

# Fresno County

**SLOW DISASTER  
CASE STUDY**



**ENVIRONMENTAL  
INJUSTICE**

**Summer 2021**

# GROUP NO. 4

## AUTHORS

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## CITE AS

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## ABOUT

This case study report was developed by students at the University of California Irvine for the undergraduate class, “Environmental Injustice,” taught by Kim Fortun and Kaitlyn Rabach for the Department of Anthropology, Summer 2021. The University of California Irvine is on the ancestral homelands of the Tongva and Acjachemen nations.

## COVER PHOTO

The cover photo shows an agricultural facility amid vast farmlands. In Fresno, agricultural industries are the top air & water polluters that significantly impact the long-term health conditions of nearby communities. In plant-based farmlands: “contamination of pesticides, fertilizers, and other chemicals discharges into neighboring lands and waters. The toxic pesticides are killing non-intended organisms and affecting humans in the ecosystem” (Horvitz 2016). In animal-based ranches: “these agricultural fields release carbon

pollution, contribute to climate change,” and livestock wastes release heavy metals, methane, ammonia, and carbon dioxide into the nearby environment (Kastenbauer 2010).

Image source:

<https://cpb-us-w2.wpmucdn.com/u.osu.edu/dist/2/38968/files/2016/10/industrial-building-air-pollution-chimney-architecture-steam-vapor-21tth4o.jpg>




(Screenshot by Pengxuan Wu)

Reference:

Horvitz, Andrew. 2016. “Agricultural Pollution and Solutions.” Ohio State University. October 2016. <https://u.osu.edu/engr2367/landuse/ruihao-individual/>. (accessed July 7, 2020)

Kastenbauer, Laura et al. 2010. “The Meat Industry – Environmental Issues & Solutions.” Clean Water Action. 2010.

<https://www.cleanwateraction.org/features/meat-industry-%E2%80%93-environmental-issues-solutions>

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# INTRODUCTION

This case study report focuses on routine, everyday air and water pollution in Fresno County

We describe routine pollution as “slow disaster” because the impacts are drawn out and cumulative, causing harm slowly, increasing rates of asthma, cancer and heart disease. In many ways, slow pollution disasters are more difficult to deal with than fast, explosive disasters because people don’t pay attention to them or even think they are normal – especially in communities of color. Often, communities have to organize and fight to get their concerns about pollution heard and addressed by government officials. Often, particular people play important leadership roles. Sometimes, these people are residents impacted by a polluting facility. Sometimes, leading figures in fights for environmental justice are professionals – physicians who work in the community or engineers who work inside the polluting facilities. This case study describes many different stakeholders in routine pollution and the actions they have taken -- and not taken -- to improve environmental conditions.

The concept of “cumulative impacts” has an important role in exacerbating the influence of slow disasters, because they complicate the solutions to these disasters, introduce additional issues regarding a larger problem, and involve multiple aspects that need to be addressed properly. Therefore, it is important to discuss cumulative impacts when addressing slow disasters. Some common indicators in a community include “pesticide exposure, hazardous waste, traffic density, and water contamination—as well as population characteristics”(Bliss 2015).

In addition to cumulative impacts, the concept of “systemic racism” complicates the issue

of slow disasters and environmental health injustices. Systemic racism, according to Mary O'Dowd 2020, is the assumption of "white superiority individually, ideologically and institutionally. The assumption of superiority can pervade thinking consciously and unconsciously." Consequently, systemic racism can lead to oppressions in minority groups in terms of wealth, education, political influence, and healthcare access. These are all important factors needed to be addressed in the discussion of environmental health injustice in Fresno County.

An important environmental concept in Fresno is industrial agriculture. It is one of the most impactful sources of air and water pollution in the County. This concept is defined as the agricultural practice in which corporations and farmers fully exploit land and water resources to maximize productivity, often with usages of multiple chemical substances. Such practice is usually unsustainable in the long-term and environmentally unfriendly (Lomax 2020). As one of the most productive counties, Fresno truly needs to deal with the negative effects on its residents brought about by its agricultural success.

The report addresses a series of ten questions (Fig. 1) that draw out local details in a manner that encourages comparison with other places. The research has been done quickly (within the constraints of a quarter-long undergraduate class) so is limited to and points to the need for further research and community engagement. The goal is to help build both a body of research on environmental injustice and a network of researchers ready to help conceptualize and implement next-generation environmental protections.

# ENVIRONMENTAL INJUSTICE CASE STUDY FRAMEWORK

1. What is the setting of this case? What are its assets?
2. What environmental health threats (from explosions, everyday pollution, climate change, etc ) are there in this setting?
3. What intersecting factors -- social, cultural, political, technological, ecological -- contribute to environmental health vulnerability and injustice in this setting?
4. Who are stakeholders, what are their characteristics, and what are their perceptions of the problems?
5. What have different stakeholder groups done (or not done) in response to the problems in this case?
6. How have environmental problems in this setting been reported by media, environmental groups, companies and government agencies?
7. What local actions would reduce environmental vulnerability and injustice in this setting?
8. What extra-local actions (at state, national or international levels) would reduce environmental vulnerability and injustice in this setting and similar settings?
9. What kinds of data and research would be useful in efforts to characterize and address environmental threats in this setting and similar settings?
10. What intersecting injustices -- data, economic, epistemic, gender, health, infrastructure, intergenerational, media, procedural, racial, reproductive -- contribute to environmental injustice in this setting?

**FIGURE 1:** This is the analytic framework that guided research for this case study.



**FIGURE 2:**

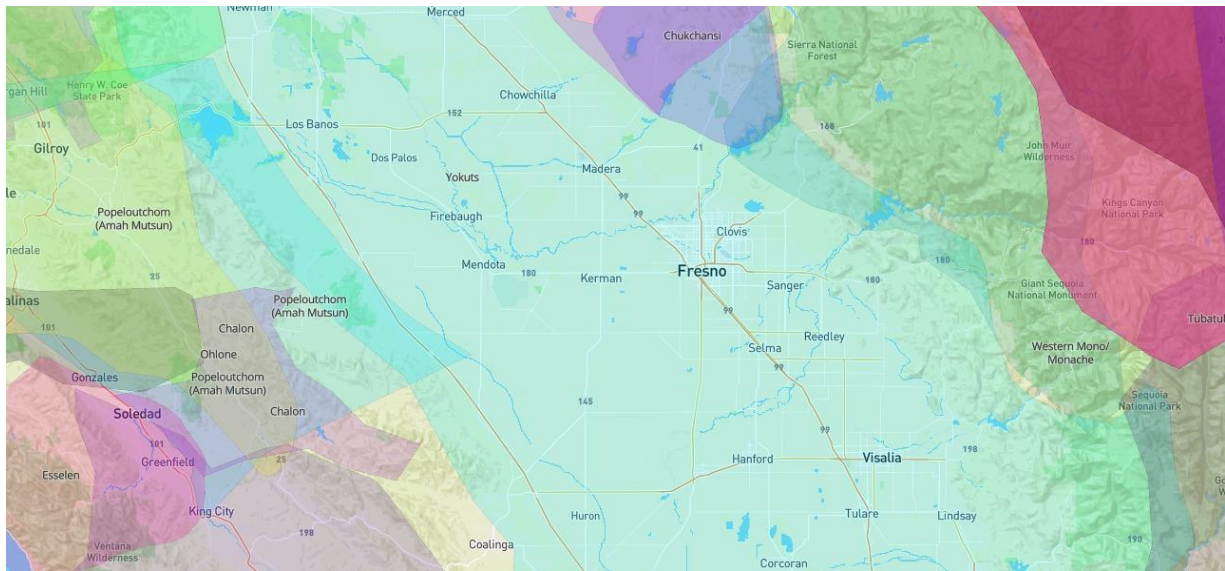
Fresno County is an inland county in Northern California known for intensive agricultural operations making the county one of the most polluted places in the United States.

Sources:

<https://www.mapsofworld.com/usa/states/california/california-county-map.html>

[https://en.wikipedia.org/wiki/Fresno\\_County,\\_California](https://en.wikipedia.org/wiki/Fresno_County,_California)

(Screenshots by Ginghei Mao, July 6.2021)



Native Land Mapping and Acknowledgement

**FIGURE 3:**  
 Native Lands' digital maps in Fresno County  
 Yokut and Western Mono/Monache homelands.  
 Screenshot by Nishtha Mistry on July 6, 2021  
 Source: <https://native-land.ca/>

“The state with the largest Native population is California; the place with the largest Native population is New York City. While socio-economic indicators vary widely across different regions, the poverty rate for those who identify as American Indian or Alaska Native is around 27%.”

<https://www.iwgia.org/en/usa/3640-iw-2020-united-states-of-america.html>

**Big Sandy Rancheria: (Western Mono Indians, Monache)**

- Federally recognized tribe located in Fresno County, California
- Based on 2010 Census only 118 population was left
- 228 Acre land outside of Auberry, CA
- They operate BSR Fuel Distribution in Auberry, CA and sell Diesel and Gasoline Products

[https://en.wikipedia.org/wiki/Big\\_Sandy\\_Rancheria](https://en.wikipedia.org/wiki/Big_Sandy_Rancheria).

**Yokuts:**

- Major tribe in Central California including Fresno County
- Population of 6,273 alone and in combination (2010)

<https://native-land.ca/>

Author: Rayomand Kapadia

# 1. COMMUNITY ASSETS & SETTING

**Beautiful yet Deadly**

*Rayomand Kapadia*

Fresno County is a county with a rich history (figure 4) that however is speckled with inequalities ranging from the racial inequalities to the environmental injustices that occur to minority, low-income groups.



**FIGURE 4:** Caption: This picture depicts farmland in Fresno. Unsustainable agricultural practices (both plant-based and animal-based) are major sources of pollution in Fresno County. With millions of acres of farmlands and hundreds of meat producing/processing facilities, Fresno would have to find a balance between its agricultural productivity and environmental health issues faced by its residents.

Screenshot by Pengxuan Wu. July 6, 2021

Image Source:

[https://res.cloudinary.com/simpleview/image/upload/v1557521604/clients/fresnoc/\\_DSC0038\\_ef9291dd-0557-4d5c-a61e-bb2249498c57.jpg](https://res.cloudinary.com/simpleview/image/upload/v1557521604/clients/fresnoc/_DSC0038_ef9291dd-0557-4d5c-a61e-bb2249498c57.jpg)

Fresno County has the 46th largest population in the United States. However, it has the 164th out of 3186 counties highest unemployment rate in the USA. Furthermore, CoVID has hit Fresno County hard with around 1.7 thousand deaths due to CoVID and unemployment rising massively due to CovID shutdowns. ("Fresno County - Place Explorer - Data Commons" 2019)

Fresno County based on the US Census Bureau in 2019 Fresno County housed 999,101 people. The county is unique in that the majority of people (53.8%) are of

Hispanic or Latinx origin. However, this does not mean that the county is a haven of equality but simply seeing the median household income shows you otherwise, being under the federal average at \$53,969. Even worse is the overall poverty level is almost double the national percent at 20.5%. (U.S. Census Bureau QuickFacts, 2021) From a sample average zip code area 93706 in Fresno County we see the Public-School Profile showing that the test score performance of the public schools serving the area are below average. Furthermore, the percentage of students eligible for free or reduced lunch, an indicator of families living near or below poverty levels, is at 86.3%. The percentage of Public Schools with Title 1 Status, meaning the schools serve underserved populations, is at 95.0%. All this shows that the social problems in the region are very dire with the combined information telling us that the majority of the region is minorities who are near or below poverty line earners and that is affecting their children and the school system they go to. ("Zip Code 93706 Map and Profile., 2020)

Furthermore, due to the racial inequalities in the past still exist today just in another form. For example, the most polluted regions of Fresno County are concentrated in West Fresno (see figure 5), which mainly by design is where the minority population is concentrated. This is due to historic allowing only white residents of Fresno to sell the good areas of Fresno only to other white people. This denied access to good housing areas for minorities causing them to go to bad neighborhoods as it was the only option available. This practice is still happening though not through the means it did in the past where newer immigrants (who the majority of are minorities) are forced to move into the west side where all the facilities and fields are located, as all the cheaper housing is cramped together there.





**FIGURE 5:**

These are images of Downtown Fresno taken one week apart. The pollution within Fresno County has been dangerously increasing, enough so that there is this much of a drastic change within a week.

Image Source:

<https://abc30.com/before-and-after-videos-skycam-air-quality-valley-california/6389356/>

As seen in figure 6 the majority of Fresno County is actually farmland with the total farmland being around 1.6 million acres. While the Agriculture Census of 2017 does show a decrease in total farms, the average farm size has increased more than 14% since 2012 showing us that mega farms, the main source of pollutants in Fresno County, are only growing bigger as the years go on.



## Fresno County California

### Total and Per Farm Overview, 2017 and change since 2012

	2017	% change since 2012
Number of farms	4,774	-16
Land in farms (acres)	1,646,540	-4
Average size of farm (acres)	345	+14
<b>Total (\$)</b>		
Market value of products sold	5,742,769,000	+15
Government payments	8,894,000	-12
Farm-related income	115,085,000	+16
Total farm production expenses	4,703,873,000	+18
Net cash farm income	1,162,874,000	+8

**13** Percent of state agriculture sales

#### Share of Sales by Type (%)

Crops	71
Livestock, poultry, and products	29

#### Land in Farms by Use (%) \*

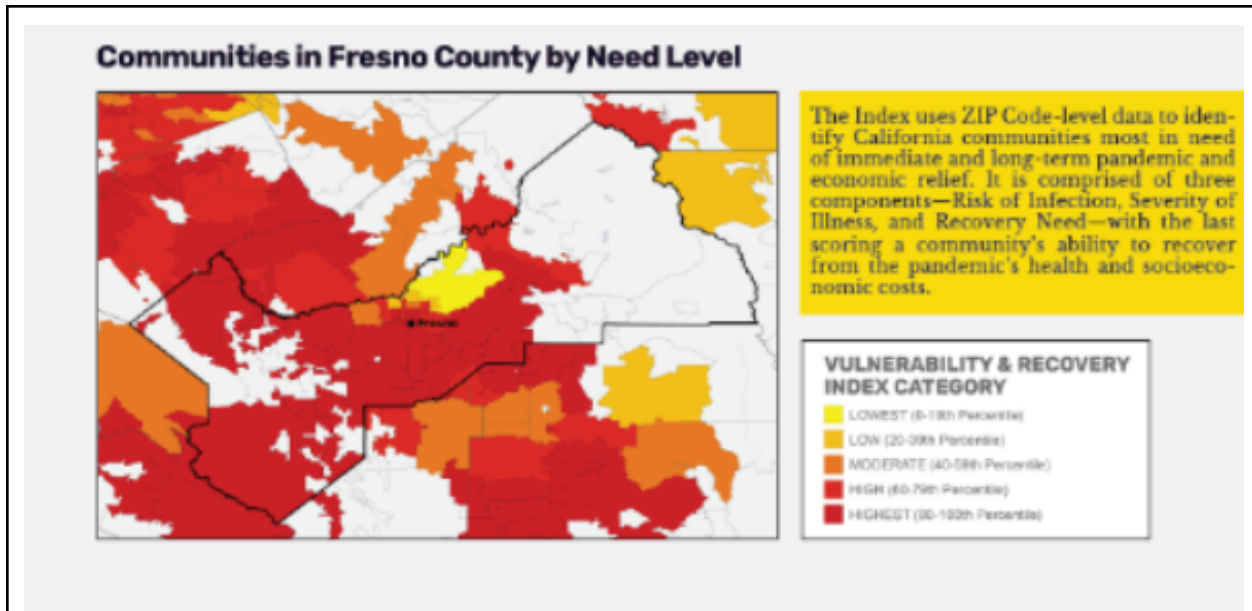
Cropland	69
Pastureland	25
Woodland	2
Other	3

### FIGURE 6:

The number of farms within Fresno County has decreased 16% from 2012-2017. However, the average size of farms in terms of acres have increased 14% within the same time period.

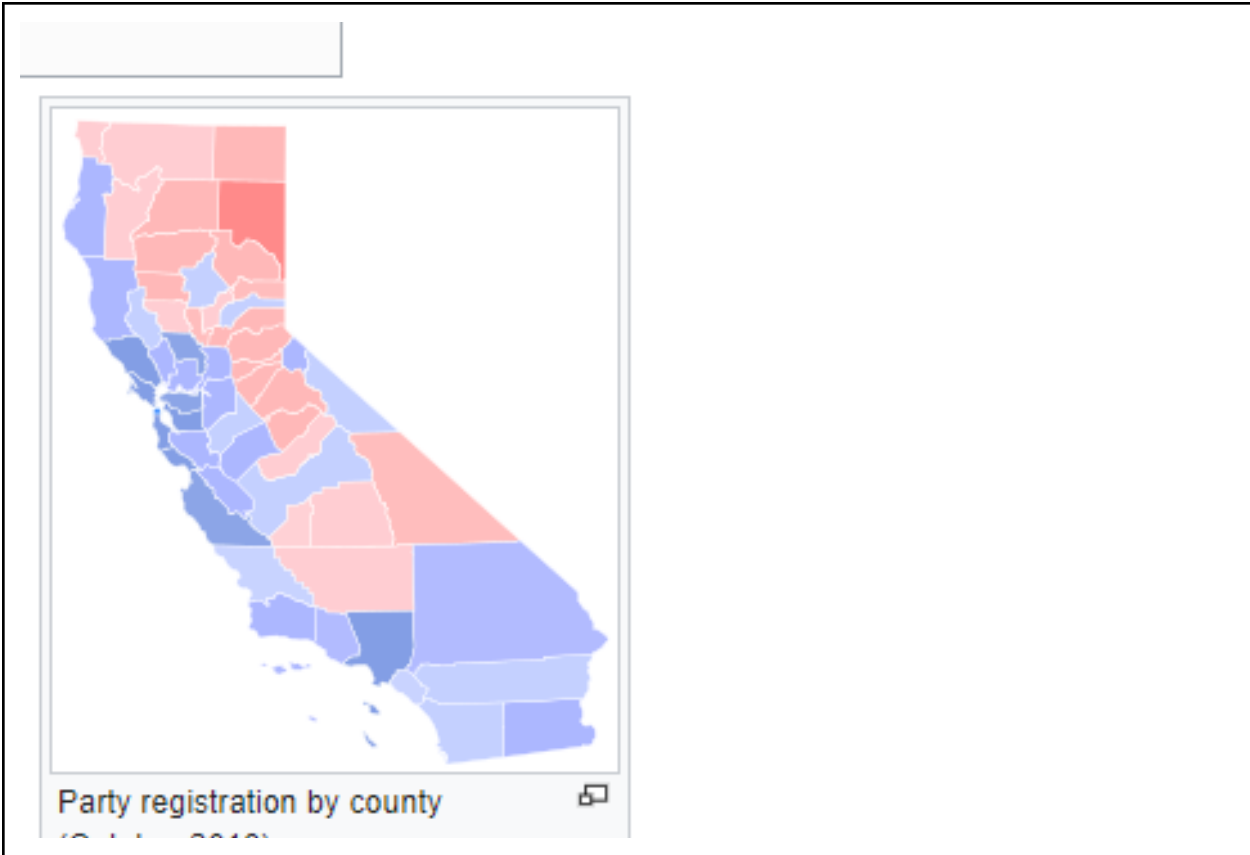
Image Source:

[https://www.nass.usda.gov/Publications/AgCensus/2017/Online\\_Resources/County\\_Profiles/California/cp06019.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/California/cp06019.pdf)



**FIGURE 7:** Figure 7 depicts communities in Fresno by Need Level. The Race Counts data project shows Fresno County uses Zip Code to depict communities in need by color from highest to lowest.

However, people in Fresno County want change against these major problems and that is shown in the fact that the county is overall blue in party registration (figure 8) meaning that the county is majority Democrat to a certain extent. That is also shown in the vast array of community assets out there that are trying to help out. The Fresno Metro Ministry is a multi-faith, multicultural organization that works toward social and economic justice. They collaborate with the citizens of an area to create ground up advocacy projects for marginalized communities and increase consciousness about the terrible air quality in the area. (Kaye, 2013) The abc30 news network is the major news network for Fresno city and surrounding areas It has the highest news broadcast time out of all Fresno news channels, Broadcasting News 39 and a half hours of locally produced news stories a week. It has also historically broadcast information relating to forest fires to help citizens avoid health hazards from the fast disaster.



**FIGURE 8:**  
 2018 MAP SHOWING POLITICAL PARTY REGISTRATION IN CALIFORNIA  
 This map shows Fresno County has a mostly democratic majority in their voter base. They also have a large number of republicans in their demographics, which can make things like passing anti-pollution laws more difficult.

Moreover, the CLRA or California Rural Legal Assistance, Inc. provides legal assistance to low-income people for a variety of actions from education to rural health. They especially protect Ingenious Mexican communities and the LGBT community members allow for more inclusive legal care for some of the most marginalized peoples. (“California Rural Legal Assistance, Inc.- Fresno | LawHelpCA.Org” n.d.) Furthermore, to help new immigrants the Fresno County Library system has a vast array of books and other forms of information in many languages including most importantly Spanish where most immigrants into Fresno County are from. This allows them to be able to get the

information necessary to protect themselves for free from the library. (“Fresno County Public Library” n.d.)

Finally, two organizations in Fresno County have been trying to combat the air pollution in Fresno County and affordable health care in low-income neighborhoods. “The Central Valley Air Quality (CVAQ) Coalition leads a partnership of more than 70 organizations in the fight for clean air for the San Joaquin Valley, our nation’s most polluted air basin.” (“CVAQ Mission” n.d.) The Fresno EOC Free Health Care organization is creating free community health centers in low-income areas of Fresno in order to provide to both insured and uninsured adults and adolescents throughout the area, especially in reproductive care. Though these organizations are amazing ones, there still are not many assets for a community of nearly one million people and assets such as parks, school community environmental organizations, etc. still do not exist in Fresno County.



## **2. SLOW DISASTER & OTHER ENVIRONMENTAL THREATS**

### **Slowly And Deadly: The Everyday Pollution**

*Yeseong Kim*

Permanent pollution is sufficient to threaten the health of people in Fresno County. Permanent pollution includes water and air pollution. These everyday pollutions are significantly discussed as a problem because people cannot avoid contact with those pollutants. For water pollution in Fresno County, the water supply was reported to include pollutants including “nitrates, pesticides and industrial chemicals” (NRDC). According to Figure 16, the water quality for safe drinking in Fresno County is measured to be one of the worst among counties in California. These environmental pollutants can cause severe problems in women with pregnancy. Padula reported that “In Fresno County, we found multiple pollution exposures associated with increased risk for preterm birth, with higher associations among the most disadvantaged. This supports other evidence finding

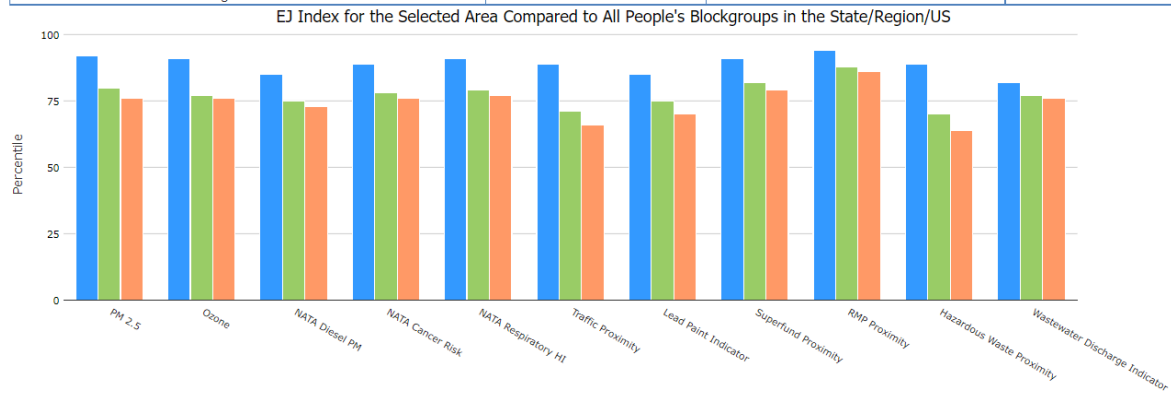
environmental exposures are important risk factors for preterm birth, and furthermore the burden is higher in areas of low SES. This data supports efforts to reduce the environmental burden on pregnant women” (Padula et al. 2018).

Air pollution in Fresno County is also dangerous to people in Fresno County. According to Figure 11, Fresno County received “Fail” for both particle pollution and Ozone rate. Fresno County experiences air pollution due to pollutants such as PM2.5 and Ozone. PM2.5 is a particulate pollutant released from vehicles for transportation and farming equipment (Fresno Air Quality Index (AQI) and California Air Pollution: AirVisual). PM2.5 is dangerous in the fact that it “traps pollutants in the low elevations of the Central Valley” (Fresno Air Quality Index (AQI) and California Air Pollution: AirVisual). Ozone is created by the reaction of particle and gas pollutants in strong heat and can “exacerbate symptoms of respiratory conditions like asthma and COPD” when exposed to it (Fresno Air Quality Index (AQI) and California Air Pollution: AirVisual).

While there are several facilities that release pollutants in air and water, industrial agriculture is one of the main causes for these permanent pollution. Agricultural chemicals including pesticides and manures that include nitrogen and phosphorus can contaminate nearby water. Also, it is reported that “air emissions from manure are comprised of a mix of volatile organic compounds, hydrogen sulfide, ammonia, and particulate matter, each of which poses a risk to humans. Exposure to ammonia or hydrogen sulfide can lead to coughing, scarring of the airways, lung damage, and disease. The accumulation of particulate matter in airways has been linked to asthma and bronchitis” (Douglas). This quote shows that industrial agriculture can also contaminate air and threaten people in Fresno County, especially those with weak respiratory organs.



Selected Variables	Percentile in State	Percentile in EPA Region	Percentile in USA
<b>EJ Indexes</b>			
EJ Index for Particulate Matter (PM 2.5)	76	80	92
EJ Index for Ozone	76	77	91
EJ Index for NATA* Diesel PM	73	75	85
EJ Index for NATA* Air Toxics Cancer Risk	76	78	89
EJ Index for NATA* Respiratory Hazard Index	77	79	91
EJ Index for Traffic Proximity and Volume	86	71	89
EJ Index for Lead Paint Indicator	70	75	85
EJ Index for Superfund Proximity	79	82	91
EJ Index for RMP Proximity	86	88	94
EJ Index for Hazardous Waste Proximity	64	70	89
EJ Index for Wastewater Discharge Indicator	76	77	82



**FIGURE 10:**

Caption:

This image is the 2020 version of a collection of environmental indicators in Fresno County and their associated percentile ranks. In Fresno, there are several highly ranked environmental hazards & risks. Fresno’s EJ Index for RMP Proximity, which represents the density of chemically hazardous facilities, is ranked 94th percentile nationally. The EJ Index for Particulate Matter (PM 2.5) is ranked 92nd percentile, implying that Fresno experiences some of the worst air qualities in the United States. Additionally, the index for NATA\* Respiratory Hazard is ranked 91st percentile nationwide, which means that Fresno residents face tremendous amounts of air toxics that would cause respiratory illnesses.

Image source:

[https://ejscreen.epa.gov/mapper/ejscreen\\_SOE.aspx](https://ejscreen.epa.gov/mapper/ejscreen_SOE.aspx)  
 (Screenshot by Pengxuan Wu)

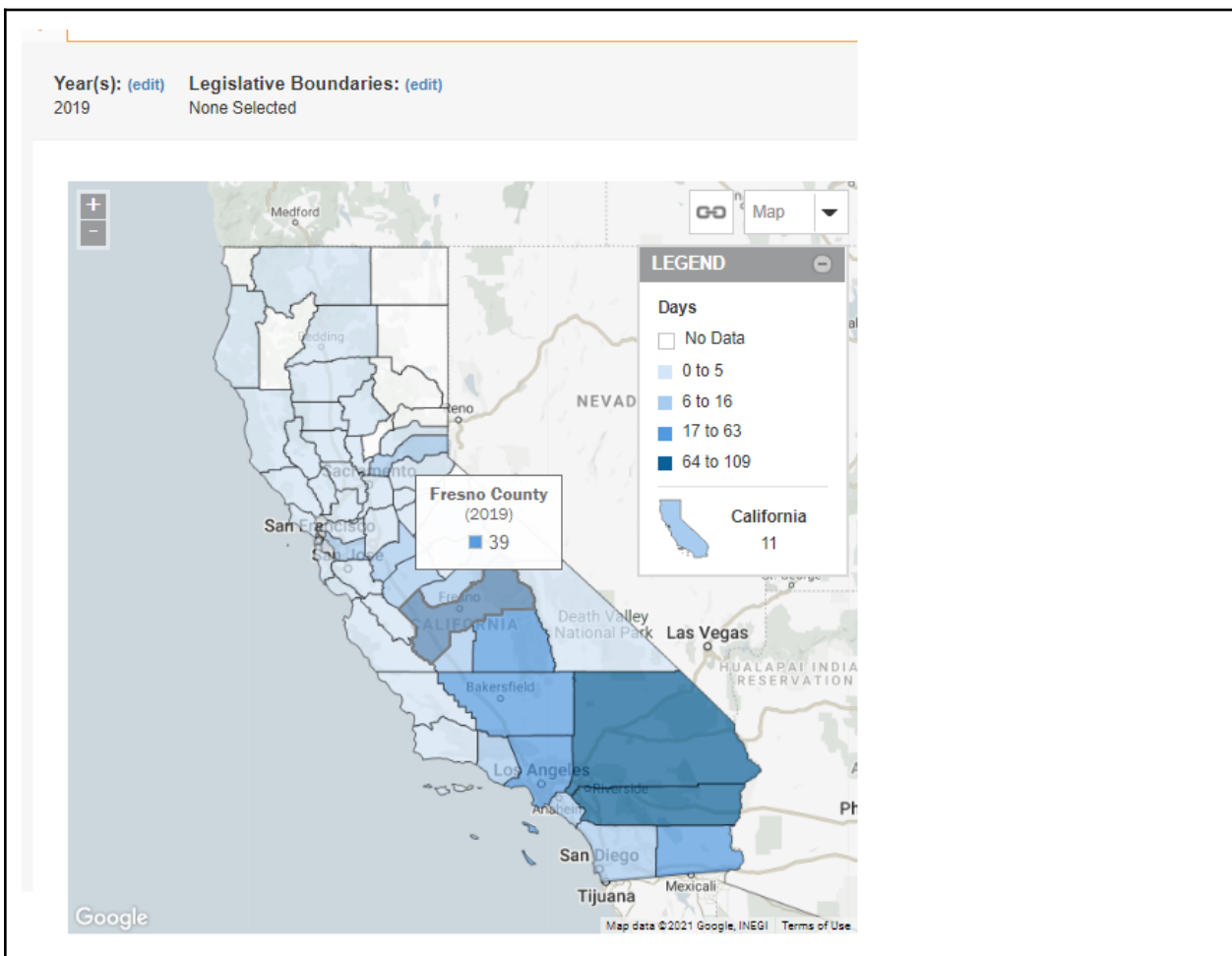
## If you live in Fresno County, the air you breathe may put your health at risk.



**FIGURE 11:**

Source: <https://www.lung.org/research/sota/city-rankings/states/california/fresno> (Screenshot by Ginghei Mao July 6.2021)

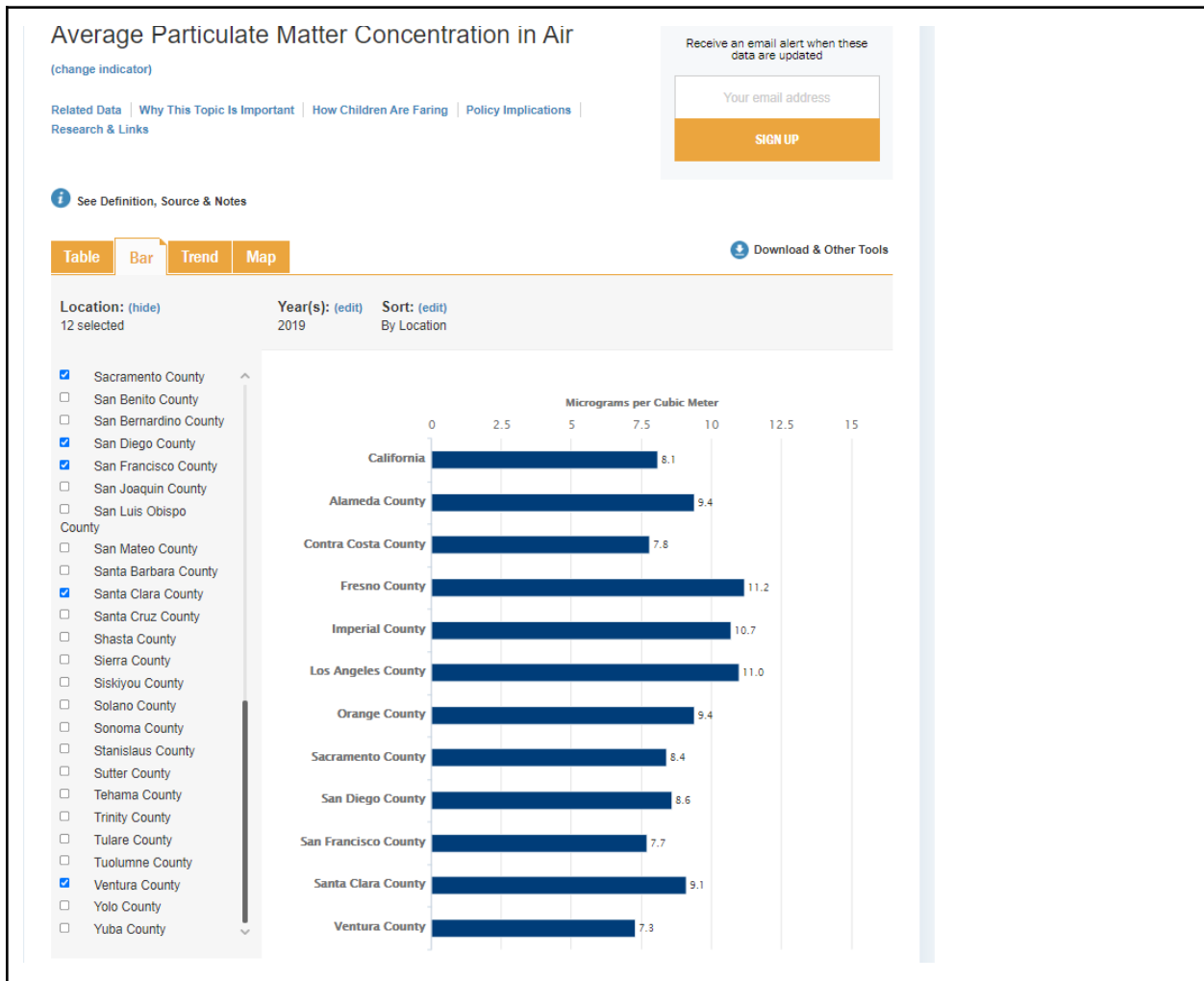
The American Lung Association (ALA) gives Fresno an “F” for both ozone and particulate pollution. This may be explained by the heavy concentration of agricultural fields and processing facilities in the county.



**FIGURE 12:**

According to 2019 data, Fresno County had 39 days that were above the regulatory standard for ozone. High ozone levels are linked to asthma and other respiratory problems for both children and adults.

<https://www.kidsdata.org/topic/80/air-quality/summary> (Screenshot by Rayomand kapadia, July 6, 2021)

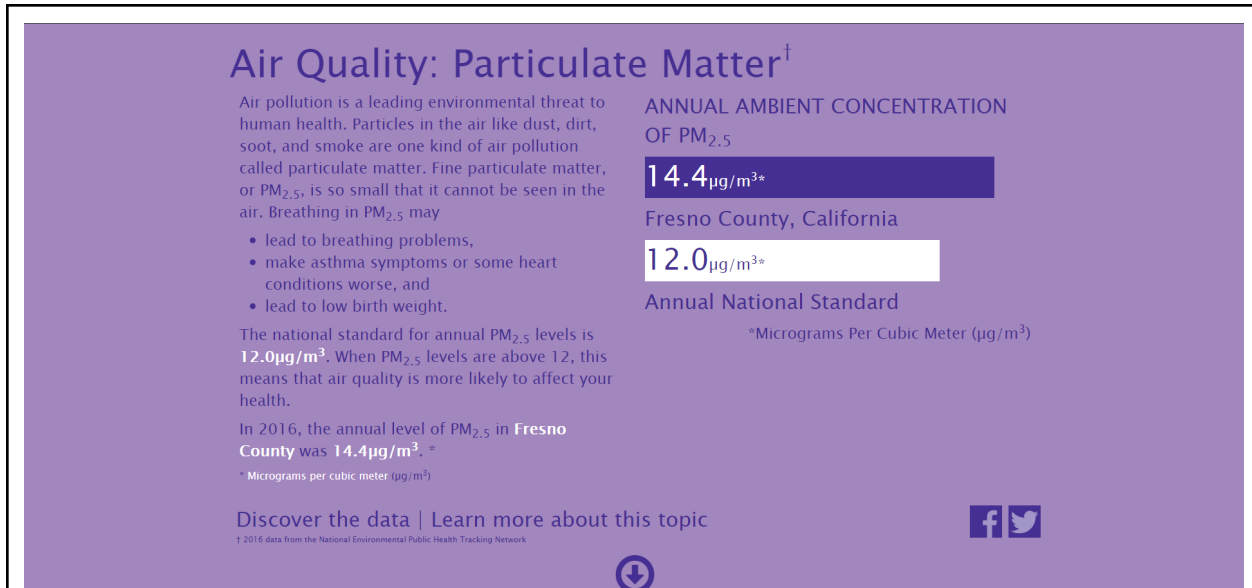


**FIGURE 13:**

According to 2019 data, Fresno County has the highest average particulate matter concentration even among some of the other worst off counties or big counties out there in California. High particulate matter concentrations in air lead to not only adverse respiratory problems for kids but also other problems such as links to adverse birth outcomes, obesity, and cardiovascular problems. The high particulate matter also is not avoidable as the air indoors is just as high in particulate matter as outdoors.

<https://www.kidsdata.org/topic/80/air-quality/summary> (Screenshot by Rayomand

Kapadia, July 6, 2021)



**FIGURE 14:**

Caption: This figure shows annual ambient concentration of PM 2.5 in St. James Parish to be above the US national standard. The particulate concentration is 14.4 far above the 12.0 concentration of the national standard. This further states that anything above the 12.0 standard is more likely to adversely affect your health, such as breathing problems, heart conditions may get worse, or low birth weight.

<https://ephtracking.cdc.gov/showInfoByLocationExt?&FIPS=22093>  
(Screenshot by Rayomand Kapadia, July 6, 2021)

## Proximity To Highways<sup>†</sup>

Traffic-related air pollution is a major cause of unhealthy air quality, especially in urban areas. Many health problems have been linked to exposure to traffic-related air pollution. The closer your home or school is to a major highway, the more likely you and your family are to be exposed to traffic-related air pollution.

In 2011, 2.4% of the population of Fresno County lived within 150 meters\* of a major highway.

In 2011, 0.9% of Fresno County public schools (preK-4<sup>th</sup> grade) were sited within 150 meters\* of a major highway.

\* 150 meters is about 2 blocks.



2.4%



of Fresno County population that live within 150m of a highway

Discover the data | Learn more about this topic

† 2011 data from the National Environmental Public Health Tracking Network

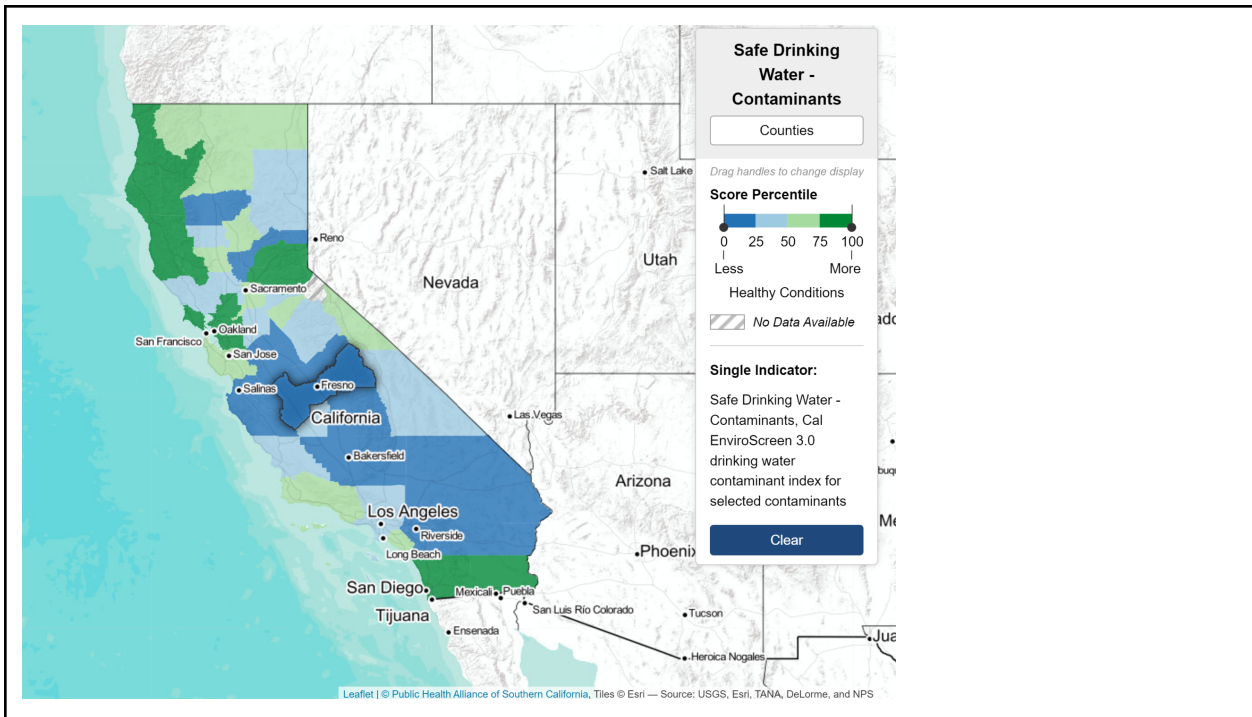


### FIGURE 15:

This figure depicts the overall percentage of Fresno's population within an unhealthy distance from a highway. Also, vulnerable public buildings, such as schools that are next to highways, are shown. According to the EPA, vehicle exhaustions and emissions are the major contributions of asthma, bronchitis, and lung cancer. With constant exposure from the nearby highways, the neighboring residents face significant environmental health threats.

Screenshot by Pengxuan Wu. July 6, 2021.

Image Source: <https://www.kidsdata.org/region/357/fresno-county/results#cat=79>



**FIGURE 16:**

Source: <https://map.healthylivesindex.org/> (Screenshot by Ginghei Mao July 6, 2021)  
 In maps provided by the California Health Places Index, Fresno County is shown to be among the worst in terms of access to clean drinking water. The county ranks at the 10.7th percentile, meaning it has less availability of clean water than roughly 90 percent of the country.

# 3. COMPOUND VULNERABILITIES

## Cumulative Impacts

*Shaoheng Zhang & Pengxuan Wu*

Solutions to environmental injustices are never apparent or straightforward. There are always implicit, intersecting factors that complicate environmental injustice. In Fresno, these cumulative impacts and intervening factors are part of every residents' daily lives including economic aspects, political power, healthcare access, community well-being, etc, and they should be properly addressed and recognized when trying to progress environmental justice efforts.

Apart from other reasons, people's quality of life problems are gradually reduced due to slow disasters that are happening in their lives. Why do you say that? With the development of the times and the advancement of technology, the nature on which we live has gradually become less strong than before. What followed were fires, high temperatures, tornadoes, and many disasters from small to large. For example, in "Some Creek Fire victims hitting a wall with California Fair Plan payouts", it is about a Greek fire in California where people had to escape from their homes because of the spread of the fire. thing. The people inside also accepted interviews one after another. One of them said "We live in a home that's almost 1,600 square feet. And we live in the mountains so my

kids are used to just running outside, playing with their friends," said Shaver Springs resident Jennifer Taber. You can see this. It was a very serious fire. What's more, after the fire broke out, someone should come to deal with these post-disaster affairs quickly, but things did not look like the villagers here imagined. Another person said, "They are currently saying they will bring in ozone machines to deodorize the home, but they're not approving us to get it cleaned professionally," said Taber. If the environmental injustice that occurs in these places is to be truly eliminated, then caring about the safety of the villagers' lives is the first thing to accomplish. Apart from other factors that may lead to slow disasters, the ability to solve problems in a timely manner is one of the most important factors. And this ability is for those who don't have the ability to solve the immediate problems. This is what I think can be an effective way to solve environmental injustice. Let us turn our attention to regional reports again. The regional report of the central coastline can be described as a pyramid, which is mild to severe. The author specifically mentioned fog, and the source of this fog is caused by wanton destruction of the environment. We can see people wearing protective clothing in these pictures. These workers are also paying for people's wanton destruction of the environment.

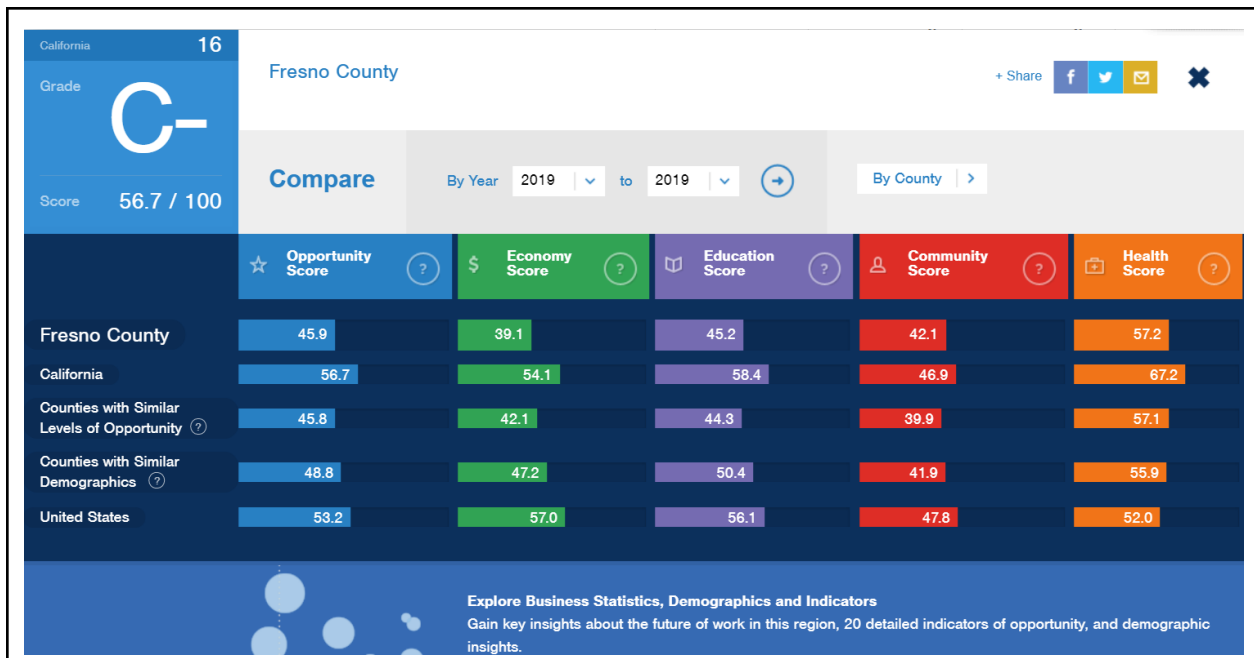


FIGURE 17:



Fresno County Opportunity index score is 56.7 out of 100 which is far below the 56.7/100 score that California has. This actually rates California 16th out of all other states on the opportunity index rankings. Furthermore, Fresno County rates 39.1 out of 100 on the Economy Score which is far behind the 54.1 score that California has. The Economy score includes factors such as the poverty rate, employment opportunities, average median income, etc. all of which Fresno County lacks severely in. The Opportunity Index is by Opportunity Nation: The Forum for Youth Investment.

(Screenshot by Rayomand Kapadia, July 6, 2021)

Figure 17 shows some multi-perspective scores for Fresno County's broad picture of opportunity, and Fresno has significantly lower scores in multiple areas when compared to other CA counties. Out of all the categories, the economy score is the lowest when compared to the state average scores. In Fresno, 48.85% of people have an income exceeding 200% of the federal poverty level. 46.4% of the population aged 25-64 are employed. The median household income is \$48,806.23 (California HPI). These statistics suggest that Fresno residents have less opportunities in improving their living conditions, move to other cities, and fewer ways to defend themselves against environmental threats (both long-term and short-term).



### EJSCREEN ACS Summary Report



Location: Fresno County  
 Ring (buffer): 0-mile radius  
 Description:

Summary of ACS Estimates		2014 - 2018	
Population		978,130	
Population Density (per sq. mile)		164	
People of Color Population		686,675	
% People of Color Population		70%	
Households		304,624	
Housing Units		328,577	
Housing Units Built Before 1950		37,916	
Per Capita Income		23,284	
Land Area (sq. miles) (Source: SF1)		5,958.10	
% Land Area		99%	
Water Area (sq. miles) (Source: SF1)		53.03	
% Water Area		1%	
	2014 - 2018 ACS Estimates	Percent	MOE (±)
<b>Population by Race</b>			
Total	978,130	100%	0
Population Reporting One Race	938,807	96%	14,756
White	627,437	64%	5,514
Black	47,372	5%	1,092
American Indian	10,961	1%	1,318
Asian	100,017	10%	1,250
Pacific Islander	1,770	0%	496
Some Other Race	151,250	15%	5,086
Population Reporting Two or More Races	39,323	4%	2,250
Total Hispanic Population	515,907	53%	0
Total Non-Hispanic Population	462,223		
White Alone	291,455	30%	523
Black Alone	44,474	5%	862
American Indian Alone	4,458	0%	429
Non-Hispanic Asian Alone	97,991	10%	1,054
Pacific Islander Alone	1,104	0%	228
Other Race Alone	1,864	0%	551
Two or More Races Alone	20,877	2%	1,519
<b>Population by Sex</b>			
Male	487,936	50%	53
Female	490,194	50%	53
<b>Population by Age</b>			
Age 0-4	78,636	8%	33
Age 0-17	279,979	29%	2,045
Age 18+	698,151	71%	3,329
Age 65+	114,438	12%	1,676

### FIGURE 18:

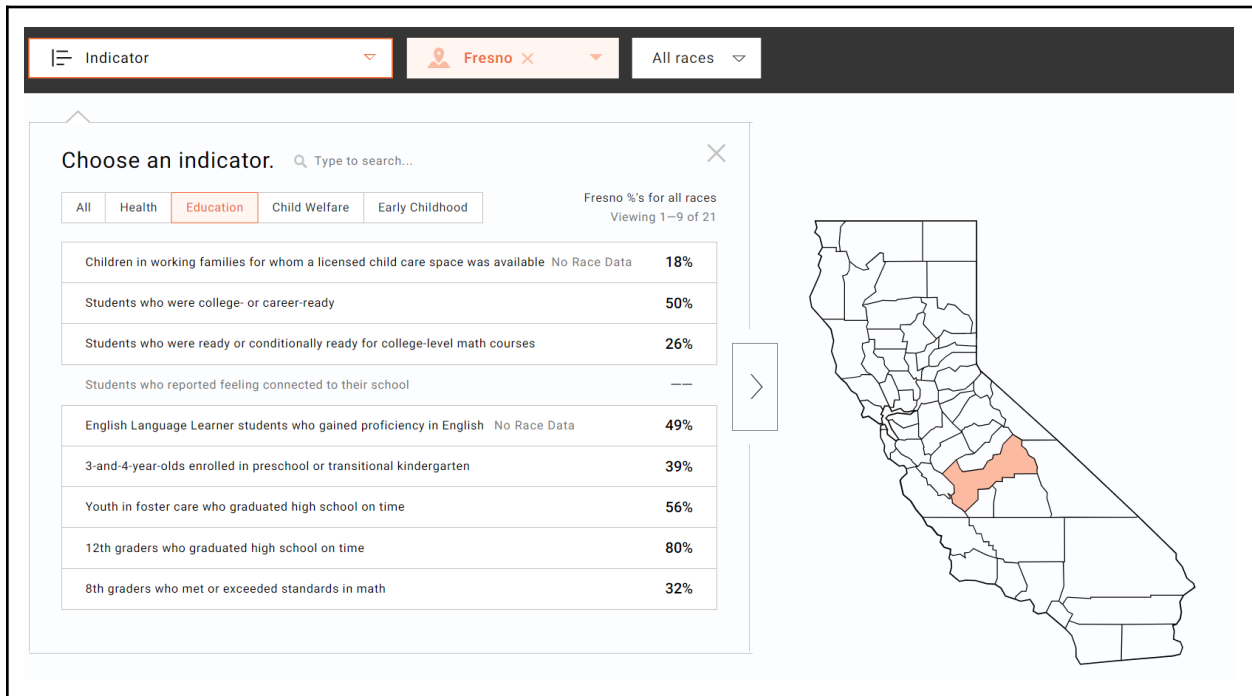
Source: <https://ejscreen.epa.gov/mapper/demogreportpdf.aspx?report=acs2018>

Climate change may negatively impact education among children via exposure to extreme temperature and droughts.. Education enables people to develop a broad range of skills and traits that predispose them towards improved health outcomes, ultimately contributing to human capital.

(Screenshot by Cristian Handaric, July 7th 2021)

When assessing Figure 18 and Figure 17 collectively, it indicates potential racial injustices in Fresno. Given that Fresno has one of the highest poverty rates in California, and the the demographic in the county has a higher percentage of Latinx and African American, it is implied that racial minorities endure worse living conditions in Fresno compared to other counties. Additionally, the effect of systemic racism may also play a role in Fresno’s

environmental health injustice, which negatively impacts minorities' opportunities in housing, employment, education, and healthcare.

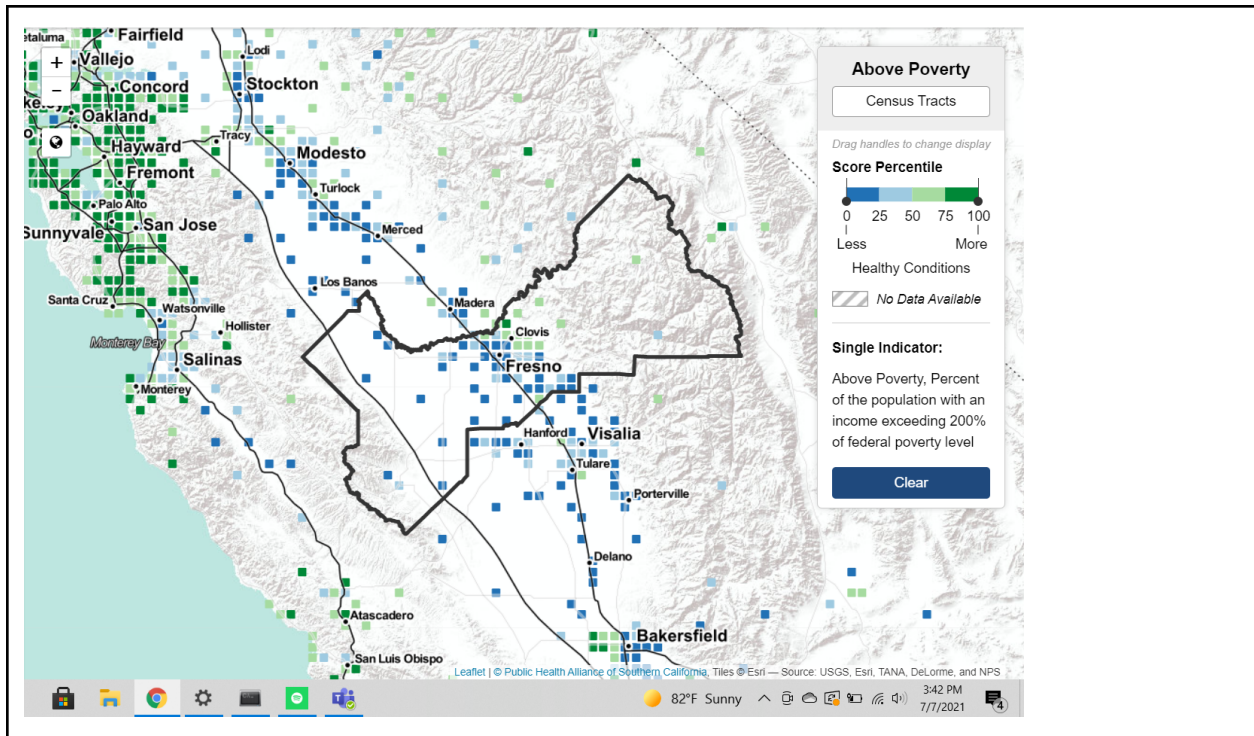


**FIGURE 19:**

Data visualization drawn from the “Children Now 2018-19 County Scorecard of Children’s Well-Being.” Education indicators point to low reading and math capacity, which suggests that information about environmental hazards made available in Fresno county may be difficult for some people to understand. Education indicators also point to low levels of student connection to their schools, and a low sense that what they do at school makes a difference. This suggests that schools are not operating optimally as community assets.

<https://scorecard.childrennow.org/?cty=fresno&yr=3>  
 (Screenshot by Cristian Handaric, July 7.2021).

In Figure 19, we see how Fresno has a poorer than average educational system in California. Also, the figure caption highlights that many students tend to feel disconnected from schools and that school makes little difference in their lives. This mindset can be dangerous, since education is often the only reliable way to improve personal income and gain better living conditions. Additionally, education usually links to individuals’ future careers and their willingness to make changes for their communities, which directly correlates to the political and intergenerational issues in Fresno.



**FIGURE 20:**

This California Health Places Index (HPI) map compares poverty levels in California counties, with dark blue indicating the highest poverty level. A county-scale view easily obscures poverty and income inequality within Fresno county.

<https://map.healthyplacesindex.org/>  
 (Screenshot by Cristian Handaric, July 7.2021)

# 4. STAKEHOLDER ANALYSIS

## Stakeholders and Steak-holders

### *Martha Rayo Osuna*

Individuals, people, and organizations with a stake in a problem or project are referred to as stakeholders. They are any group that is implicated in the issue or initiative, who hold different stakes whose outcomes can affect them in a multitude of ways. For example, within a community there are workers, residents, and companies that hold stakes in local issues. Alternatively, there are representatives, administrations, and governments that can be identified as non-local stakeholders. They can also be both internal or external. These are just a few examples of stakeholders, as there are a great deal. To name a few, there are researchers of Fresno, residents, the NRDC (Natural Resources Defense Council) and meat processing corporations. Their perceptions for some of the issues in Fresno include a lack of recognition and environmental justice for the peoples health and wellbeing as a result of living in these highly polluted areas.

Fresno's birth rates significantly contribute to the livelihood of its community. Currently, there is research that has discovered there is a high number of preterm births that is correlated with low socioeconomic status, "In Fresno County, we found multiple pollution exposures associated with increased risk for preterm birth, with higher associations among the most disadvantaged." (Padula et al. 2018) Stakeholders directly impacted by

this data include not only currently pregnant women, but also families, and anyone in the area who would one day hope to start a family of their own. In addition, people affected by these findings are generally unable to take actions against these issues as they are usually lower-income people and cannot afford better healthcare or to move away from the area.

Another stakeholder is the NDRC, who published an article on water contaminants, "Fresno's water supply, which the report cited as the worst of the four, has serious problems caused by nitrates, pesticides and industrial chemicals." (2002) There are several risks posed to drinking this contaminated water, yet this information is not made publicly aware. "Although the report does not advise residents to stop drinking tap water, it cited medical experts who suggest that pregnant women and parents of infants consult with their health care providers." The NDRC seemingly acknowledges the issue, but does not provide a solution for its most vulnerable population that will bear the brunt of the consequences of consuming this water.

Finally, the major meat corporations that significantly contribute to pollution and other environmental hazards are one of the largest stakeholders out there, as they profit from their corporations' meat rendering and total lack of care for the environmental pollution and hazards they cause. "Throughout its nearly 60 year history, the Darling industrial site has disrupted the lives of the surrounding community...Despite outcry from residents, the property was expanded by Variance 377 to include meat rendering. Since then, the plant has been receiving animal by-products from slaughterhouses and like facilities, converting them for uses such as fuel, fertilizers, and animal food. Taking up 5.22 acres of space, it is currently able to process around 850,000 pounds of bones, fat, and other refuse." (Arcgis) For decades, residents living in the surrounding areas of the plant are burdened with the smell and pollution these stakeholders brought on. Thus, these are just a few of those who are most affected by these environmental injustices that require more recognition and solutions.

# 5. STAKEHOLDER ACTIONS

## Lost voices of residents

### *Veena Naveen*

Stakeholders in Fresno include the U.S. Department of Housing and Urban Development (HUD), City leaders, the Natural Resources Defense Council, and researchers who study the long-term effects of pollution in Fresno.

Researchers affiliated with the University of California in San Francisco, the University of California in San Diego, and the Office of Environmental Health Hazard Assessment in the California Environmental Protection Agency (EPA) authored a research paper in 2018 titled "Environmental pollution and social factors as contributors to preterm birth in Fresno County" that examined the associations between several environmental exposures, both individually and cumulatively, and the risk of preterm birth in Fresno. Their findings provided tools to help explain the effects of environmental and social factors on preterm births in Fresno. However, the data acquired was not made available to the public and the researchers did not provide strategies for reducing exposure to

pollutants that contribute to pre-term births (Manuela).

The U.S. Department of Housing and Urban Development (HUD) gave millions of dollars to Fresno to clean up dumps and develop housing. They also mandated cooperation between residents and city leaders to distribute funds. However, the city leaders, which included the Fresno Redevelopment Agency, became uncomfortable with allowing residents to have control over the funds.

As a result, the city leaders took over the funds and diverted them towards other projects such as funding the police. These city leaders are now in the process of paying back these misused funds. According to Fresno State sociologist Tania Pacheco-Werner, the city leaders claimed that their redevelopment projects would ultimately benefit all residents, although history has shown this to not be true (Padula et al.).

The National Resources Defense Council published a report in 2002 that elucidated how pollution was deteriorating water supplies in Fresno. In the report, they surveyed tap water quality in Fresno, Los Angeles, San Diego, and San Francisco. They found that the quality of Fresno's water supply was the worst of the four and had "serious problems caused by nitrates, pesticides and industrial chemicals". The report made recommended improving source water protection measures and waterworks infrastructure. However, the report did not include strategies for implementing these improvements, and measures were not taken to warn the citizens of Fresno about the quality of their tap water (NRDC).



# 6. ROLE OF MEDIA AND BIG ENVIRONMENTAL ORGANIZATIONS

## The Leaders for Environment

*Pengxuan Wu, Nishtha Mistry*

Being a county in the most productive and most polluted area in California, the Central Valley, Fresno has gained a substantial amount of media coverage, exposure from environmental organizations, and attention from governmental agencies like the EPA and the state Department of Toxic Substances Control. Thanks to these collective efforts to fight against environmental health injustice, Fresno has received valuable resources to support vulnerable families & combat cumulative impacts, implemented corrective measures & stricter regulations for the local sources of pollutants, and gained public awareness about the alarming severity of slow disaster threats in the county.

The Los Angeles Times has made several reports related to the slow disasters in Fresno. In the article, “3 of Top 10 Most Polluted Zip Codes in California are in LA County,” LA Times pointed out that in terms of overall pollution impact on the community, “Fresno ranked No. 1 with a score of 66.4 percent -- the higher the percentage, the higher the impact pollution has on a zip code” (Becerra 2013). The ranking of pollution impact was based on

Cal/EPA's standards of eleven environmental indicators "including air pollution, groundwater threats and traffic density, as well as seven socioeconomic factors such as low birth weight, asthma rates and poverty"(Becerra 2013). Another LA Times report, "California Farms are Looking Greener Than Ever," focused more on the positive side. This article discussed that many farms in the Central Valley are applying the appropriate agricultural practices to conserve more resources and following regulations to prevent toxic substances from contaminating nearby areas. LA Times encouraged more agricultural stakeholders to adopt to more environmentally friendly practices as opposed to the unsustainable industrial agriculture

Sierra Club, one of the most influential environmental organizations, has contributed to the efforts in dealing with Fresno's slow disaster threats. For example, the organization actively participated in the protection and restoration programs for water sources (rivers, coasts, groundwater, estuaries) in San Francisco Bay and Central Valley. These programs include the Clean Water Act programs introduced by the EPA, and the Site Cleanup Program led by California State Water Boards, and many organizational, community-based activities/volunteering. This is extremely helpful for Fresno County, since water contamination from industrial agriculture is one of the most severe health threats for local residents (Lomax 2020). Another interesting action from Sierra Club is a lawsuit: "In Sierra Club v. County of Fresno (2018) 6 Cal.5th 502, the California Supreme Court held that portions of the air quality analysis in Fresno County's EIR for the 942-acre Friant Ranch Specific Plan violated CEQA"(Moose 2018). In this case, Sierra Club took judicial action against violations in CEQA guidelines, which was an effective and forceful method to bring environmental justice to Fresno residents. Other organizations, like Central California Environmental Justice Network and Pesticide Action Network North America (PANNA), have addressed more environmental issues regarding industrial agriculture. For example, two articles from PANNA: "State to set legal limit on pesticide byproduct found in Valley drinking water," and "Central Valley residents urge state officials to protect school kids from hazardous pesticides," detailedly discussed how

chemicals from farms & fields are impacting Fresno communities.

Lastly, government agencies like the EPA and CA department of toxic substances control have implemented specific programs for Fresno County to clean up contamination and purify water sources. For example, EPA built a 145-acre sanitary site for long-term remedy of local water, groundwater treatment, and pollutant monitoring (“FRESNO MUNICIPAL SANITARY ... ” 2017). Also, the DTSC proposed a water cleanup and remedial project in southern Fresno. (“South Fresno Regional Groundwater...” 2007).

Wikipedia, one of the most accessible sources of information, touched upon the environmental issues in Fresno. The environmental problems that were mentioned in the article were the contamination of groundwater by pesticides and other chemical run-offs. In addition, it is mentioned that Fresno had 2600 counts of radon in a sample compared to the national standard of 300. The problems of air quality are also mentioned in relation to the surrounding mountains in the valley that trap emissions. However, no further discussions were identified in the Wikipedia Talk page.

# 7. RECOMMENDED LOCAL ACTIONS

## Preventive and Combative actions for a healthier Valley

***Author Name: Cristian Handaric***

According to the United States Environmental Protection Agency (EPA), Fresno County (The San Joaquin Valley) has some of the nation's worst air quality, "failing to meet federal health standards for both ozone and particulate pollution."(epa.gov). Besides the topography of the valley that causes air pollutants to be trapped in the valley due to the surrounding mountain ranges, additional pollution sources include heavy traffic on I-5 and Highway 99, irrigation systems and diesel-burning locomotives. While smog has become a daily reality for Californians, the American Lung Society warns that "research has repeatedly found that ozone increases the risk of premature death even when other pollutants are also present." (lung.org)

Besides the long term exposure effects presented, additional symptoms are shortness of breath, wheezing and coughing, asthma attacks, and increased risk of respiratory infections. In an effort to combat air pollution, "The San Joaquin Valley Air Pollution Control District (SJVAPCD) uses the Pollutant Standard Index (PSI) to report air pollution information to the public, as well as to monitor compliance with the Clean Air Act."(municode.com) Additionally, the City of Fresno is actively creating strategies to purchase fuel efficient low emission vehicles and technologies in a cost-effective manner,

while the Advisory Committee will develop strategies that include funding opportunities to educate the private sector to convert their fleet to lower emission vehicles.

While air pollution is very dangerous for the population living in the valley, the pollution of water is also extremely detrimental to the health of the public. With a high level of chemical fertilizers being used in the local agriculture, although the local leadership has already implemented regulations on the use of such substances, they should also conduct campaigns that would inform the population of the state of the quality of water and its source. Besides the pollution of drinking water, Fresno County is also faced with extensive droughts that endanger its fields. An action to prevent future droughts is the new water treatment facility that was inaugurated in 2018, expanding Fresno's water system and pipelines to allow use of additional surface water. According to the City of Fresno Water Division, "Thanks to our Recharge Fresno program, the new surface water plant has been running continuously since May 2018. This has allowed the City to become more drought resilient by reducing dependence on groundwater."(fresno.gov)

Besides the issues presented and the actions taken to combat the danger of pollution on the population, a more efficient method of preventing environmental injustices is the education of the next generation. While the actions presented so far are necessary, educating future generations would deal with the bigger issue, which is the way we interact with the environment around us, and how much energy we spend protecting it. One such organization is the CCEJN which educated low income communities regarding their environment threats. On their website we can read the organisation's mission: "CCEJN's mission is to empower our communities and secure our children's future by eliminating negative environmental impacts in low income and communities of color in the Central Valley"(ccejn.org). Such programs and organizations should be encouraged and advertised more frequently, since they have the potential to empower the next generation, and equip it with the necessary means and information to combat future environmental injustices.

With a combination of preventive measures such as education programs, and combative actions such as the ones presented regarding the limitation of air and water pollution, the County of Fresno has the potential to change its reputation of environmental injustices and improve the quality of life for its population.

# 8. RECOMMENDED EXTRA-LOCAL ACTIONS

## Taking Action Beyond the Valley

### *Nishtha Mistry*

The San Joaquin Valley air pollution is the cause of countless health issues amongst residents of Fresno, specifically the low-income population residing in the west region. As air is trapped by the mountains, the heavy pollution lingers throughout county which in turn causes intergenerational health vulnerabilities. The cause of this poor outcome stems back to the vast number of industrial facilities, freeways and high polluting farming practices. Disadvantaged communities - which are disproportionately minorities due to redlining - are more at risk of the burden of pollution than the rest of the Fresno region, since most of these practices are done near their homes. The government has taken advantage of their inability to fight back against people of authority and large corporations, leaving them subject to the detrimental health impacts caused by the pollution in the area. In addition, minorities have been pushed back into poverty and unable to access the same form of education as other residents in the county have, causing a lack of participation in local politics.

The most important step towards fighting against environmental injustice outside of the county is actually taking small steps within. By education affected communities that they

suffer inordinate amounts of environmental risk compared to others, residents will become more motivated to be involved in politics and represent their community's views at a state/national level.

In terms of air pollution caused by farming practices, the act of field burning was a large contributor to this factor. In the process of field burning, farmers would burn unwanted byproducts of previous crops as well as buildup of certain grasses before seeding a new crop (The Desert Review). In 2017, approximately six tons of PM 2.5 were generated by open burning in the state every day. These particles would enter into a person's lungs and bloodstream, resulting in respiratory health issues. The biggest indicator of its impact was the fact that about one in six children suffered from asthma or another respiratory issue – in comparison to the national average of 1/12 (The Fresno Bee). In response to this, the San Joaquin Valley Air Pollution Control District presented a new proposal that would end the practice of field burning entirely by 2025. The main contender with this idea on the political level is that the ban would impose higher costs on agriculture. Therefore, it is demonstrated that politicians value income over residential health, an even more valuable factor.

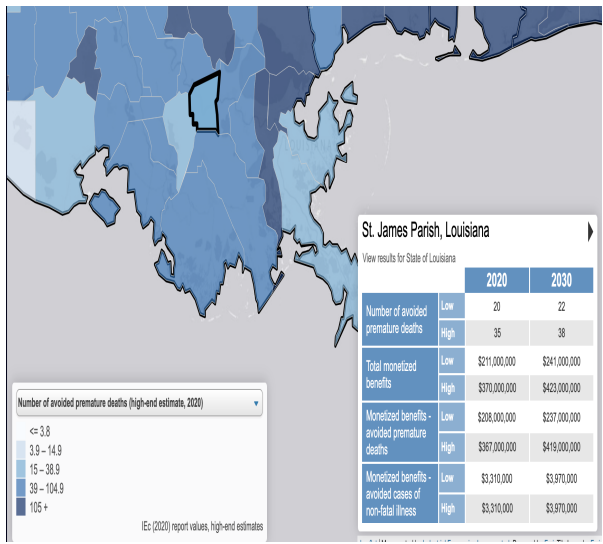
In addition to the impacts of field burning, ammonia, which is associated with manure and feed, also produces particles that result in lung irritation and, in turn, lead to respiratory problems as described before. When this issue was brought to the government level, studies were done that indicated the ammonia exposure in the area was relatively low. Both Dr. Frank Mitloehner of UC Davis and Tony Toso, President of California's Cattlemen's Association agreed that these gases present in the air were not the cause of the health problems and mortalities in the region. However, as stated by Julia Jordan, Policy Coordinator for Leadership Council for Justice and Accountability, the residents speak about the burdens of this air pollution they face every day (Gonzalez). Clearly, the impacts of these gases in the air are negatively impacting the residents in the area, but their experiences are being invalidated by figures of authority. A key factor of eliminating



the elements of pollution in the area is to increase regulations on the industrial facilities in the area, namely the dairies. Without putting an end to their practices or limiting their actions, the contaminated water and concentration of methane in the air will remain consistent, causing gradual damage to the health of the residents in the area.

Since minority groups who experience the environmental injustice present in the area are underrepresented in the decision-making process, it is evident that the outcome of proposals/trials such as these do not usually come out in their favor, but rather focuses on the economic value of the decision.

It is integral that advocacy groups come together to take these issues onto statewide/national levels and give the west Fresno residents a platform to voice their experiences. California Rural Legal Assistance Inc. (CRLA) is an example of a statewide organization that has provided assistance to low-income residents in Fresno. Legal groups such as CRLA help in the fight against environmental injustice in regions that have been silenced by people of authority. (LawHelpCA.org) The involvement of statewide organizations is a key factor to spreading awareness about regions heavily impacted by pollution. This will help the residents themselves to realize what situation they are in so they can be involved in making a change as well.



**FIGURE 21:** These are the benefits of an Air Act in Louisiana. As we can see, this Act do have a positive effect on the environment problem. The death rate reduces a lot.

<https://www.nrdc.org/resources/clean-air-acts-benefits-map> Screenshot by Shaoheng Zhang

# 9. RECOMMENDATIONS FOR FUTURE RESEARCH

## Food for Thought

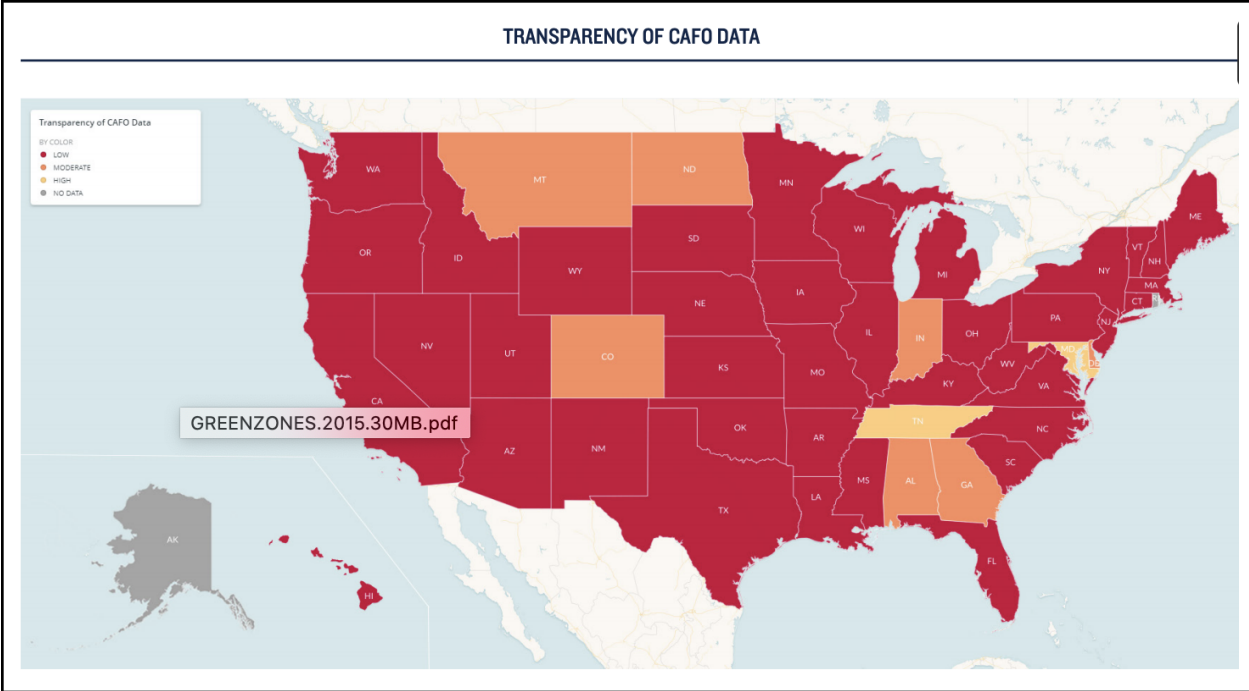
*Jimmy Duong*

One of the most prominent and impactful environmental threats within Fresno County specifically is the pollution. In fact, Fresno has consistently been ranked among the top 10 most polluted cities in California for a number of years (“Fresno Air Quality Index (AQI) and California Air Pollution: AirVisual) This pollution is created through various different means such as industrial facilities pumping out particulates and gases, natural disasters such as wildfires, vehicle emissions, and the agriculture sector. Jim Aldredge, a former city manager in West Fresno, stated that “pollution data is the farthest thing from your mind when you’re looking for your next meal”(Marcum). From this quote, we can interpret that the data regarding pollution is ignored since people are more worried about surviving rather than the pollution going on. The industrial facility owners within the area are prioritizing making a profit rather than reducing the amount of pollution that they pump out. Since this is what is being said regarding the data and research addressing this environmental threat in Fresno County, it would be best to address the lack of research and effort by part of the county. In order to better understand the pollution within this area, we must conduct more research.

First and foremost, we must figure out why this area is so heavily affected by

pollution due to vehicle emissions. The population in this area is relatively small compared to other counties such as San Diego County. However, the pollution in San Diego is not as bad as in Fresno County, considering that San Diego has a population that is about 3x as big as Fresno County. Secondly, we know that the particulates and gases in the atmosphere due to pollution lead to respiratory and cardiac diseases, however, we need to see if there are other negative health consequences that this pollution may have on the residents of this area. Lastly, some quantitative social survey data we need in this community is the number of people who are personally affected by the pollution. For example, how many people are hindered from doing their everyday tasks due to pollution and smog?

From this list of information that we need to collect, we have designed a qualitative study in order to find the answers. The research question we must ask is: how does the Latinx community perceive the current pollution that is going on with Fresno County? From this question alone, we have narrowed down the social groups that we will interact with to the Latinx community since they make up the majority of Fresno County at 53.5% of the population. In order to gain access to the Latinx community, we will put up flyers asking Latinx residents to call in and voluntarily answer our anonymous survey. We will also have field analysts roaming the area asking residents if they would like to participate in the survey. The participants will remain anonymous in order to protect their identity. We can use survey responses in order to get the data we need to make a claim regarding the health and psychological effects the pollution has on them. We will ask the participants the following questions: How do you feel about the state of pollution in your area currently? Have you noticed any changes in your health or mental state since the pollution occurred? Are there any concerns that you have regarding the pollution in this county? The participant answers to these questions would be incredibly useful to policymakers in the county since it will clearly relay the concerns the residents may have to those policymakers.



**FIGURE 22:** Natural Resource Defense Council’s 2019 report, *CAFOs: What We Don’t Know is Hurting US*, documents the unavailability of publicly accessible data about concentrated animal feeding operations. In research for this case study, this lack of transparency was confirmed. Report authors searched and were unable to find data about confined animal operations in Fresno.  
<https://www.nrdc.org/sites/default/files/cafos-dont-know-hurting-us-report.pdf>  
 (Screenshot by Veena Naveen, July 7, 2021).

# 10. INJUSTICE ANALYSIS

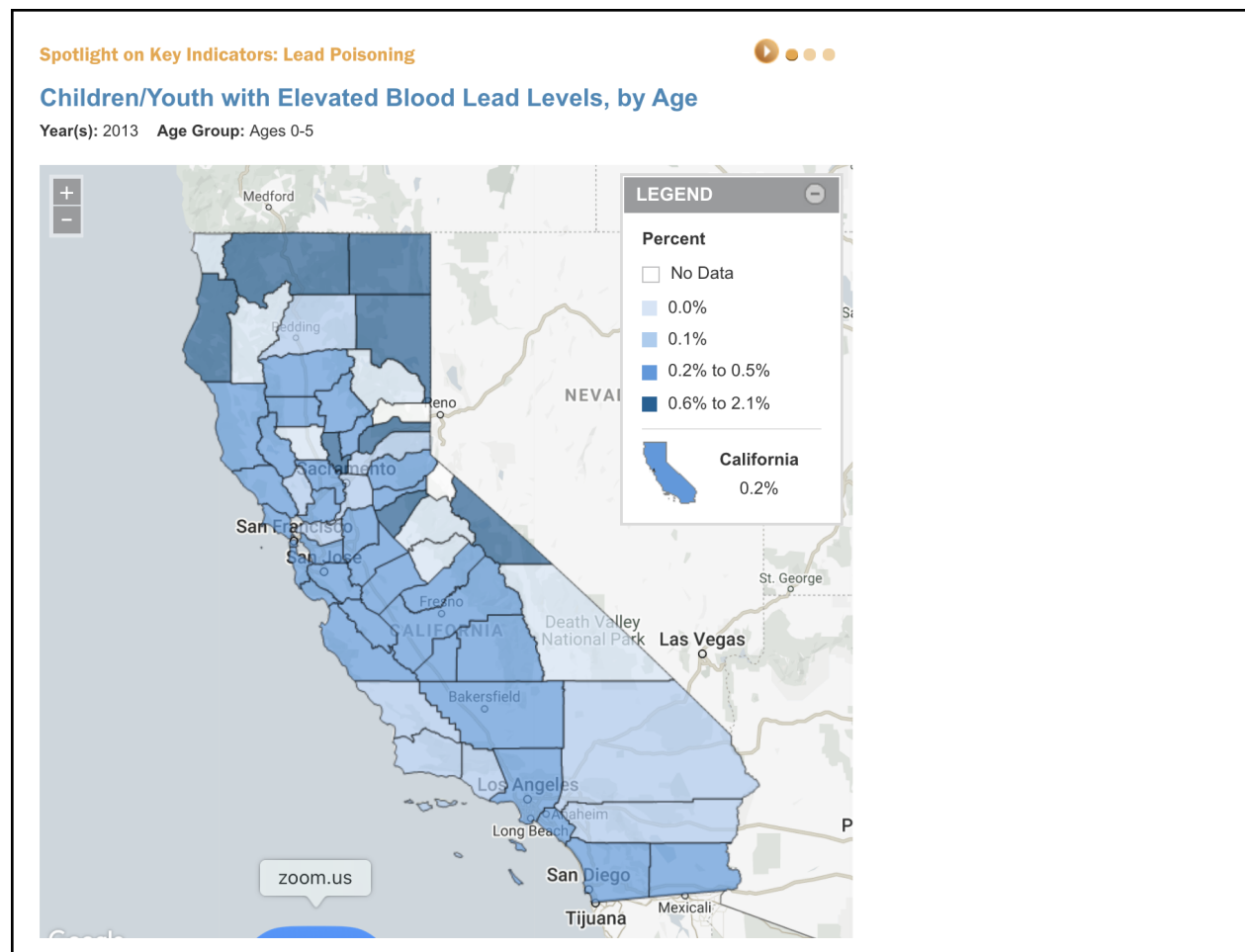
## The Injustice League

### *Ginghei Mao*

Hidden behind the scenes of any atrocity is a plethora of unnoticed factors that collaborate to create and exacerbate the issue. The residents of Fresno, specifically those from the western half of the county, are victims to more than just environmental injustice; they also contend with health injustice, procedural injustice, and economic injustice (and every other form of injustice that can be named, but for simplicity's sake, we'll focus on these) on a daily basis.

Due to their constant exposure to countless pollutants through both the air they breathe and the water they drink, the residents of Fresno often suffer from "multiple health problems, including asthma and other respiratory issues" (qtd. in Miller). However, because "there's more concentrated poverty there than nearly anywhere else in America" (Thebault), many lack the means to obtain adequate healthcare, so "In the city's south and southwest, Fresnoans live, on average, 20 years less" (Thebault). Despite this, the local and federal government have expended little effort to help. As stated by Kieshaun White, an activist who established a network of air quality monitors in the region, politicians are ineffective in resolving the issue since "in their eyes, they live in a perfect world with no problems or stress. But for lower- or middle-class people that stay in polluted, poverty-stricken neighborhoods, this is our lives. Every day" (qtd. in Bliss). In essence, those who are most impacted have little political value, as they are composed mostly of minors, minorities, non-citizens, and those in poverty. This status leads to their presence

and problems being forgotten or ignored in political settings. These forms of health and procedural injustice are exacerbated due to the intense economic injustice affecting the region: the extreme poverty in western Fresno means that residents are unable to afford healthcare and incapable of making substantial donations to campaigns in order to sway politicians. The minute details of these factors could be endlessly discussed, but a look through history immediately reveals the root of the problem: racism. At a town hall meeting in the county's early days, "Fresno's white residents agreed not to rent, sell or lease any land east of the railroad tracks, where they and their families lived, to Chinese immigrants," which "established a pattern that persists today: Fresno's poorest and most vulnerable residents [are] consigned to the same neighborhoods as the city's dirtiest factories" (Thebault). Evidently, the current state of environmental injustice in Fresno was created through racism and is maintained through the continued propagation of racism.



**FIGURE 23:**

According to 2013 data, 2% of children ages 0-5 in Los Angeles County have elevated blood lead levels. Lead exposure could be occurring at home (through air, soil or ingestion of old paint) or in daycare facilities. Beginning in 2020, daycares in California are required by law to test their drinking water for lead (Savidge 2018).

<https://m.kidsdata.org/table/364/los-angeles-county/529/environment-lead>

(Screenshot by Veena Naveen, July 7, 2021).



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# FIGURES

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