began rulemaking for 1,3-D following a 2018 court judgment and subsequent appeals process, with [a draft rule expected in fall 2022](#). [Californians for Pesticide Reform](#) (CPR) and other advocacy organizations are focused on influencing 1,3-D regulations to protect the health of agricultural workers and nearby communities.

The California Office of Environmental Health Hazard Assessment ([OEHHA](#)) recently granted a [CPR petition](#) to establish a [Prop 65 Safe Harbor level](#) for 1,3-D and adopted a NSRL (No Significant Risk Level) of 3.7 micrograms per day for oral and inhalation exposure, [effective October 1, 2022](#). This level is significantly more health-protective than DPR's proposed target.

Research Needs

Research that supports the development of an evidence-based health protective regulatory process for the use of 1,3-D in California, such as:

- Research on 1,3-D drift dynamics to better understand the relationship between applications, exposures, and human health outcomes (see [DPR investigation of 2018 1,3-D detections in Shafter](#))
- Research into the development of effective, evidence-based pesticide monitoring strategies with a public health focus (including but not limited to 1,3-D)
- Research that identifies safe alternatives to fumigant pesticides, for example, by examining agricultural practices and health outcomes in countries where 1,3-D is banned.

CSTAC members working on this issue

- **Californians for Pesticide Reform:**
 - [Letter to Governor: Dear Governor Newsom: Pesticides are Air Contaminants too!](#)
 - [California Must Ban or Severely Restrict Cancer-Causing 1,3-Dichloropropene \(Telone\)](#)

References and Additional Reading

- (1) [California Office of Environmental Health Hazard Assessment: 1,3-Dichloropropene](#)
 - (2) [California Department of Pesticide Regulation: Volatile Organic Compound \(VOC\) Emissions from Pesticides](#)
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- (3) [California Department of Pesticide Regulation: Toxic Air Contaminant Program](#)
- (4) [California Department of Pesticide Regulation: Summary of Pesticide Use Report Data \(2018\)](#)
- (5) [Pesticide Action Network International's Consolidated List of Banned Pesticides](#)
- (6) [California Department of Pesticide Regulation Homepage](#)
- (7) [Californians for Pesticide Reform: California Must Ban or Severely Restrict Cancer-Causing 1,3-Dichloropropene \(Telone\)](#)
- (8) [Californians for Pesticide Reform Homepage](#)
- (9) [California Office of Environmental Health Hazard Assessment Homepage](#)
- (10) [Californians for Pesticide Reform's Petition Pursuant to Government Code §11340.6 for Adoption of Proposition 65 Regulation Setting a No Significant Risk Level for 1,3-Dichloropropene](#)
- (11) [California Office of Environmental Health Hazard Assessment: Proposition 65 No Significant Risk Levels \(NSRLs\) and Maximum Allowable Dose Levels \(MADLs\)](#)
- (12) [California Office of Environmental Health Hazard Assessment: Proposition 65: No Significant Risk Level for 1,3-Dichloropropene \(1,3-D\)](#)
- (13) [California Department of Pesticide Regulation Report on Elevated Telone Detections \(2018\)](#)
- (14) [Californians for Pesticide Reform: Levels of a cancer-causing pesticide have spiked in Shafter this year \(2018\)](#)



School Buffer Zones

Policy Context

California established regulations [limiting pesticide applications near schools and daycare facilities](#) during the school day in 2016, which went into effect in 2018. However, advocates are concerned with the efficacy of these regulations due to their limited enforceability (2,3,4).

Research needs

Research that informs the development of enforceable, health protective pesticide application buffer zones around school, such as:

- Research on pesticide drift and exposure dynamics.
- Research on the health impacts of pesticide exposure among school-age children (particularly long-term, cumulative impacts).
- Research that compares detectable levels of pesticides on school and daycare sites on spray days versus non-spray days.
- Analysis of changes to pesticide use patterns near schools and daycares since adoption of the 2018 regulation and/or changes to relevant biomarkers or health outcomes in affected areas.

CSTAC members working on this issue

- **Comite Civico del Valle:** [Brawley, CA Health ACTION Environmental Study](#)
- **Californians for Pesticide Reform:** [News Release: Pesticide Protection Zones: Keeping Kids Safe at School \(2016\)](#)
- **California Department of Pesticide Regulation:** [Guidance on Pesticide Use Enforcement Near Schools and Child Care Facilities](#)
- **California EPA Office of Environmental Health Hazard Assessment:** [Development of Health Criteria for School Site Risk Assessment for the Identification of Potential Chemical Contaminants of Concern](#)

References and Additional Reading

- (1) [California Department of Pesticide Regulation: DPR 16-004 Pesticide Use Near Schoolsites](#)
 - (2) [Californians for Pesticide Reform Letter to Director Val Dolcini, Department of Pesticide Regulation \(2021\)](#)
 - (3) [Californians for Pesticide Reform and California Rural Legal Assistance Foundation Letter to California Department of Pesticide Regulation \(2021\)](#)
 - (4) [PLOS Biology Journal: Will buffer zones around schools in agricultural areas be adequate to protect children from the potential adverse effects of pesticide exposure?](#)
-

Alternatives to Hazardous Pesticides

Policy Context

In response to the 2019 California state [ban on chlorpyrifos](#) that went into effect in January 2021, the Department of Pesticide Regulation convened an [Alternatives to Chlorpyrifos Work Group](#) and released a list of alternative pesticides in a 2020 [Action Plan](#). A [Sustainable Pest Management Work Group](#) was then convened in spring 2021 as a collaborative forum to help identify ways to minimize the use of hazardous pesticides and expand the use of integrated pest management practices. Californians for Pesticide Reform are monitoring alternatives proposed by these workgroups for pesticides of concern.

Research Needs

Research that provides communities and advocacy groups with accurate information on the human health impacts of proposed alternatives to chlorpyrifos and other hazardous pesticides, such as:

- Research on the human health impacts of classes of pesticides rather than of individual pesticides. A broader approach can help avoid situations in which the use of a specific product is limited or discontinued and similarly hazardous alternatives continue to be used in its place.
- Research on the public health costs associated with hazardous pesticide use, including medical care, lost wages/productivity, and educational and other support needs resulting from developmental, cognitive, and motor function impacts.
- Research on public health outcomes in communities in proximity to farms using organic, IPM, and conventional pest management practices.
- Research on pesticide lifecycle contributions to greenhouse gas emissions from manufacture, transport, use, and disposal.
 - Note on environmental health science connection: Evidence that pesticide use contributes to greenhouse gas emissions would open up additional health protective policy mechanisms, potentially resulting in health benefits both from reduced pesticide exposure and reduced greenhouse gas emissions.

CSTAC members working on this issue

- **California Department of Public Health:** [Conference @ UC Davis for Safer Alternatives for Pest Control in Agriculture - Making the Public Health Case for Change](#)
 - **Californians for Pesticide Reform:**
 - [TAKE ACTION: California needs safe alternatives to chlorpyrifos and other hazardous pesticides](#)
 - [Letter to Governor: Dear Governor Newsom: Pesticides are Air Contaminants too!](#)
-

References and Additional Reading

- (1) [California Department of Pesticide Regulation: Chlorpyrifos Cancellation](#)
- (2) [California Department of Pesticide Regulation and California Department of Food and Agriculture Announcement for Alternatives to Chlorpyrifos Work Group](#)
- (3) [California Department of Pesticide Regulation's Alternatives to Chlorpyrifos Work Group Action Plan: Towards Safer and More Sustainable Alternatives to Chlorpyrifos \(2020\)](#)
- (4) [California Department of Pesticide Regulation News Release: New, Cross-sector Work Group will Speed California's Shift to Safer Pest Management](#)



Photo by [Tim Mossholder](#)

Section 3: Water Quality & Quantity

SB 200 Implementation

Policy context

In 2019, [SB 200](#) established the [Safe and Affordable Funding for Equity and Resilience \(SAFER\) Program](#), which provides \$130 million per year over 10 years in funding support for underperforming and at-risk small water systems through the [Safe and Affordable Drinking Water Fund](#). The Fund's [Expenditure Plan](#) is updated each year based on an annual [Drinking Water Needs Assessment](#).

There is currently limited testing of domestic wells by public agencies, which represents a major gap in the knowledge base needed for effective regulation and investments.

Research Needs

Research on whether SB 200 implementation is reducing exposures and/or improving health outcomes in communities that are most impacted by water contamination, such as:

- Research identifying higher risk contaminants to human health in small water systems and domestic wells, which could help prioritize funding by the State Water Board. There is a particular interest in research that expands testing of domestic wells for contaminants of concern.
 - Research that identifies small water systems at high risk of failure, which could enable the provision of funding to disadvantaged communities before their systems underperform or fail.
 - Research that identifies health impacts related to ingestion and absorption of contaminants found in small water systems and domestic wells.
 - Research that assesses resource allocations under SB 200, i.e. which small districts are accessing funding and for those that are not, barriers faced and the impact on health disparities.
 - Research on the effectiveness of interventions under the SAFER program in improving public health outcomes.
 - Research on the impact of water affordability on public health outcomes.
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CSTAC members working on this issue

- **Community Water Center:**
 - [SAFER Advisory Group](#)
 - [Developing Equitable and Effective Early Action Plans: The Cost of Interim Drinking Water Solutions and Public Outreach for Nitrate Contaminated Drinking Water](#)
- **Leadership Counsel for Justice and Accountability:** [Water Advocacy](#)
- **California EPA Office of Environmental Health Hazard Assessment:** [Assessment of Community Water Systems: Achieving the Human Right to Water in California](#)

References and Additional Reading

- (1) [California Water Board's Fact Sheet: SB 200 Closes Funding Gap to Provide All Californians with Access to Safe and Affordable Drinking Water](#)
- (2) [California Water Boards: SAFER Drinking Water Program Homepage](#)
- (3) [California Water Boards: Safe and Affordable Funding for Equity and Resilience](#)
- (4) [California Water Board's Fund Expenditure Plan \(FFY 2020-2021\)](#)
- (5) [California Water Board's Drinking Water Needs Assessment \(2021\)](#)



Photo by [Ross Stone](#)

Drought Resiliency

Policy Context

Drought can negatively impact public health both by reducing access to water and by reducing water quality. Recent bills related to drought response in California include CA [SB 552 Drought Resilient Communities Act](#), which was [passed in September 2021](#), and the national [Large Scale Water Recycling and Drought Resiliency Investment Act](#), co-sponsored by California Senator Alex Padilla and currently in committee.

Research Needs

Research on effective ways to improve water quality and public health outcomes during periods of drought, such as:

- Research on strategies or technologies to protect drinking water quality during drought conditions.
- Research on effective remediation of residential and community wells, including both toxic contamination and salt water intrusion.
- A cost/benefit analysis of various health protective strategies, including connecting to municipal water services.

CSTAC members working on this issue

- **California Department of Public Health:** [Physical, Mental, and Financial Impacts from Drought in Tulare, Mariposa Counties \(2015\)](#)
- **Community Water Center:** [New Legislation for the Next Big Drought](#)
- **Environmental Justice Coalition for Water:** [Drought and Equity in California](#)
- **Leadership Counsel for Justice and Accountability:** [Breakdown: The Good, Not So Good, and TBD of Newsom's May Revise 2022-2023](#)

References and Additional Reading

- (1) [Senate Majority Leader Emeritus Robert Hertzberg Press Release: SB 552 enhances drought resiliency in California's most vulnerable communities and will help prevent catastrophic water shortages \(2021\)](#)
 - (2) [California Department of Water Resources: Drought Planning for Small Water Suppliers and Rural Communities \(SB-552\)](#)
 - (3) [Alex Padilla: Padilla Cosponsors Bill to Combat Drought in California and Across the Western U.S. \(2021\)](#)
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SGMA Implementation

Policy Context

The [Sustainable Groundwater Management Act \(SGMA\)](#) requires local [Groundwater Sustainability Agencies \(GSAs\)](#) in [high- and medium-priority basins](#) to develop and implement [Groundwater Sustainability Plans \(GSPs\)](#) or [Alternatives to GSPs](#), which are submitted to the Department of Water Resources' (DWR) [SGMA Portal](#). SGMA went into effect in 2017 and is [in the process of implementation across the state](#).

SGMA requires GSPs to address [groundwater level declines, groundwater storage reductions, land subsidence, depletion of interconnected surface waters, sea water intrusion, and water quality degradation](#). However, some groundwater management practices may produce improvements in one area and deteriorations in another. For example, groundwater recharge [can both positively and negatively impact drinking water quality](#) (and thus public health) depending on a number of factors related to both the aquifer and the process used.

Research Needs

Research that supports the development of effective sustainable groundwater management systems that improve public health outcomes, particularly in marginalized communities, such as:

- Research on the public health impacts of new groundwater management strategies being deployed as part of SGMA implementation.
- Research on the impact of wildfire on surface and groundwater quality, in particular in cases of proposed groundwater recharge under SGMA using surface water in wildfire impacted regions.
- Research identifying gaps in SGMA related to public health that could be addressed by future legislation or regulatory rule-making.
- Research on the effectiveness, transparency, and responsiveness of Groundwater Sustainability Agencies (GSAs) in addressing public health concerns in disadvantaged communities.

CSTAC members working on this issue

- **Leadership Counsel for Justice and Accountability:** [As Drought Sets In, Communities Hope SGMA can Change the Future of Water](#)
 - **Community Water Center:**
 - [Sustainable Groundwater Management](#)
 - [Groundwater Management and Safe Drinking Water in the San Joaquin Valley: Analysis of Critically Overdrafted Basins' Groundwater Sustainability Plans](#)
 - [Guide to Protecting Drinking Water Quality Under the Sustainable Groundwater Management Act](#)
-

References and Additional Reading

- (1) [California Department of Water Resources: Sustainable Groundwater Management Act \(SGMA\)](#)
- (2) [California Department of Water Resources: Groundwater Sustainability Agencies Homepage](#)
- (3) [California Department of Water Resources: Basin Prioritization](#)
- (4) [California Department of Water Resources: Groundwater Sustainability Plans](#)
- (5) [California Department of Water Resources: Alternatives to Groundwater Sustainability Plans](#)
- (6) [California Department of Water Resources: SGMA Portal](#)
- (7) [United States Geological Survey: Sustainable Groundwater Management](#)
- (8) [Community Water Center's Guide to Protecting Drinking Water Quality Under the Sustainable Groundwater Management Act](#)



Wastewater Management

Policy Context

Many rural residents in California rely on septic systems for wastewater management, which may be overburdened or inappropriate for the soil conditions. This can result in soil and water contamination, including the contamination of residential wells. The state has the authority to require local municipalities / wastewater providers to provide connections to residents on septic systems, but has done very little to do so.

Note that the 2021 California state budget included \$1.3 billion over 4 years for [“drinking water and wastewater infrastructure, with a focus on small and disadvantaged communities.”](#)

Research Needs

Research that supports the establishment of an evidence-based regulatory and funding framework to ensure adequate wastewater and sanitation services in disadvantaged rural communities.

- Research on the public health impacts of inadequate wastewater services.
- Research on health outcomes associated with the implementation of the [SAFER](#) program as it pertains to sanitation and wastewater.
- Research that builds on the analysis in the UC Davis report [“The Struggle for Water Justice in California’s San Joaquin Valley”](#) to include the health implications of waste water and sanitation services in an overall analysis of how to provide safe water infrastructure to rural communities. This original research focused on [Disadvantaged Unincorporated Communities](#) (low-income communities outside of cities) because urban areas generally have city-run wastewater systems.
- An analysis of the distance between inadequate septic systems and municipal or county wastewater services. This kind of proximity analysis could help identify the feasibility of connecting places with no or inadequate sewage systems to existing formal systems.
- Research analyzing the costs, health benefits, and any policy/structural barriers associated with connecting rural residents to wastewater management systems.

CSTAC members working on this issue

- **Leadership Counsel for Justice and Accountability:** [Water Advocacy](#)

References and Additional Reading

- (1) [California Office of the Governor News Release: Governor Newsom Announces \\$5.1 Billion Package for Water Infrastructure and Drought Response as Part of \\$100 Billion California Comeback Plan](#)
 - (2) [California Water Boards: SAFER Drinking Water Program Homepage](#)
 - (3) [UC Davis Center for Regional Change Report: The Struggle for Water Justice in California’s San Joaquin Valley: A Focus on Disadvantaged Unincorporated Communities](#)
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- (4) [PolicyLink Report: California Unincorporated: Mapping Disadvantaged Communities in the San Joaquin Valley](#)



PFAS Regulation & Remediation

Policy Context

[Per- and polyfluoroalkyl substances \(PFAS\)](#) are a family of man-made chemicals that repel oil and water and are used across a range of industries and consumer products -- including food packaging, waterproof clothing and upholstery, and at high concentrations in Class B firefighting foam (used for flammable liquid fires). They are associated with [a range of adverse health effects](#), including immune, reproductive, and developmental impacts and increased risk of testicular and kidney cancer. Other potential sources of PFAS exposure include military bases, airports, landfills, wastewater treatment facilities, and other industrial or manufacturing facilities. A national monitoring survey in 2013-2015 found [more detections of PFAS in California drinking water sources than any other state](#). Remediation of PFAS contamination [is technically challenging](#) due to its unique characteristics.

Firefighting foam is of particular concern in California due to its use on military bases, which can be a major source of groundwater contamination (and around which [federal/state responsibilities for remediation are complex and unresolved](#)). It is also [an area of emerging concern in wildfire zones with an urban interface](#), where gas stations or other industrial facilities at risk for flammable liquid fires may be impacted. In 2020, California [SB 1044](#) required PFAS chemicals to be phased out of Class B firefighting foam by 2022 for most uses, with waivers available to certain facilities, including oil refineries, through 2032.

The EPA classified PFAS as an “emerging contaminant” in 2016 and established a [\(non-enforceable and non-regulatory\) lifetime health advisory level](#). The California State Water Resources Control Board Division of Drinking Water (SWRCB-DDW) established notification and response levels for three PFAS chemicals in California, including: perfluorooctanoate (PFOA), perfluorooctanesulfonate (PFOS), and perfluorobutane sulfonate (PFBS). If these are detected at or above the response level, it is recommended that a water source is taken out of service [\[9\]](#). Environmental justice advocates would like the Office of Environmental Health Hazard Assessment (OEHHA) to [develop a public health goal \(PHG\) for PFAS as a class, allowing the effective regulation of all \(approximately 4,700\) PFAS chemicals in drinking water](#).

In September 2021, [AB 1200](#) passed the California Senate requiring disclosure of PFAS used in cookware. The [2021-22 California state budget includes \\$4.3 million](#) and 21 permanent positions to the State Water Resources Control Board to oversee cleanup of contaminants including PFAS. Orange County received a [\\$131 million EPA Water Infrastructure Finance and Innovation Act \(WIFIA\) Loan in 2021](#), which will support 35 PFAS treatment systems for 59 impacted wells in the Orange County Water District's service area. These treatment systems are currently under design and are expected to be constructed in the next two years.

Two PFAS bills were introduced this year, including The Safer Clothes and Textiles Act ([AB1817](#)), which would ban the sale of clothing and textile products in California containing

PFAS, and The PFAS-Free Beauty Act ([AB2771](#)), which would ban the entire class of PFAS from beauty and personal care products.

Research Needs

Research that informs the development and implementation of state policies that mandate PFAS remediation of impacted water systems and prevent future contamination, such as:

- Research on improved methods of testing for the presence of PFAS chemicals, including detection of low concentrations in both environmental and biological samples.
- Research that expands water sampling, particularly of small water systems and domestic wells, both in proximity to military bases and airports and in locations of unknown risk.
- Research on potential human health benefits of using alternatives to PFAS.
- Research on effective, health protective PFAS remediation and mitigation strategies/technologies.
- Research on the human health effects of the use of PFAS-based firefighting foams during urban-interface wildfires and the impact on surface and groundwater quality in impacted communities.
- Research on the human health impacts of newer short-chain PFAS chemicals in comparison to the older long-chain PFAS that they are being used to replace.
- Research on the human health impacts of exposure to mixtures of PFAS and/or PFAS in combination with other chemicals.

References and Additional Reading

- (1) [California State Water Resource Control Board: PFAS](#)
 - (2) [US Agency for Toxic Substances and Disease Registry: Toxicological Profile for Perfluoroalkyls](#)
 - (3) [Detection of Poly- and Perfluoroalkyl Substances \(PFASs\) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants \(Hu 2016\)](#)
 - (4) [Comparing PFAS to other underwater contaminants: Implications for remediation \(Newell 2020\)](#)
 - (5) [LA Times: Firefighting foam leaves toxic legacy in Californians' drinking water](#)
 - (6) [Water Online: Are California Wildfires Worsening The Water Contamination At Military Bases?](#)
 - (7) [California Office of the State Fire Marshal: Fire Fighting Equipment and Foam: PFAS](#)
 - (8) [EPA's 2022 Interim Updated PFOA and PFOS Drinking Water Health Advisories](#)
 - (9) [United States Geological Survey Report: Sampling for Per- and Polyfluoroalkyl Substances \(PFAS\) by the Groundwater Ambient Monitoring and Assessment Priority Basin Project](#)
 - (10) [NRDC Letter to Members of the State Water Resources Control Board regarding Poly- and Perfluorinated Alkyl Substances \(2018\)](#)
 - (11) [NRDC Blog: CA Bill to Reduce Toxic PFAS Exposures Passed by Legislature \(2021\)](#)
 - (12) [California State Assembly Floor Report of the 2021-22 Budget](#)
 - (13) [EPA News Release: EPA Announces \\$131 Million WIFIA Loan for PFAS Treatment and Removal Systems in Orange County, California](#)
 - (14) [California State Assembly Bill AB-1817: Product safety: textile articles: perfluoroalkyl and polyfluoroalkyl substances \(PFAS\). \(2021-2022\)](#)
 - (15) [California State Assembly Bill AB-2771: Cosmetic products: safety. \(2021-2022\)](#)
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Section 4: Climate Change & Health Equity

Policy Context

The State of California has [a wide range of climate-related policies and programs](#) designed to meet its greenhouse gas (GHG) emissions reduction targets of 40% below 1990 levels by 2030 and carbon neutrality by 2045.

The California Department of Public Health (CDPH)'s Climate Change and Health Equity Section ([CCHES](#)) works to increase integration between climate and health policies through a range of programs and tools ([3,4,5,6](#)) designed to ensure that climate change mitigation and adaptation strategies benefit public health overall and do not increase health disparities.

“Climate change and health inequities share similar root causes: the inequitable distribution of social, political, and economic power. These power imbalances result in systems (economic, transportation, land use, etc.) and conditions that drive both health inequities and greenhouse gas (GHG) emissions...The good news is that addressing climate change represents a significant opportunity to improve public health and advance health equity. Many actions that limit climate change also improve the health of families and communities and reduce health inequities.” - CCHES Section Overview

The California Air Resources Board ([CARB](#)) also leverages health protective policy mechanisms in the [AB 32 Climate Change Scoping Plan](#), which it develops every five years. The Scoping Plan lays out policy options for achieving the state's climate goals, [largely by utilizing existing air pollution programs](#). The [2022 Draft Scoping Plan](#) was released in May and will be finalized in the fall. The [Public Health Appendix \(Appendix G\)](#) explicitly addresses both the health threats associated with climate change and the opportunities for improving public health and health equity through climate policy.

Environmental justice groups, environmentalists, academics and climate policy experts have [raised concerns](#) about the current draft. These concerns include the adequacy of interim targets as well as some of the mechanisms proposed for meeting those targets, particularly reliance on cap and trade and carbon capture and sequestration (CCS), which advocates say could negatively impact the health of already heavily burdened California communities. These concerns were documented in [a letter sent to Governor Newsom and the CARB Board Chair on June 22, 2022](#).

Research Priorities Overview

Our community stakeholders want to see research that assesses the health impacts of various climate actions/policies, including both benefits and unintended disproportionate harms. There is particular interest in research that assesses the impact of various greenhouse gas (GHG) emissions reduction strategies on adaptation capacity/resilience, equity, and public health.

The following sections describe a few specific issues of concern to the community stakeholders we work with.

CSTAC members working on this issue

- **California Department of Public Health:** [Climate Change and Health Equity Homepage](#)
- **Leadership Counsel for Justice and Accountability:** [List of climate change advocacy priorities](#)
- **California EPA Office of Environmental Health Hazard Assessment:** [List of publications on human health impacts of climate change](#)

References and Additional Reading

- (1) [UC Berkeley School of Law: California Climate Policy Dashboard](#)
- (2) [California Department of Public Health: Climate Change & Health Equity Section](#)
- (3) [California Department of Public Health: Climate Change and Health Vulnerability Indicators for California](#)
- (4) [California Department of Public Health: California Building Resilience Against Climate Effects \(CalBRACE\) Project: Preparing for Climate Change](#)
- (5) [California Department of Public Health: Climate Change and Health Profile Reports](#)
- (6) [California Department of Public Health: Climate Change & Health Vulnerability Indicators for California \(CCHVIs\)](#)
- (7) [California Air Resources Board Homepage](#)
- (8) [California Air Resources Board: AB-32 Climate Change Scoping Plan](#)
- (9) [California Air Resources Board: AB-32 Climate Change Scoping Plan About Page](#)
- (10) [California Air Resources Board: Draft 2022 Scoping Plan Update and Appendices](#)
- (11) [California Air Resources Board: Draft 2022 Scoping Plan Update: Public Health Appendix \(Appendix G\)](#)
- (12) [CalMatters: Climate controversy: California's plan for handling crisis is flawed, advisors say](#)
- (13) [Letter to California Air Resources Board Regarding 73 Organizations Call for A Just and Ambitious 2022 Scoping Plan](#)



Carbon Capture and Sequestration (CCS)

[Carbon Capture and Sequestration \(CCS\)](#) is a relatively new technology that involves capturing carbon either from the air or directly from an emissions source (like an oil refinery, power plant, or biomass conversion facility), liquifying it, and storing it deep underground. The geology of California's Central Valley makes it uniquely capable of carbon storage, though carbon could also be captured in other parts of the state and transported to the Valley by truck, rail, barge, or pipeline (2).

CCS can also play a role in *enhanced oil recovery*, a process in which CO₂ injections are used to facilitate extraction in oil wells near the end of their life (3, 4)

CCS Expansion

CCS is not currently used in California, though there are [seven applications](#) for [Class IV wells](#) currently pending with the EPA (all in Kern County) and [at least 10 more](#) expected soon.

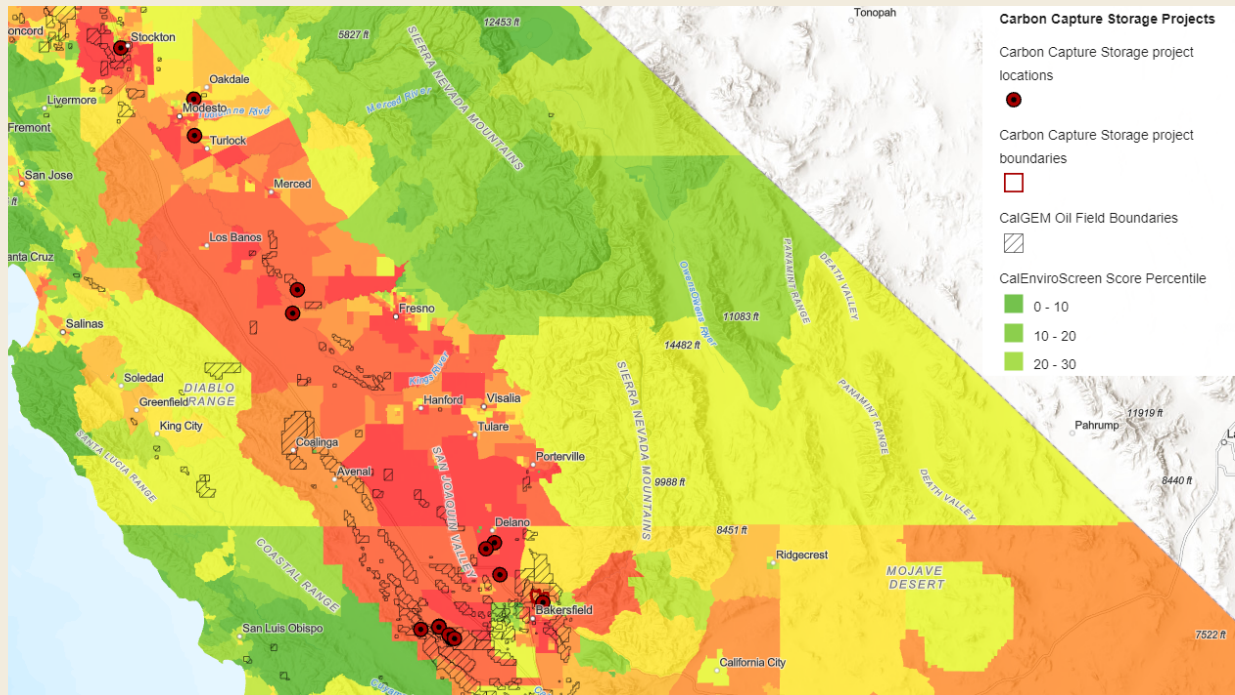
The current draft of the 2022 California Climate Change Scoping Plan includes investment in CCS projects. These projects [are currently eligible to receive Low Carbon Fuel Standard \(LCFS\) credits](#), but are [otherwise not yet able to participate in California's climate programs, including the cap-and-trade program](#). The California Air Resources Board (CARB) [is working to change this](#) in order to allow public incentives to support CCS infrastructure development [1].

Health and Equity Concerns

Both due to CCS's geologic requirements and its connection to oil production, CCS projects, in particular the carbon storage components, are likely to be overwhelmingly located in communities already overburdened with environmental hazards [7] and with [limited access to mitigations and health care](#).

The primary public health risks associated with CCS projects are CO₂ leaks (14, 15), including from [pipeline infrastructure](#), and induced seismicity. Though CO₂ typically disperses rapidly in air, it is dangerous at high concentrations. In addition, elevated CO₂ in soil and aquifers can harm plants and degrade water quality by increasing acidity and metal concentrations. Seismic activity can be triggered if sites do not manage pressure appropriately (17).

Environmental and climate justice advocates also question the viability and effectiveness of CCS [12] based on [its track record in other locations and its potential to extend fossil fuels use and divert investments from cleaner energy solutions](#). In response to some of these concerns, California passed [SB 1314](#), which helps ensure that CCS doesn't promote continued reliance on fossil fuels by prohibiting the use of extracted carbon for enhanced oil recovery.



Proposed/Potential CCS Sites in California (Graphic)

[Preview of an interactive map that shows proposed/potential CCS sites across CA compared to CalEnviroScreen Score Percentiles \(Center for Biological Diversity\)](#)

Research Needs

Community advocates would like to see research on the human health impacts of CCS, including transportation between capture and storage locations, to help guide the development of:

- (1) A health-protective emissions reduction strategy for the State of California
- (2) A health-protective regulatory framework for CCS projects if they are included in that strategy.

References and Additional Reading

- (1) [USGS: What is carbon sequestration?](#)
- (2) [Lawrence Livermore National Laboratory Report: Getting to Neutral: Options for Negative Carbon Emissions in California](#)
- (3) [Enhanced Oil Recovery Overview, US Office of Fossil Energy and Carbon Management](#)
- (4) [USGS: What's the difference between geologic and biologic carbon sequestration?](#)
- (5) [Class VI Wells Permitted by EPA](#)
- (6) [Class VI – Wells used for Geologic Sequestration of Carbon Dioxide](#)
- (7) [Center for Biological Diversity Press Release: EPA Urged to Reject Carbon Capture Projects in Central California](#)

- (8) [California Air Resources Board: Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard](#)
- (9) [Stanford Center for Carbon Storage Energy Science and Engineering: CCS could reduce California emissions by 15%, save \\$750M a year: report](#)
- (10) [California Air Resources Board's Carbon Capture and Sequestration Program: 2016 Progress and Future Plans](#)
- (11) [California Air Resources Board's CCS Page](#)
- (12) [Letter to the EPA Region 9 Office from 81 Organizations RE: EPA Review and Consideration of Class VI Carbon Storage Permits.](#)
- (13) [Center for Biological Diversity's Map of Proposed CCS Projects in California Compared to CalEnviroScreen scores](#)
- (14) [Huff Post: The Gassing Of Satartia](#)
- (15) [Clarion Ledger: 'Foaming at the mouth': First responders describe scene after pipeline rupture, gas leak](#)
- (16) [Pipeline Safety Trust: Carbon Dioxide Pipelines: Dangerous and Under-Regulated](#)
- (17) [California Air Resources Board's Carbon Capture and Sequestration Program: 2016 Progress and Future Plans](#)
- (18) [Center for International Environmental Law: Confronting the Myth of Carbon-Free Fossil Fuels: Why Carbon Capture Is Not a Climate Solution](#)
- (19) [SB 1314: Oil and gas: Class II injection wells: enhanced oil recovery](#)



Cap and Trade & REDD+

The [Kyoto Protocol](#), which was initiated in 1997 and went into effect in 2005, establishes global greenhouse gas (GHG) emission targets and market-based mechanisms for meeting them. One of these mechanisms is [emissions trading](#), often called "cap-and-trade," in which a government sets a limit ("cap") on GHG emissions and then allows the largest emitters to trade allocations within that limit among themselves in the form of credits. Emissions markets can also include offsets, or verified emission reductions, which companies can purchase in addition to unused credits to increase their allowed emissions.

California's [Global Warming Solutions Act of 2006 \(AB 32\)](#) established GHG emissions targets for the state and includes its own [cap-and-trade program](#) as part of its [Climate Change Scoping Plan](#).

CARB has considered expanding California's Offset Program to include international [sector-based offsets](#), including those within the UN's [Reducing Emissions from Deforestation and Degradation \(REDD+\)](#) framework ([8,9,10](#)).

REDD+ was designed to incentivize the reduction of carbon emissions in developing countries from deforestation and forest degradation, [which accounts for 11% of overall GHG emissions](#), by allowing them to sell emissions offsets for forest conservation and restoration.

Critiques

One critique of cap-and-trade is the potential for increasing local environmental health risks when a company buys credits or offsets that allow it to increase emissions. Emission sources are often located in or near communities that already experience disproportionate pollution and health burdens, and cap-and-trade can exacerbate these disparities.

With REDD+ there are additional concerns raised about the political, social, economic, and health impacts on communities where offsets are being sold, as well as technical concerns about the equivalence of trades in the forest sector (i.e. [carbon emissions are permanent, but living trees are not](#)) and difficulties in calculating and verifying offsets.

In addition, bringing forests into carbon markets increases their value to those who own/control them. This dynamic can lead to land grabs and displacement of forest-dependent and indigenous peoples, particularly in countries with already weak political and social infrastructure. In some cases REDD+ may even incentivize deforestation in advance of project development (so that it can be replanted for credit), and/or the replacement of old growth forests with monoculture plantations ([13,14,15](#)).

Research Needs

Research on the environmental health impacts to California communities of GHG emission markets, such as:

- Analysis of changes to GHG and co-pollutant emissions in proximity to frontline communities as a result of the purchase of credits or offsets; measures of associated health impacts.
- Assessment of the utilization of international and sector-based offset programs like REDD+ and their potential to impact health outcomes in California communities in proximity to emissions sources utilizing these offsets.

References and Additional Reading

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 - (2) [United Nations' Framework Convention on Climate Change: Emissions Trading](#)
 - (3) [California Air Resources Board: AB-32 Global Warming Solutions Act of 2006](#)
 - (4) [California Air Resources Board: Cap-and-Trade Program](#)
 - (5) [California Air Resources Board: AB-32 Climate Change Scoping Plan](#)
 - (6) [California Air Resources Board: Sector-Based Offset Credits](#)
 - (7) [UN-REDD Programme's Landing Page: About REDD+](#)
 - (8) [Friends of the Earth International's Report: REDD+: The Carbon Market and California-Acre-Chiapas Cooperation: Legalizing Mechanisms of Dispossession \(2017\)](#)
 - (9) [California Air Resources Board: Sector-Based Offset Credits](#)
 - (10) [Center for Global Development's Working Paper 386: CGD Climate and Forest Paper Series #13: The California REDD+ Experience: The Ongoing Political History of California's Initiative to Include Jurisdictional REDD+ Offsets within Its Cap-and-Trade System \(2014\)](#)
 - (11) [UN-REDD Programme's Fact Sheet: About REDD+](#)
 - (12) [REDD-Monitor's Blog: Forest offsets go up in smoke in California's "forever fire" \(2022\)](#)
 - (13) [World Rainforest Movement's Publication on REDD: A Collection of Conflicts, Contradictions and Lies \(2014\)](#)
 - (14) [Climate Change Journal: "You can't value what you can't measure": a critical look at forest carbon accounting \(2020\)](#)
 - (15) [Ephemera Journal: A colonial mechanism to enclose lands: A critical review of two REDD+-focused special issues \(2011\)](#)
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SB 375: The Sustainable Communities and Climate Protection Act

The [Sustainable Communities and Climate Protection Act of 2008](#) addresses the need to integrate transportation, land use, and housing development strategies to reduce the greenhouse gas emissions associated with car travel. This includes making sure affordable housing is available closer to where people need to go (work, school, parks, etc.) and providing feasible alternatives that enable people to drive less, like improved or expanded public transit, biking, and walking infrastructure.

Under [SB 150, which was passed in 2017](#), California Air Resources Board (CARB) is required to prepare a progress report to the Legislature every four years on the implementation of SB 35. The [first report was published in 2018](#) and a [draft version of the 2022 report](#), along with a [draft data dashboard site](#), is currently available on the CARB website.

Research Needs

Research on changes to environmental exposures and health outcomes associated with the implementation of SB 375.

- SB 150 established a set of metrics for use in tracking the implementation of SB 375, but these do not currently include any measures related to environmental exposures or health outcomes.
- Research is needed to establish the health impacts, positive or negative, of the various strategies being implemented to reduce transportation-related greenhouse gas emissions in California. There is a particular interest in assessing any impact on exposure or health outcome disparities.

CSTAC members working on this issue

- **Central California Environmental Justice Network:** [Comments to CARB regarding San Joaquin Valley SB 375 COG Review](#)
- **Leadership Counsel for Justice and Accountability:** [List of climate change advocacy priorities](#)

References and Additional Reading

- (1) [California State Senate Bill SB-375: Transportation planning: travel demand models: sustainable communities strategy: environmental review. \(2007-2008\)](#)
 - (2) [California Air Resources Board's Progress Report to the Legislature on Sustainable Communities Implementation](#)
 - (3) [California Air Resources Board's Progress Report: California's Sustainable Communities and Climate Protection Act \(2018\)](#)
 - (4) [California Air Resources Board's Draft Progress Report: California's Sustainable Communities and Climate Protection Act \(2022 DRAFT\)](#)
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- (5) [California Air Resources Board's Dashboard for Tracking Progress - Sustainable Communities \(2022 DRAFT\)](#)



Lithium

Lithium use & current sourcing

Lithium-ion rechargeable batteries power electric vehicles and support the integration of renewable energy sources into the electric grid. However, the extraction and processing of lithium and other mineral resources critical to low carbon technologies can also be a source of environmental degradation and human rights abuses ([1,2,3](#))

Lithium is currently mined primarily in Argentina, Chile, China, and Australia. Argentina and Chile using a lengthy and water intensive extraction method in which pools of brine evaporate in the sun, leaving minerals (including lithium) behind ([4,5](#)). In China and Australia lithium is extracted from open pit mines and acids, a highly energy-intensive process ([5,6](#)). Rising demand for lithium has led to dramatic price increases over the past year and raised concerns about the ability of supply chains to keep up ([7](#)).

Lithium in California

In 2020, the [Lithium Valley Commission](#) was appointed under [AB 1657](#) to bring together government, industry, and community stakeholders to assess the feasibility, benefits, and impacts of extracting lithium from the geothermal brines in the Salton Sea region. A [draft of the Commission's final report](#) is currently available for public comment ([though October 28, 2022](#)).

The Salton Sea is California's largest lake, located in Imperial and Riverside Counties near the US-Mexico border. Though the region has experienced periodic flooding throughout its history, what we know today as the Salton Sea was formed in 1905 when a series of canals failed and diverted the entire flow of the Colorado River into the Salton Basin for almost two years. It is currently [maintained primarily by agricultural runoff from the Imperial and Coachella Valleys](#) and has become [one of the most important wetlands resources for birds in North America](#), though [rising salinity levels and toxic contamination](#) threaten the wildlife that have come to depend on it.

The Salton Sea is more than [twice as salty as the ocean](#) and [heavily polluted](#) with [pesticides and heavy metals](#). It has also been [receding since the 1990s](#) in the face of hotter, more arid conditions and reduced inflow due to agricultural water conservation practices. Decreasing water levels have exposed large areas of former lakebed, producing [toxic dust and fumes](#) that [threaten the health of nearby communities](#), many of which are already burdened by [some of the worst air quality in the state](#).

The Salton Sea also sits on top of substantial lithium reserves in the form of [highly concentrated geothermal brine](#). A [2020 report by the California Energy Commission](#) estimates that the Salton Sea could generate more than 600,000 tons of lithium annually, more than all other global sources combined. There are currently [11 geothermal energy plants](#)

[in the Salton Sea region that already bring this underground brine to the surface to produce electricity](#). Normally the cooled brine would be re-injected into the ground, but [new technologies are being developed to extract lithium](#) first.

While this new type of lithium extraction is still an emerging technology, the combination of increasing global demand, large underground reserves, and the potential for new cost effective and environmentally friendly extraction technologies is positioning California to take a large and lucrative role in the future of lithium.

Environmental justice advocates in the Salton Sea are working to ensure that community stakeholders are involved in shaping that future, and that any resources that come with this new industry include investments in the work they have been doing for decades to clean up the Salton Sea and protect the health of local communities ([20](#), [21](#), [22](#), [23](#)).

Research Needs

Research that supports health-protective policy and investments in the development of a California lithium industry, such as:

- Research on environmental exposures and/or public health outcomes in the Salton Sea region.
- Research on effective strategies for reducing exposures and improving health outcomes in the Salton Sea region.
- Research on potential environmental health and equity concerns related to the emerging lithium extraction industry in the Salton Sea.

CSTAC members working on this issue

- **Comite Civico del Valle:**
 - [Letter to the Lithium Valley Commission Concerning Issues of Lithium Extraction from Frontline Communities](#) (August 2022)
 - [Letter to the Lithium Valley Commission Concerning Community Engagement in Fenceline Communities](#) (December 2021)
 - [Let's seize lithium opportunities and bring jobs and economic benefits to Imperial Valley](#) (Luis Olmedo, **Comite Civico del Valle**)
 - [Lithium Valley Community Coalition](#). Includes **Comite Civico del Valle**.
 - [Lithium Valley Commission](#). Includes Luis Olmedo of **Comite Civico del Valle**.
- [Sign-on Letter in Support of Lithium Valley Development Budget Proposals](#) (June 2022). Signed by **Comite Civico del Valle**, the **Central California Asthma Collaborative**, and the **Central California Environmental Justice Network**.

References and Additional Reading

- (1) [One Earth Journal: The material foundations of a low-carbon economy \(2021\)](#)
 - (2) [Wired: The spiraling environmental cost of our lithium battery addiction \(2018\)](#)
 - (3) [NY Times: Mining of Lithium, Key to the Climate Fight, Faces New Scrutiny in Chile \(2022\)](#)
 - (4) [KCET: As Lithium Drilling Advances at the Salton Sea, Researchers Work Out the Details \(2022\)](#)
 - (5) [Nature Editorial: Lithium-ion batteries need to be greener and more ethical \(2021\)](#)
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- (6) [California Energy Commission: Lithium Valley Commission Fact Sheet \(2022\)](#)
- (7) [Aljazeera: 'Insane' lithium price bump threatens EV fix for climate change \(2022\)](#)
- (8) [LegiScan's Bill Text for California Assembly Bill AB-1657: State Energy Resources Conservation and Development Commission: Blue Ribbon Commission on Lithium Extraction in California](#)
- (9) [Draft Report of the Blue Ribbon Commission on Lithium Extraction in California \(2022\)](#)
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- (11) [The Salton Sea Authority's Fact Sheet on the Salton Sea](#)
- (12) [The Salton Sea Authority's History and Timeline of the Salton Sea](#)
- (13) [California Department of Fish and Wildlife: Background Information on the Salton Sea](#)
- (14) [LA Times: Can lithium cure what ails the Salton Sea?](#)
- (15) [CNBC: Ghost towns and toxic fumes: How an idyllic California lake became a disaster](#)
- (16) [The Atlantic: Toxic Dust From a Dying California Lake](#)
- (17) [Food & Environment Reporting Network: As the Salton Sea shrinks, it leaves behind a toxic reminder of the cost of making a desert bloom](#)
- (18) [Bloomberg Law: Salton Sea Dust, Air Quality to Get Closer Look in California](#)
- (19) [California Energy Commission Energy Research and Development Division's Final Project Report for Selective Recovery of Lithium from Geothermal Brines](#)
- (20) [PubMed: Assessment of lithium criticality in the global energy transition and addressing policy gaps in transportation \(2020\)](#)
- (21) [Comite Civico del Valle's Community Outreach Education & Engagement \(COEE\) Homepage](#)
- (22) [Torres Martinez Desert Cahuilla Indians: Desert Cahuilla Wetland](#)
- (23) [Alanza Coachella Valley's Salton Sea Homepage](#)
- (24) [CNBC Video: How the shrinking, troubled Salton Sea could supply the U.S. with green lithium](#)



Section 5: Hazardous Waste Disposal

Policy Context

Kettleman City is one of the [birthplaces of the environmental justice movement in California](#); residents have been [organizing since the 80s](#) to protect their community from multiple environmental hazards, most notably the [Chemical Waste Management's Kettleman Hills](#) landfill, which is the largest hazardous waste landfill in the west and is located just over two miles from Kettleman City.

Residents of Kettleman City and other communities impacted by hazardous waste facilities are currently working to ensure that California's new permitting framework for hazardous waste disposal protects public health. They are focused on issues of setbacks, violations, and community engagement within the permitting process.

In 2015, [SB 673](#) required the California Department of Toxic Substances Control ([DTSC](#)) to address environmental justice concerns regarding the location and operation of hazardous waste facilities by updating its permitting criteria to include “the vulnerability of, and existing health risks to, nearby populations” and to consider setting minimum setback distances from sensitive locations (schools, homes, hospitals, elder care facilities, etc.). In response, the DTSC released a draft regulatory approach in 2018, which was [updated based on public comment in May 2021](#). The DTSC took additional comments on this revised draft through [October 2021](#), which will be incorporated into the draft formal regulatory text that will be submitted to the Office of Administrative Law in 2022.

Research Needs

Research on the adequacy of proposed setbacks from hazardous waste facilities to protect public health.

CSTAC members working on this issue

- **Greenaction for Health and Environmental Justice** and **El Pueblo para el Aire y Agua Limpia**, Kettleman City:
 - [Comments in Support of Denial of Variance Request from Clean Harbors Buttonwillow Hazardous Waste Landfill](#) (2022) (co-signed by **Central California Environmental Justice Network**).
 - [Environmental Justice, Racism, Health, and Civil Rights in Kettleman City](#)
 - [Equity Groups Urge CalEPA to Extend Civil Rights Pact to Meet Deadlines](#) (2019)
 - [Letter to CalEPA and DTSC Regarding Ongoing Violations of Kettleman City Title VI Settlement](#) (2019)
 - [Title VI Settlement Agreement: DTSC, CalEPA, Greenaction, El Pueblo](#) (2016)
 - [Kettleman City CalEnviroScreen Fact Sheet](#)
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[2021 Documentary on EHSC Community-Engaged Research in Kettleman City](#)

References and Additional Reading

- (1) [Greenaction for Health & Environmental Justice: Kettleman City](#)
 - (2) [Timeline: This poor, Hispanic town in California has been fighting a local toxic waste dump for 35 years \(2017\)](#)
 - (3) [California Department of Toxic Substances Control's Site Project Documents for Kettleman Hills Facility](#)
 - (4) [California Department of Toxic Substances Control's Update to California State Senate Bill SB-673: DTSC Proposes Rules to Strengthen Safeguards for Hazardous Waste Permits \(Cumulative Impacts and Community Vulnerability\)](#)
 - (5) [California Department of Toxic Substances Control \(DTSC\) Homepage](#)
 - (6) [California Department of Toxic Substances Control and California Environmental Protection Agency's Revision Draft Deliberative Document: SB 673 Cumulative Impacts and Community Vulnerability Draft Regulatory Framework \(2021\)](#)
 - (7) [California Department of Toxic Substances Control's Listening Session on Violations Scoring Procedure Regulation Changes](#)
 - (8) [UC Davis Environmental Health Sciences Center's Documentary: Air, Water, Blood: The Power of Community-Engaged Research \(2022\)](#)
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Section 6: Research Methods

In addition to advising on specific topical priorities, CSTAC members have also advised us on a set of priority research methods. Utilizing these research methods in any of the proposed research focus areas is of particular interest.

Health Equity Risk Assessments

The key question the public has around many environmental exposures is, “Should I be concerned about this?” Comprehensive [Human Health Risk Assessment](#) is a multi-step process involving hazard identification, dose-response measurement of effects, exposure assessment, and risk characterization, which can inform decision-making to control or otherwise respond to exposures to environmental hazards. The work requires multidisciplinary teams and can be applied to a wide range of environmental health concerns. CSTAC members are particularly interested in seeing Human Health Risk Assessments that take into account health disparities and social determinants of health.

Open access data sources and computational toxicology tools are available to expedite this process, including:

- [CompTox Chemicals Dashboard \(epa.gov\)](#)
- [OEHHA Chemical Database: Chemicals - OEHHA](#)
- [DPR Pesticide Databases: Department of Pesticide Regulation Databases \(ca.gov\)](#)
- [PubChem Chemicals Database: PubChem \(nih.gov\)](#)
- [US EPA Endocrine Disruptor Screening Program: Endocrine Disruption | US EPA](#)
- [Integrated Chemical Environment Computational Toxicology Tools: Integrated Chemical Environment \(ICE\) \(nih.gov\)](#)

True Cost Accounting

[True Cost Accounting](#) is a methodology often [used in sustainable agriculture](#) to take into account the externalities associated with growing food. CSTAC members are interested in collaborating on research that incorporates a similar approach to health economics and accounts for the true costs of pollution and other environmental hazards. They have specifically asked for EHSC to build relationships with more UC Davis health economists.

Policy Impact Assessment

For many of our CSTAC members, the primary public health intervention that they are engaged in is policy change. Across all topic areas, there is significant interest in environmental health research that assesses the health impacts of environmental health policy interventions (i.e. changes to public rules and regulations). There is also interest in examining the public health impacts of environmental, land use, or other types of policies

that do not have direct public health goals, but which have the potential to influence public health through their environmental impact.

This type of research could include analysis of changes to exposure levels and/or health outcomes associated with policy implementation, examination of the health impact of specific mechanisms of implementation, and/or assess the health impacts of compliance – the degree to which existing health protective policies are being followed/enforced.

Life Cycle Assessment

A [Life Cycle Assessment](#) (LCA) is a method for accounting for costs and benefits along a product's life cycle. Depending on the goals of the assessment, a wide range of costs and benefits can be considered, including positive and negative human health impacts. Human health impact assessment is most commonly addressed in a type of LCA called a Social Life Cycle Assessment (SLCA,[10](#),[11](#),[12](#)), which considers the social aspects of a product's life cycle. [Environmental injustice](#) and other health disparities can also be included in a SLCA.

Health Equity Data Visualization Tools

Health equity data visualization tools use indicators of exposure and vulnerability to identify geographic locations where communities are at disproportionate risk of environmental health impacts. These are designed to be used by policymakers, community organizations, and researchers to set priorities and allocate resources.

In California, these include [CalEnviroScreen](#) 4.0, [Climate Change and Health Vulnerability Indicators for California](#) (CCHViz), the [California Healthy Places Index](#) (HPI), the [Human Right to Water Portal](#), [EJScreen](#) (national), and a tool currently in development analyzing toxic facilities by the Department of Toxic Substances Control (see [SB 673 Cumulative Impacts and Community Vulnerability Regulatory Framework, 2021](#)).

These tools provide valuable data for environmental justice advocates, policy makers, and regulatory agencies to help ensure that the health of communities at highest risk of harm is protected and prioritized. CSTAC members are interested in research that utilizes these (or similar) tools or investigates the efficacy/impact of these tools in influencing budgeting, land use, and permitting decisions in ways that improve environmental and public health.

Exposomics

The exposome is defined as "[the measure of all the exposures of an individual in a lifetime and how those exposures relate to health](#)." CSTAC members have expressed the desire to see more research that looks at complex mixtures and cumulative exposures, particularly in communities facing high environmental burdens. Exposomics is an emerging field that may offer insights into these more complex questions.

References and Additional Reading

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 - (2) [Environmental Protection Agency's CompTox Chemicals Dashboard](#)
 - (3) [California Office of Environmental Health Hazard Assessment's Chemical Database](#)
 - (4) [California Department of Pesticide Regulation's Pesticide Database](#)
 - (5) [National Institutes of Health's National Library of Medicine: PubChem Chemicals Database](#)
 - (6) [Environmental Protection Agency's Endocrine Disruption Homepage](#)
 - (7) [U.S. Department of Health and Human Services' National Toxicology Program: Integrated Chemical Environment \(ICE\) Homepage](#)
 - (8) [Delft University of Technology: Sustainability Impact Metrics: True Cost Accounting Homepage](#)
 - (9) [Rochester Institute of Technology's Golisano Institute for Sustainability Blog: What is life cycle assessment \(LCA\)? \(2020\)](#)
 - (10) [United Nations Environment Programme's Guidelines for Social Life Cycle Assessment of Products \(2009\)](#)
 - (11) [United Nations Environment Programme's Methodological Sheets for Sub-categories in Social Life Cycle Assessments \(S-LCA\) \(2013\)](#)
 - (12) [The International Journal of Life Cycle Assessment: A method for human health impact assessment in social LCA: lessons from three case studies \(2018\)](#)
 - (13) [The International Journal of Justice and Sustainability: Environmental justice along product life cycles: importance, renewable energy examples and policy complexities \(2017\)](#)
 - (14) [California Office of Environmental Health Hazard Assessment's Draft CalEnviroScreen 4.0 \(2021\)](#)
 - (15) [California Department of Public Health: Climate Change and Health Vulnerability Indicators for California](#)
 - (16) [California Healthy Places Index Homepage](#)
 - (17) [California Water Boards' Human Right to Water Portal: Hr2w Homepage](#)
 - (18) [Environmental Protection Agency's EJScreen: Environmental Justice Screening and Mapping Tool](#)
 - (19) [California Department of Toxic Substances Control and California Environmental Protection Agency's Revised Draft of SB 673 Cumulative Impacts and Community Vulnerability Draft Regulatory Framework \(2021\)](#)
 - (20) [Centers for Disease Control and Prevention: Exposome and Exposomics](#)
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