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This case study report was developed by students at the University of California Irvine for the undergraduate class, "Environmental Injustice," taught by Kim Fortun (kfortun@uci.edu), Tim Schütz (tschuetz@uci.edu) and Kaitlyn Rabach (krabach@uci.edu) for the Department of Anthropology, Summer 2020.

Biographical Statements

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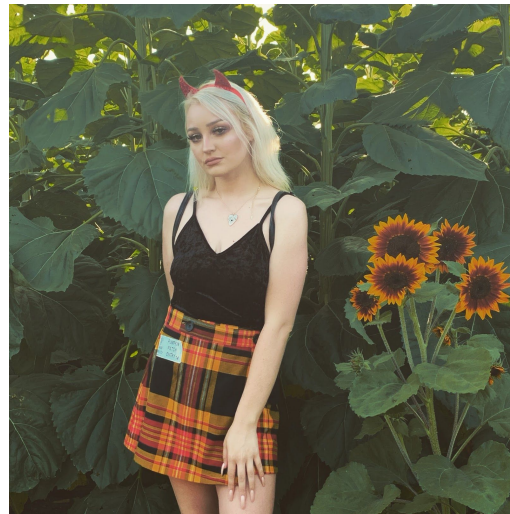
Gerald Lee is a second year student at the University of California, Irvine under the Henry Samueli School of Engineering. He is studying Biomedical Engineering, with interests in developing imaging technology and discussing ethics both inside and outside the laboratory.



Supriya Dadi is a second-year Biomedical Engineering: Pre-Medical student at the University of California, Irvine. She plans to go to medical school after graduating, as she is interested in how to combat the health impact of pollution. She is currently a publicity officer in both Human Biology Club and Student Health Outreach.



Ciara Hernandez is a senior at the University of California, Irvine and is a psychology major with an emphasis in cognitive neuroscience. She is particularly interested in artificial intelligence, computational brain modeling and neuroimaging research regarding white matter fiber tracts. She is interested in advocating against the disproportionate allocation of environmental hazards in vulnerable communities domestically and internationally.



Cristabel Portillo will be going into her second year as a Undeclared major at the University of California, Irvine. She is currently pursuing Biochemistry with a minor in Medical Anthropology. Cristabel has been able to take various classes that peaked her interest in taking Anthropology 25A in order to broaden her knowledge about environmental issues going around her and globally. She would like to learn more about environmental injustices occurring and how to help combat these issues.



Fariha Karim is a first-year at UC Irvine majoring in biological sciences. She is invested in learning about the environment and the impact humans have on it, hoping to apply what she learns to the world around her through research and informing others.



Jiji Hamdan will be a sophomore this fall at the University of California Irvine majoring in Environmental Science & Policy. Living in Dubai most of her life, Jiji has been a passionate marine conservationist and environmental activist since a very young age and is eager to share her knowledge and experiences on environmental issues to make change and persuade others to do so as well.



Rishab Sridhar is a second-year student at the University of California, Irvine majoring in Computer Science & Engineering. His interests include environmental policy and sustainability. He wants to contribute to solving and tracking climate change issues using software.



Likang Te is a fourth-year Public Health student at the University of California, Irvine. During the years majoring in Public Health Policy, She has learned how to collect, organize, and activate health data and create interventions to prevent and manage the disease. She had her practicum at UCI sustainability center, a school organization that spent lots of resources and approaches to decrease plastic wastes and student's sugary beverage consumption. After this summer, she will finish her public health degree with a medical anthropology minor, and she will apply for graduate school in the Spring quarter of 2021. After finishing graduate school, she is planning to apply for a job position from a life science company that develops the next generation of health solutions.



Zachary Techall Whipps, will be a second year Civil Engineering student at UC Irvine this fall. His upbringing in the Pacific islands of Palau have given him deep respect and appreciation for the sea. Marine conservation and environment sustainability are issues that he is very passionate about and they affect him on a personal level. He is in the process of changing his major into Environmental Engineering to help promote sustainable development.



Ryan Robinson will be a second year Biological Science major at the University of California, Irvine. Being able to witness the BP oil spill in the Gulf of Mexico first hand, an interest in environmental sciences sparked. Ryan is excited to work in groups to learn about everyone's experiences and to take advantage of an individual's expertise as an outlet to learn and grow as a person.



TABLE OF CONTENTS

SECTION 1: Community Setting & Assets [Ryan Robinson]	11
SECTION 2: Everyday Pollution as Slow Disaster [Supriya Dadi]	15
SECTION 2B: Everyday Pollution as Slow Disaster [Zachary Techall Whipps]	18
SECTION 3: Compound Vulnerabilities [Ciara Hernandez]	21
SECTION 4: Stakeholder Analysis [Rishab Sridhar]	26
SECTION 5: Stakeholder Actions [Likang Te]	29
SECTION 6: Role of Media and Big Environmental Organizations [Jiji Hamdan]	32
SECTION 7: Recommended Local Actions [Cristabel Portillo]	36
SECTION 8: Recommended Extra-Local Actions [Fariha Karim]	39
SECTION 9: Recommendations for Future Research [Gerald Lee]	42
SECTION 10: Injustice Analysis [Emil Zublin]	45
BIBLIOGRAPHY	49
FIGURES	57
APPENDIX	58
Appendix 1: SKETCH: Community Assets	58
Appendix 2: SKETCH: Environmental Hazards	59
Appendix 3: SKETCH: Compound Vulnerabilities	61
Appendix 4: SKETCH: Stakeholder Analysis	64
Appendix 5: SKETCH: Stakeholder Actions	65
Appendix 6: SKETCH: Media & Enviro Org Coverage	66
Appendix 7: SKETCH: Possible Local Actions	70
Appendix 8: SKETCH Possible Extra-Local Actions	72
Appendix 9: SKETCH: Data & Qualitative Research Design Proposal	74
Appendix 10: SKETCH: Multiple Forms of Injustice	76

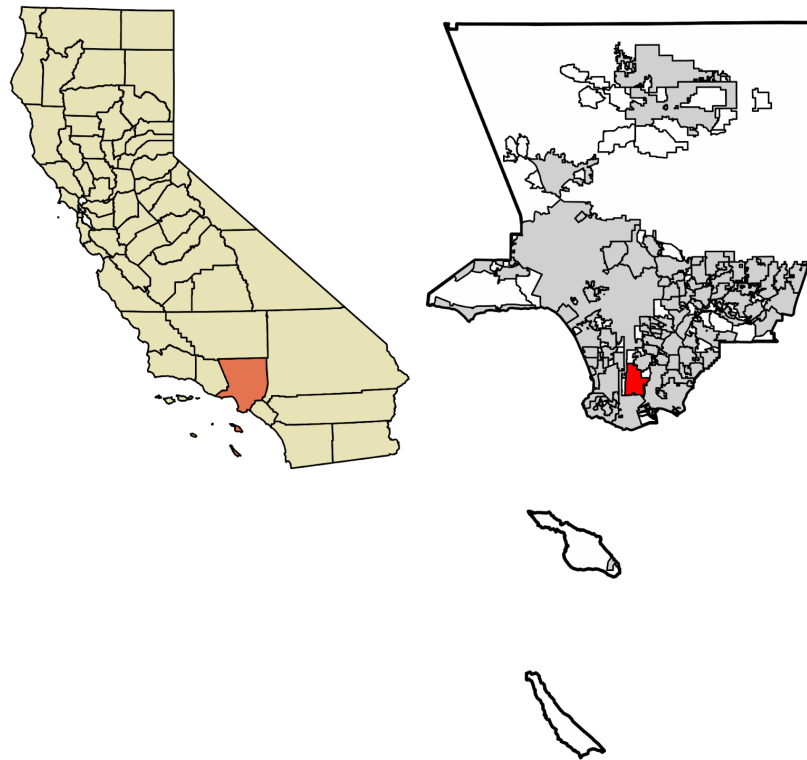


Figure 1. Location Map of Carson, CA. The left image has the Los Angeles county shaded in orange, on the right shows the placement of Carson shaded red within Los Angeles. (Screenshot by Cristabel Portillo. Wikipedia, retrieved July 8, 2020).

INTRODUCTION

This case study report focuses on everyday, cumulative pollution in Carson. The report addresses a series of ten questions 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.

INTERDISCIPLINARY ENVIRONMENTAL INJUSTICE CASE STUDY
1. What is the setting of this case?
2. What environmental health threats (from worst case scenarios, 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 news agencies and advocacy organizations brought attention to environmental problems in this setting?
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, in your view, is ethically wrong or unjust in this case?

Figure 2. This is the analytic framework that guided research for this case study.

SECTION 1: Community Setting & Assets [Ryan Robinson]

This week, we will be focusing on the city Carson in Los Angeles County, CA pictured below (EJScreen 2020). Based on the most recent census, the population is close to 92,000, with a demographic make-up of about 7.7% white European, 23% African American, 25% Asian, and around 40% of the population identifying with Hispanic or Latino (EPA EJScreen Report 2020). Also, 32% of the population is foreign born. There are several schools within the Carson area, including three high schools. Carson is represented by Steven Bradford and Mike Gipson, two democrats. Carson has a rooted history in fossil fuels, starting in 1921 when Carson Estate Company first started drilling for oil. From there, hundreds of oil derricks and tank farms were scattered throughout the city, leases primarily being held by Shell Oil Company and Union Oil. These oil refineries lead to an increase in jobs, a major contributing factor in the population boom.

Carson has already had their fair share of exposure to pollution, even to the point where regulations had to be put on Shell after a benzene and methane gas leak was discovered in the Carousel neighborhood. Carson has just under an 11% poverty rate, despite the nearly \$79,000 average household income, exemplifying the drastic wealth gap in the city, and likely meaning that in an oil dominated economy for the area, fighting for and prompting for change will be harder to invoke.

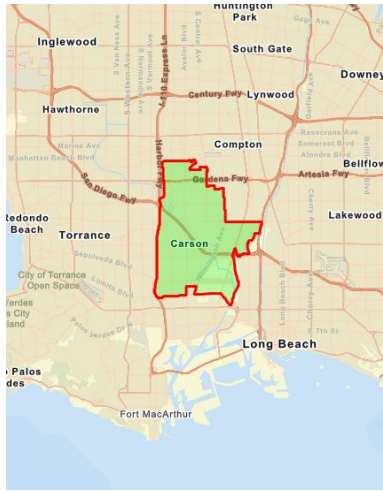


Figure 3. Selected area for Carson. (Screenshot by Ryan Robinson, July 2020. EPA EJSscreen Report, retrieved July 8, 2020).

EJSCREEN ACS Summary Report

Location: City: Carson city
 Ring (buffer): 0-mile radius
 Description:

Summary of ACS Estimates		2013 - 2017	
Population		92,793	
Population Density (per sq. mile)		4,974	
Minority Population		86,034	
% Minority		93%	
Households		25,392	
Housing Units		26,130	
Housing Units Built Before 1950		2,873	
Per Capita Income		24,637	
Land Area (sq. miles) (Source: SF1)		18.66	
% Land Area		99%	
Water Area (sq. miles) (Source: SF1)		0.24	
% Water Area		1%	

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	92,793	100%	801
Population Reporting One Race	87,800	95%	3,012
White	26,753	29%	510
Black	21,459	23%	596
American Indian	700	1%	210
Asian	24,838	27%	637
Pacific Islander	1,920	2%	408
Some Other Race	12,133	13%	651
Population Reporting Two or More Races	4,993	5%	491
Total Hispanic Population	35,207	38%	575
Total Non-Hispanic Population	57,587		
White Alone	6,760	7%	274
Black Alone	21,051	23%	596
American Indian Alone	155	0%	121
Non-Hispanic Asian Alone	24,508	26%	637
Pacific Islander Alone	1,892	2%	408
Other Race Alone	177	0%	84
Two or More Races Alone	3,044	3%	465
Population by Sex			
Male	44,979	48%	438
Female	47,814	52%	463
Population by Age			
Age 0-4	5,277	6%	153
Age 0-17	19,758	21%	230
Age 18+	73,035	79%	385
Age 65+	14,722	16%	180

Figure 4. Population breakdown of Carson, CA but age, ethnicity/race, and sex. (Screenshot by Ryan Robinson, July 2020. From EPA EJSscreen Report, retrieved July 8, 2020.)

Community assets are necessary when it comes to the togetherness of a community. Planned Parenthood is an example of a community asset, a funded, accessible, and safe place for the healthcare needs of a community. Community assets such as public access to the internet and safe meeting spaces are essential in a community (Internet Locator 2020). A sense of togetherness and community holds value when it comes to advocating or movements for change. Seeing people in outrage might prompt you to look into a topic, but seeing the members of your community, your neighbors, your friends and family that you interact with over a mutual community garden or other area fighting for change, there is a higher likelihood for researching and forming opinions on particular topics (LA Garden Council 2020). Catering to the needs of only the wealthy businesses is no longer an option when community assets are in place to prevent such gross misinterpretation of representation.

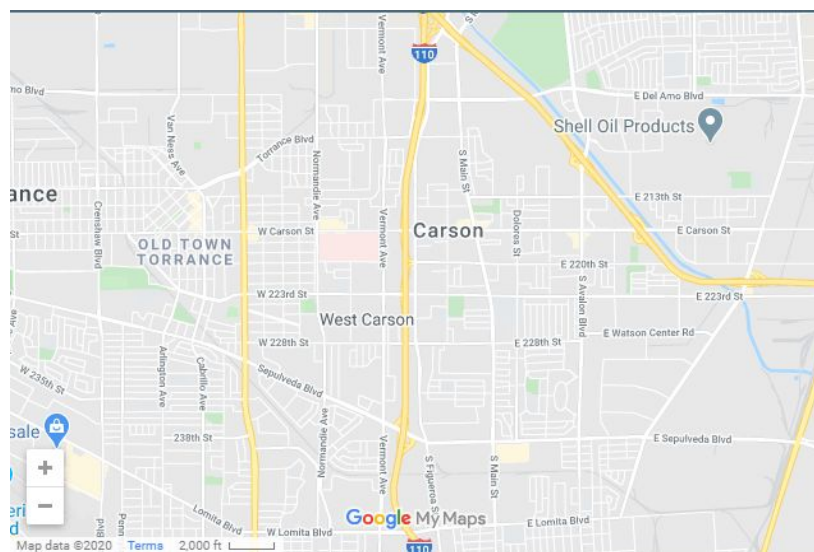


Figure 5. Map of Community Gardens in Carson. There are no community gardens in the city of Carson (Screenshot by Ryan Robinson, June 2020. *Los Angeles Community Garden Council*, retrieved June 29, 2020.

<http://lagardencouncil.org/find-a-garden>)

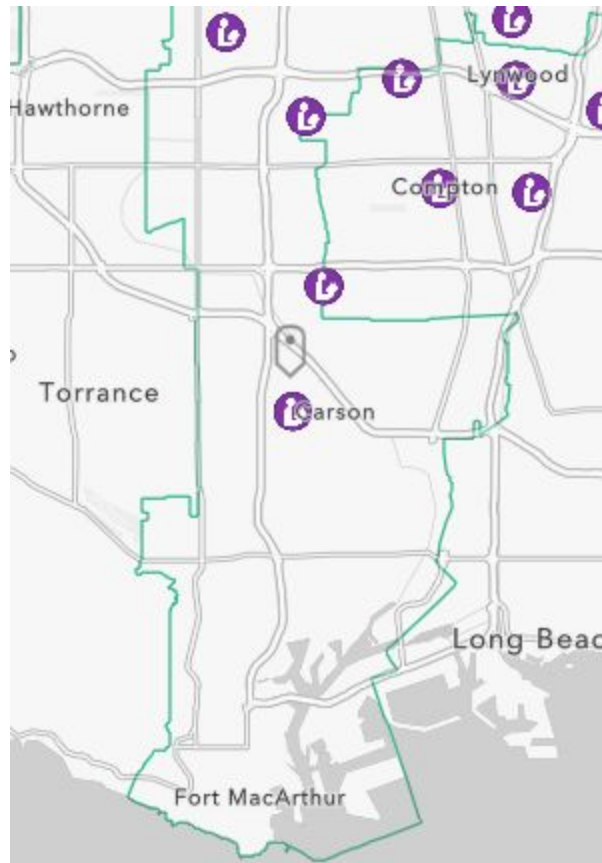


Figure 6. Map of Public Internet Access in Carson. (Screenshot by Ryan Robinson, June 2020. Internet Locator Map, *County of Los Angeles*, retrieved June 29, 2020.

<https://lacounty.maps.arcgis.com/apps/ZoneLookup/index.html?appid=e6fbcad3b92244cabcb7b2130e5ffae7>)

Carson currently sits on former Tongva lands, natives who have since had to move. Historically, they resided in much of present-day Los Angeles and the

Channel Islands. Despite hardships such as Eisenhower’s “assimilation” policy in the 1950s, the State of California officially recognized the Gabrielino-Tongva Tribe as of 1994 (Gabrielino-Tongva Tribe 2020).

SECTION 2: Everyday Pollution as Slow Disaster

[Supriya Dadi]

The principal environmental threats explored in this report include routine pollution resulting from environmental injustices and vulnerabilities. The main threat comes from the release of toxic chemicals into the air, which thereby exposes communities already vulnerable to coronavirus to millions of tons of known carcinogens. In fact, the polluted air killed over 5,000 in LA County in just one year (City News Service 2020).

Volatile organic compounds (VOCs) and criteria pollutants, like nitrogen oxides and fine particles, are constantly released by factories such as Andeavor, Phillips 66, and Valero. In fact, they have reported that they released 14 million pounds of these pollutants. A large part of which comes from Andevour, whose factories release 4.5 million pounds of pollutants and 374,621 pounds of toxics. To make matters worse, a study showed that these values are actually 2.7 to almost 12 times higher than reported values due to various leaks in the factories (Morris 2017), and another study revealed that VOC emissions from the crude storage tanks could be almost 30 times what reports predicted (Mazza 2018). The release of such chemicals into the air has excruciating health effects. An investigation by researchers at the University of Southern California in 1992 found that “early-childhood exposure to pollutants can have lifelong consequences, from

diminished lung function to chronic absences from school and work.” The American Lung Association states that breathing in VOCs irritates the eyes, nose, and throat, causes difficulty breathing and nausea, damages the central nervous system and several other organs, and can cause cancer (*Volatile Organic Compounds*).

However, VOCs aren’t the only toxins released by these factories. Praxair (a factory that already had an accident that damaged acres of land), Carson Cogeneration Company, Americold, and Mountain Water Ice Company store ammonium (*RMP Facilities*), which can cause difficulty in breathing, eye, nose, or throat irritation, burn, blister, and in high concentrations, it can be fatal. When ammonium nitrate (a similar chemical) was accidentally released in Texas City in April 1947, it caused a fire that destroyed over 1,000 buildings, 175 to be listed as missing, and 400 as dead (What Is Anhydrous Ammonia 2013). Furthermore, Material Logistic, which has already reported that they had one accident, stores benzene/toluene which are known carcinogens, and the Eco Services Dominguez Plant, which has already previously that they had one accident and a hundred evacuations, stores sulfur dioxide (*RMP Facilities*) which makes breathing harder (*Sulfur Dioxide*). The complete map of hazardous waste sites in Carson can be seen in Figure 7 below

Overview of Hazardous Waste sites and sites reporting to the EPA



Figure 7. Overview of Hazardous Waste sites and sites reporting to the EPA (Screenshot by Supriya Dadi, June 2020. *EPA Ejscreen*, retrieved June 29, 2020).

These injustices are further exacerbated in Carson's education system. For example, the Caroldale Learning Community has lead levels of 25.2 ppb, which is exceedingly higher than acceptable lead limits and requires action to be taken immediately. Most schools have lead levels between 5.1 to 15- with most hovering near 14 ppb- which can be detrimental to the students' health. Only three schools have safe lead levels (Xie 2019). The map of lead levels in school can be seen below in Figure 8.

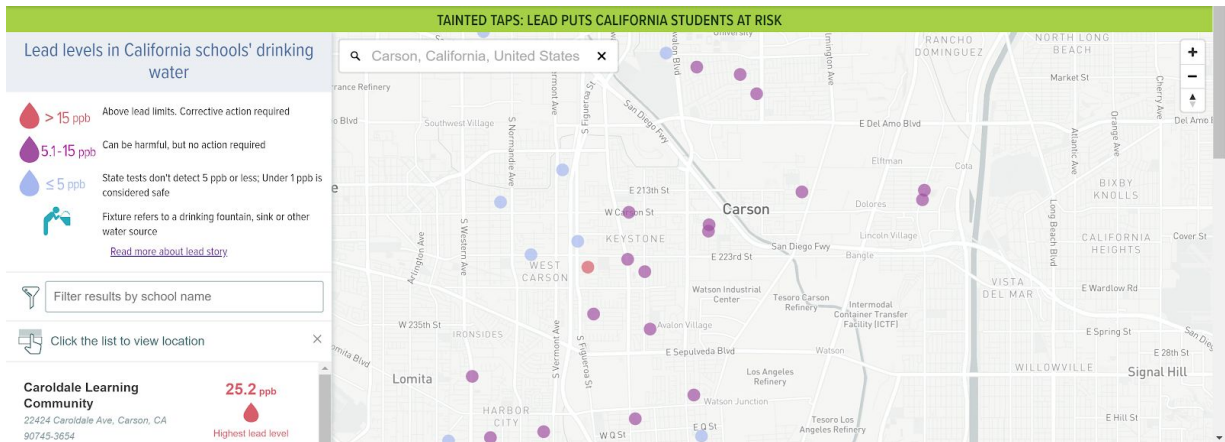


Figure 8. Lead Levels in Carson. Most schools in Carson have harmful levels of lead in the school’s drinking water with one- Caroldale Learning community- having extremely dangerous levels of lead. (Screenshot by Supriya Dadi, June 2020. *EdSource*, retrieved June 29, 2020. <https://edsource.org/2018/interactive-map-lead-levels-found-in-california-schools-drinking-water/602769>)

To make matters worse, near the Torrance Unified School District, specifically the Torrance Elementary School, there used to be the Naval Material Redistribution and Disposal Center, which containerized hazardous, toxic, and radioactive waste. Despite the DOD stating that the military cleanup actions are complete, the site may still be dangerous. While many of these sites are put under long-term monitoring or other restrictions, children are still being put in danger as the long term impact of these substances is still unknown (Groeger 2017). The location of the site can be seen in Figure 9 below.

Below are the locations of hazardous sites associated with this military installation, according to the DOD. A site's contamination may affect a much larger area, including public and private lands and the water supplies beneath them.

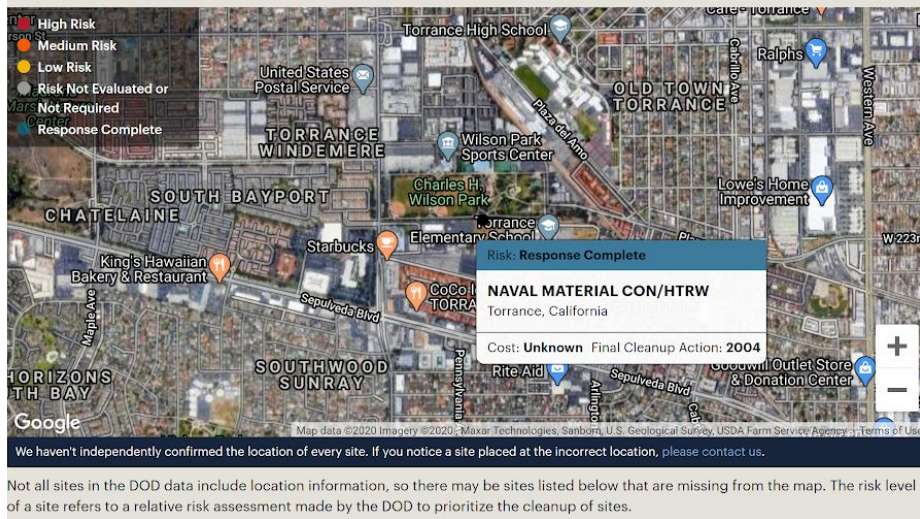


Figure 9. Military Clean-Up Sites in Carson. The Naval Redistribution Site near Carson is where a park, elementary school, and a shopping complex have been built despite there being unclear readings on whether the danger is gone. (Screenshot by Supriya Dadi, June 2020. Bombs in Your Backyard Series, *ProPublica*, retrieved June 29, 2020. <https://projects.propublica.org/bombs>)

SECTION 2B: Everyday Pollution as Slow Disaster [Zachary Techall Whipps]

The dangers of prolonged exposure to toxins and poor air quality have plagued the people of Southern California for years, but its effects are only now beginning to make themselves clear. Poor air quality has been shown to increase the risk of developing respiratory illness and cancers (Bestplaces) and city Carson scores much higher than the national average in that regard, scoring a 46.8 vs the national average of 38.5 and a 55.1 vs 46.6, respectively). The combination of the presence of heavy industry, traffic, and other geological and environmental factors have left Carson in the state that it is in.

In surrounding cities like Torrance and Long Beach, massive oil refineries such as Exxon and Phillips 66 are some of the largest emitters of greenhouse gasses in North America. There are over 30 gas refineries in and around Carson, with numerous other chemical plants. Nearly a third of all VOC emissions in the area came from these refineries alone. (Morris, 2017) Aside from these manufacturing facilities, there are a host of other storage locations and distributors for these chemicals (Refineries) whose very mere existence poses a threat to the people living nearby.

Another cause for concern for the residents of Carson is their proximity to the Interstate 110 Freeway (as seen in figure 10) and of the three public high schools in Carson, all are located within a kilometer of the freeway. As stated earlier, many students were shown to have dangerously high levels of lead in their bodies, lead is hazardous to everyone, but its effects will exponentially be more damaging. Lead poisoning in youth can cause behavioral disorders and impair cognitive ability. This paired with the heavy flow of into and out of the city has contributed to huge amounts of CO₂ and nitrous oxide found in the air.

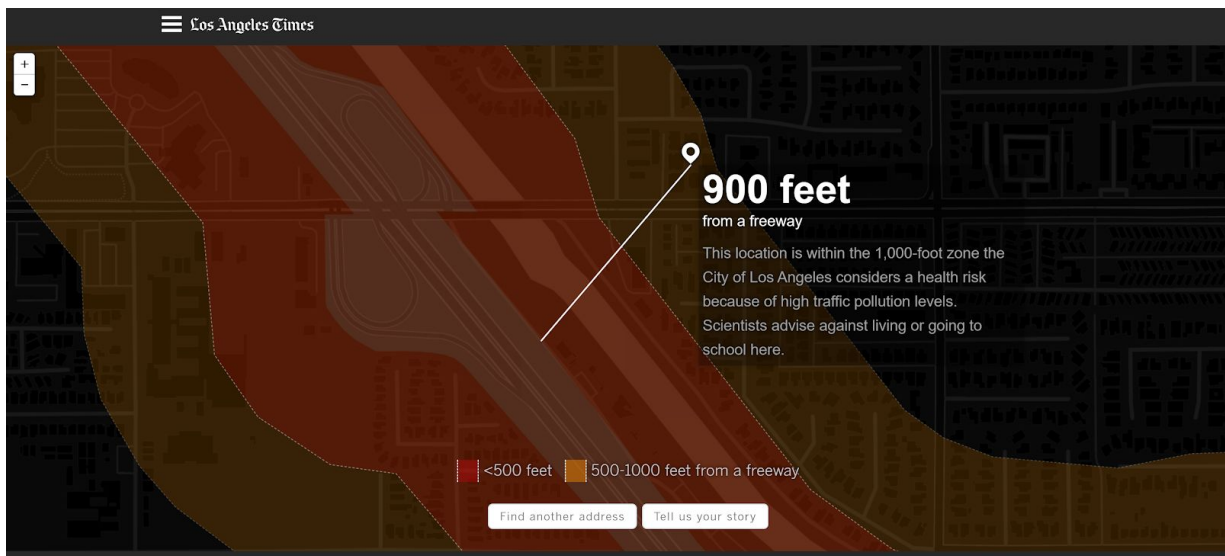


Figure 10. Freeway proximity for Carson. (Screenshot by Supriya Dadi, July 8, 2020. From How close do you live to the freeway? Los Angeles Times, retrieved June 29, 2020 <https://www.latimes.com/projects/la-me-freeway-how-close-map>)

All of the above concerns are made worse by the very location of Carson, within the South Bay Basin. The region of California has an arid climate and the surrounding mountains damper air circulation (Bestplace). The vast quantities of pollutants being poured into the atmosphere eventually settle in the Basin and its low points, one of these being Carson. Due to its distance from the sea, cities like Torrance and Long Beach do slightly better in terms of PM 2.5, Ozone damage than Carson despite housing heavy industry. (Figure 11) As a matter of fact, the city scores well above the national and even state averages on every metric found on EPA's Environmental Justice Indexes. (see figure 12)

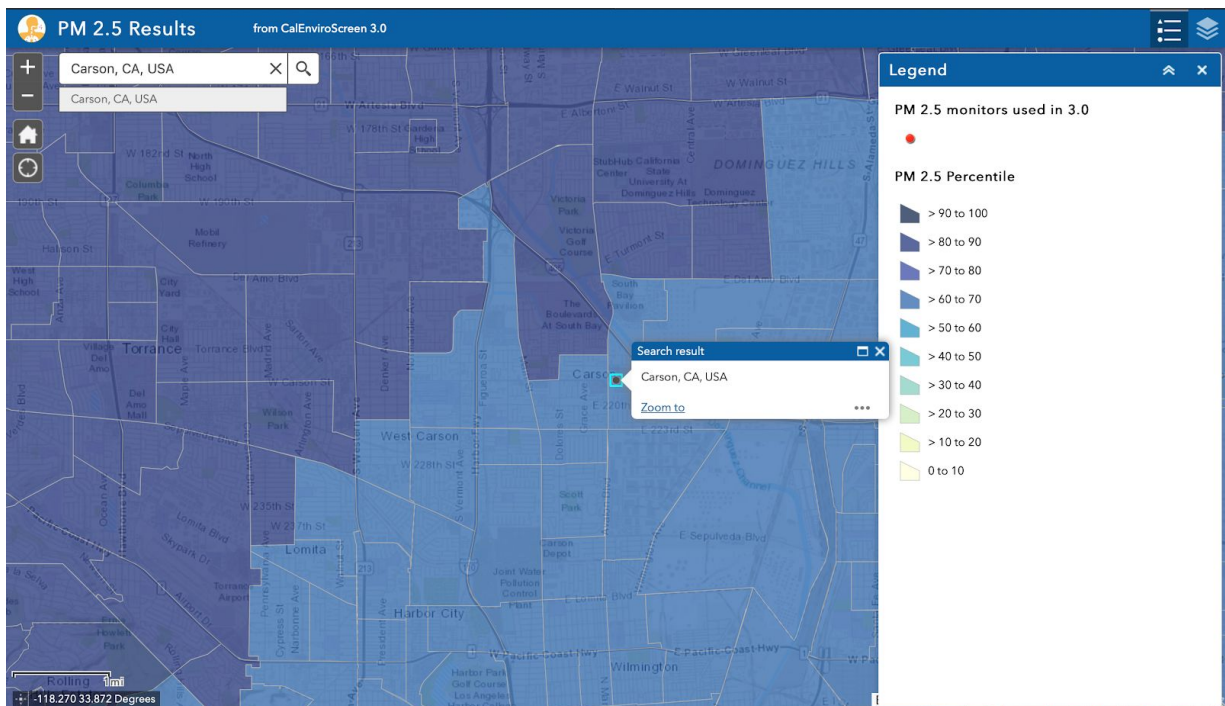


Figure 11. High Scoring Census Tracts for PM 2.5 in Carson (Screenshot by Zachary

Whipps, June 2020. *CalEnviroScreen 3.0*, retrieved July 7, 2020).

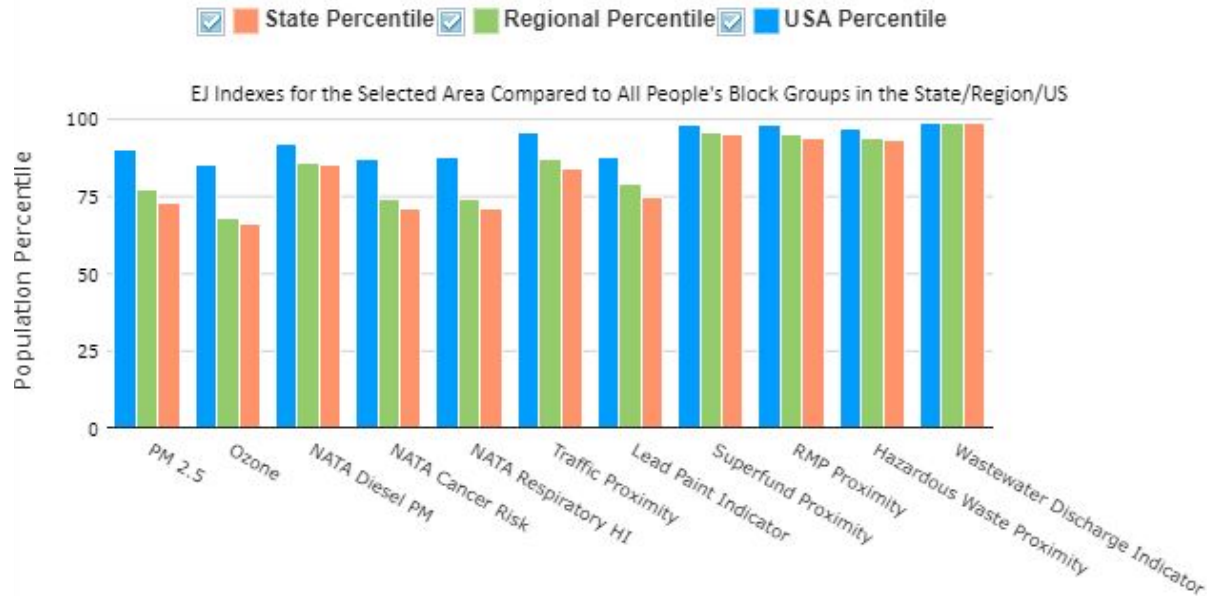


Figure 12. A graph showcasing Carson’s environmental statistics in comparison with California and the United States. It shows how Carson is more polluted than California, but not as polluted as the nation as a whole. (Screenshot by Zachary Whipps, July 2020. *EPA EJScreen*, retrieved July 7, 2020).

The people of Carson, in particular its children, are exposed to unseemly amounts of hazardous pollutants on a daily basis and it will have an effect on their futures. As stated earlier, there are rules and regulations in place to help protect residents from pollution but are only effective when enforced. If nothing is done, damage to the health and livelihoods of these people will worsen, not only in Carson but throughout LA County.

SECTION 3: Compound Vulnerabilities [Ciara Hernandez]

Carson is a unique place in California as it houses some of the most boisterous titans of industry, especially in one of the most lucrative markets ever cultivated: oil. Carson boasts the ownership of two massive scale crude oil refineries, one being Phillips 66 refinery and the other being Marathon Oil Refinery (City of Carson 2020). Needless to say, this small area is bombarded with emissions from competing chemical plants, plants that manufacture plastic and oil refineries to name a few. However, often accompanying instances of environmental injustice, like the ones Carson is currently experiencing, are intersecting factors that make these communities even more vulnerable.

Using a tool called CalEnviroScreen one is able to see huge disparities in layers of inequality that afflicts not only Carson but specifically the neighborhoods that border some of the aforementioned refineries. First and foremost, Carson has reported 750 known COVID-19 cases, which is substantially lower than the neighboring city of Gardena's 583 reported cases (City of Gardena 2020). Being that COVID-19 is a respiratory disease and Carson is the home to so many toxic refineries, the integrity of these resident's lungs may not be as robust as the residents of Gardena who may not be exposed so closely to these toxic emissions.

Similarly, using CalEnviroScreen the linguistic isolation of Carson residents in the fence line zone of Marathon Oil Refinery is higher than 73% of other Californians, with the most prevalent foreign language being Tagalog, which can be found below in Figure 13 (California Office of Environmental Health Hazard Assessment 2018). This poses a unique issue for the residents of Carson as it is commonplace to see pertinent announcements for environmental stressors, such

as emission hazards and things like COVID-19 in Spanish and English, however, it is much less prevalent to get this kind of information directly translated to Tagalog. Similarly, due to this underrepresentation, these residents are much more vulnerable to the neighboring emissions due to how common it is for pertinent information to get lost in translation, or in this case lack thereof.

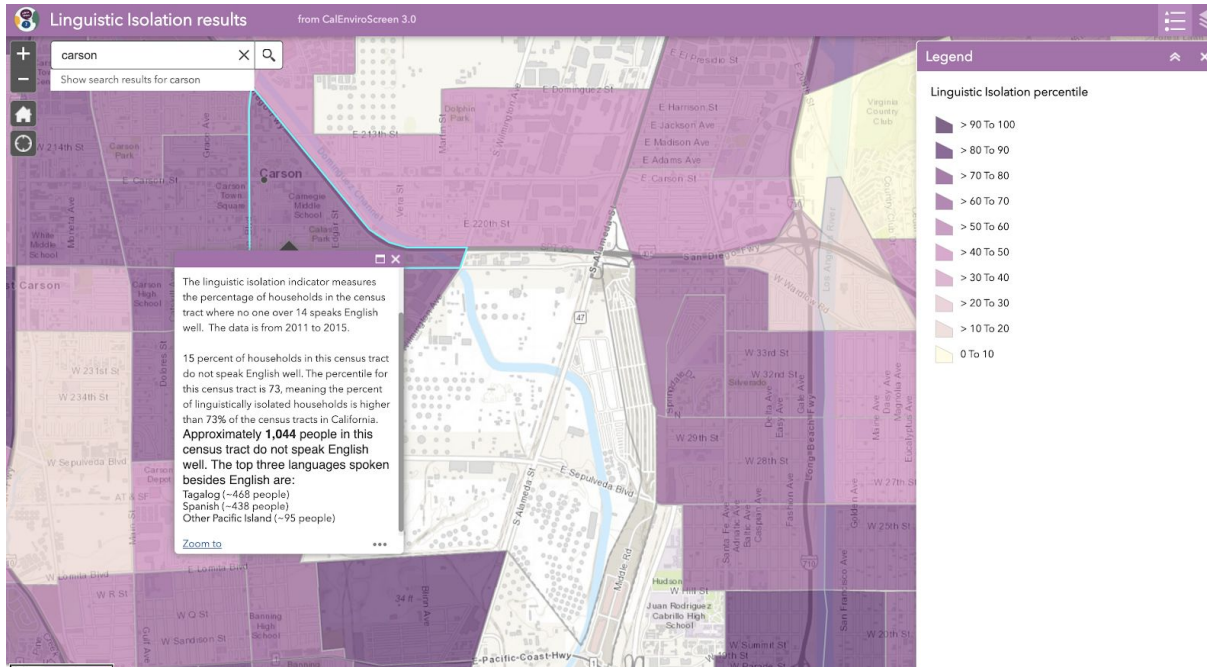


Figure 13. High Scoring Census Tracts for Linguistic Isolation in Carson, CA. Specifically higher in the neighborhoods that directly border Marathon Oil Refinery. (Screenshot by Ciara Hernandez, July 2020. *CalEnviroScreen 3.0*, retrieved July 7th, 2020).

Carson experiences similar compounding vulnerabilities with educational attainment and housing burden as well, which by no coincidence reach the highest percentiles in the neighborhoods directly parallel to refineries like Marathon. For instance, in the neighborhood directly bordering Marathon Oil Refinery 34% of adults have less than a high school education, placing this specific neighborhood as

having less educational attainment than 80% of California residents (California Office of Environmental Health Hazard Assessment 2018). This indicates two things: that these residents might be economically confined from moving from this area due to a lack of income because of this lack of education and that it severely lessens the probability that these residents are privy to the toxicity of their air as environmental issues are rarely a point of instruction in Los Angeles County public schools.

Lastly, this same neighborhood that borders Marathon Oil Refinery garners a uniquely high housing burden as well, refer to Figure 14 below for illustration. A housing burden refers to a household that is both low income and spends more than 50% of this income on housing costs, in this particular neighborhood of Carson their percentile ranked 76%, this translates to being severely burdened by housing costs more than 76% of other Californians (California Office of Environmental Health Hazard Assessment 2018). This reinforces the previously mentioned point of residents in the neighborhood directly parallel to Marathon Oil Refinery being confined to this toxic living arrangement through economic restraints. However, other separate indicators such as linguistic isolation and educational attainment all seem to run concurrently with similar economic indicators, especially in this neighborhood.

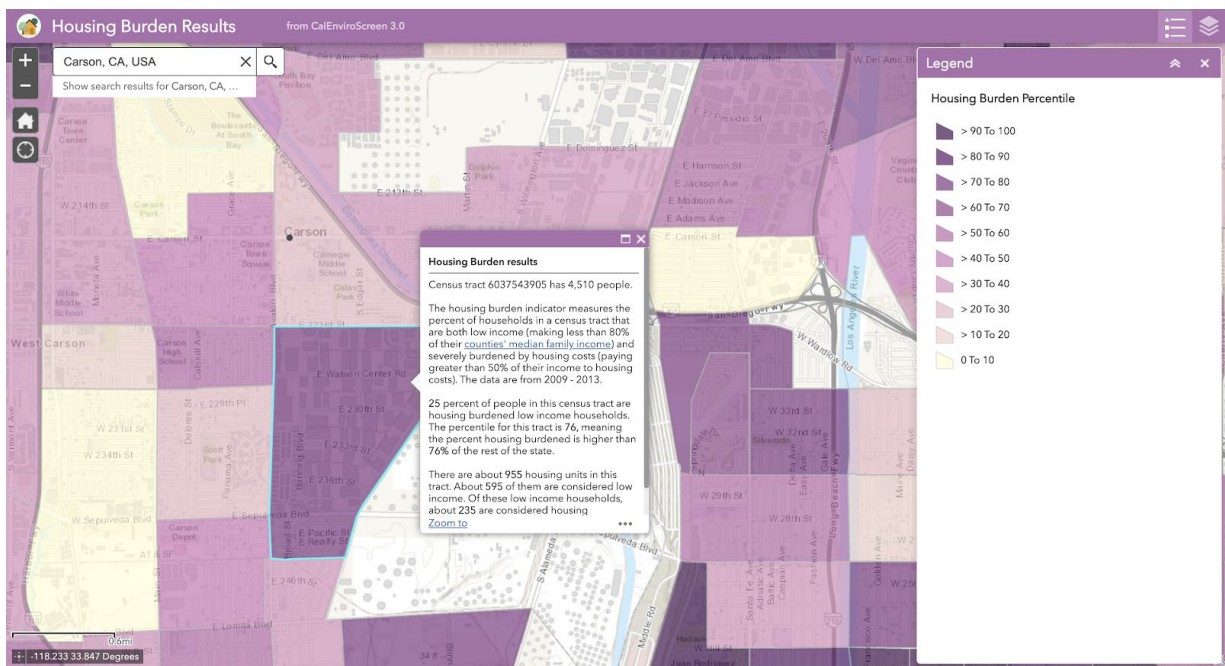


Figure 14. This image of the CalEnviroScreen specifically illustrates housing burden distribution in several Carson neighborhoods. The specific affected area highlighted is the neighborhood directly parallel to Marathon Oil Refinery. (Photo/Visual by CalEnviroScreen feature of the California Office of Environmental Health Hazard Assessment, 2018, retrieved July 7, 2020)

A summation of these intersecting vulnerabilities can be found below in Figure 15 which indicates that this neighborhood, in particular, boasts better health conditions than only 33.9% of other California neighborhoods (Public Health Alliance of Southern California 2018). These intersecting factors create a population of supremely vulnerable residents to the notorious greenhouse gasses emitted from refineries such as Marathon and Phillips 66 including but not limited to: Carbon Monoxide (CO), sulfur-oxides (SO_x) and Particulate Matter (PM) as well as competing motor emissions from nearby freeways (Allison & Mandler 2018). As a consequence these residents garner festering long term health issues from the constant exposure to these toxic emissions and simultaneously are provided with

no tools to even begin to understand the gravity of the situation they are being exposed to, thus allowing the situation to become insidious.

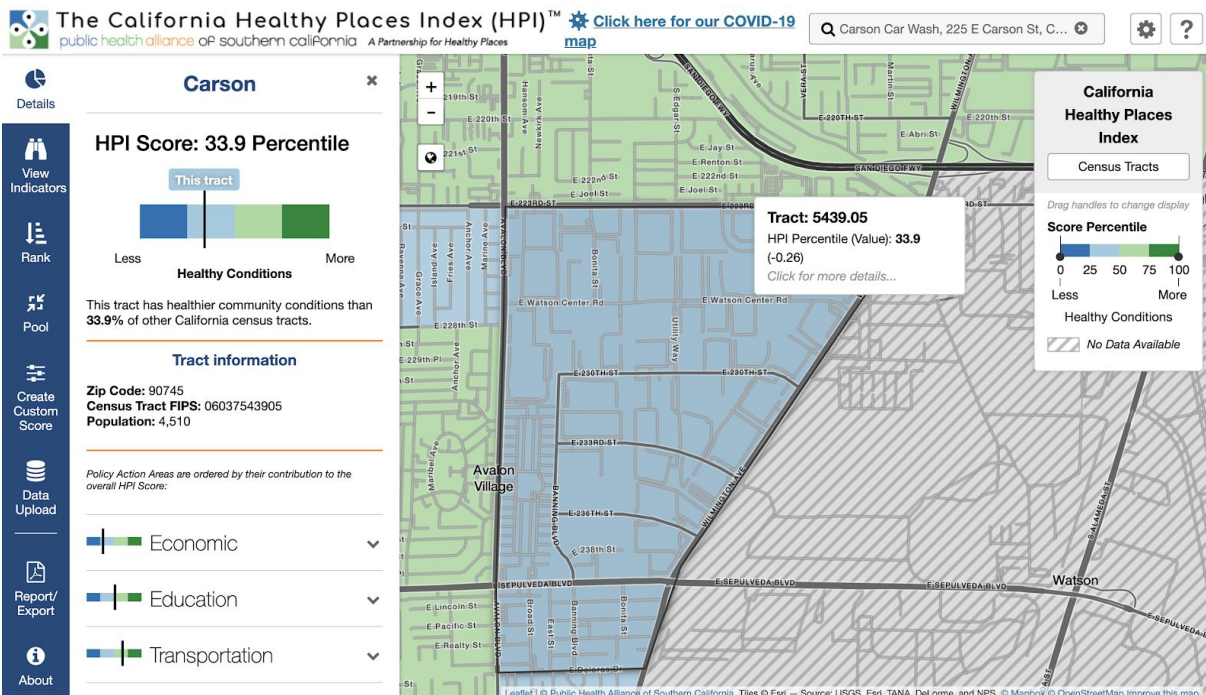


Figure 15. Healthy Places Index overall community health tracker for Carson, CA shows a clear disparity between parallel neighborhoods, the neighborhood highlighted in blue that directly borders Marathon Oil Refinery possesses healthier community conditions than only 33.9% of other California neighborhoods. (Screenshot by Ciara Hernandez, July 2020. *The California Healthy Places Index*, retrieved July 9th, 2020).

SECTION 4: Stakeholder Analysis [Rishab Sridhar]

The city of Carson has a variety of stakeholders, including both people who are and are not directly affected by pollution and slow disasters in that area. These stakeholders consist of people who have an influence over the environment through policy and actions, and it also consists of those who are directly affected by the pollution in Carson.

The primary stakeholders consist of people living near the oil refineries and plant workers as they both experience large amounts of pollution from these facilities. Dolores Linares, a woman from L.A. county who lives within a mile of three oil refineries, describes an asthma attack of her son: “He starts turning purple, and it’s like he’s going to faint” and that her family needs to move (Morris 2017). Due to the amount of pollution in Carson, many people have asthma and suffer from other health problems that are related to the number of pollutants these refineries release into the air. However, they find it difficult to express their concerns about this issue as they do not have a powerful influence on policies.

There are other stakeholders, which include workers that live in Carson, but may not live right next to refineries, such as teachers, hospital workers, and students. The population of Carson is 34.9% Latinx, 24.8% Black, and 24.4% Asian; of this, only 18.1% of Carson residents have four-year college degrees and have an income level of about \$70,000 (“Carson”). The people facing the harmful dangers of pollution in Carson are primarily minority and low-income residents. They believe that there should be more regulation of these corporations to reduce pollution in their city. While they have a similar perception as those who live next to refineries,

they may not experience the consequences as severely. The people of Carson want to live a life free of environmental health hazards, and they understand that not only are the corporations unwilling to place health over profits but also that the local and state government agencies are not doing enough to stop slow disasters in Carson.

Another group of stakeholders is the corporations that own refineries in Carson. Corporate stakeholders have not essentially nothing to help Carson reduce pollution. Oil refineries continue to pollute the air, but its effects are not present for the corporate stakeholders, but the people of Carson. In fact, there are two refineries in Carson, owned by Andeavor and Phillips 66; Andeavor is actually planning on merging the refineries in Carson and Wilmington, which could cause even more pollution in both cities (Mazza 2018). The corporations do not care about the pollution that they cause in Carson. Rather, they focus primarily on profits, and thus the health of the people of Carson is placed on a lower priority. Their perception of the issues of pollution and slow disasters is that they are not dangerous and pose no real threat to the individuals living in Carson. These corporations also have a large influence on policy because of lobbying and providing other community services, making it harder for residents to voice their opinions.



Figure 16. Los Angeles County environmental groups are outside advocating for more Green Zones and training low-income residents for community activism. (Photo by Matthew Rodriguez (CalEPA), Unknown Date, retrieved July 8, 2020)

Furthermore, another group of stakeholders is government agencies and local government. While they aren't directly affected by pollution, they still have influence over Carson in terms of policy and inciting change. Government agencies have implemented some programs that help people. For example, the South Coast AQMD has implemented programs in Carson to reduce pollution and the risks of slow disasters; notably, they created policies of air monitoring and a Community Emissions Reduction Plan to inhibit the polluting practices of oil refineries and other facilities ("Wilmington/West Long Beach/Carson"). While this would serve to benefit the people of Carson, it does not do enough to stop corporations from polluting the air. The government agencies must have a balance of environmental regulation, otherwise, they would suffer litigation from corporations. Thus, their perception of the problem is that the pollution should be stopped, but not at the

expense of large corporate profits; this directly harms the people of Carson as their own agencies do not put their health at paramount importance.

Fortunately, there are environmental groups that strive to promote the welfare of Carson. One environmental group that supports the people of Carson is the Communities for a Better Environment (CBE). In 2017, the CBE sued the SCAQMD for allowing a merger of the two oil refineries in Carson because the company failed to recognize the shipments of crude oil (Hardman 2018). These groups understand the problem, and they are working to give a voice to the people of Carson and urge lawmakers to take action against polluting corporations. In Figure 16, several environmental groups, including the CBE and the California Environmental Justice Alliance, are advocating for more Green Zones and are looking to train low-income residents in activism in their community (Rodriquez). These groups believe that bringing the community together and being active in advocacy would lead to a reduction of pollution in Carson. Their perception of the situation is that the health of the people of Carson is the priority, and they must work hard to get the resources to take legal action against government agencies or companies that fail to enforce or comply with environmental standards.

SECTION 5: Stakeholder Actions [Likang Te]

One action has been started with the South Coast Air Quality Management District is the Community Emissions Reduction Plan (CERP). This plan was implemented for several years beginning in late 2019. The purpose of this plan is to reduce air pollution emission and exposure to increase air quality. South Coast AQMD staff will provide information about this project to every stakeholder and track its progress (CERP 2019).

Before the implementation of the Community Emissions Reduction Plan (CERP), the South Coast Air Quality Management District showed the air pollution affected counties 10,743 square miles near the South Coast Air Basin. These cities include LA, Orange County, and San Bernardino (Morris, n.d). As Jim Morris noted in the article, a company in Carson called Andeavor, formerly Tesoro Corp, plans to merge its two refineries from Wilmington and Carson together to become the biggest crude-processing complex. A resident, Dolores Linares in Wilmington, and her family live in a two-bedroom apartment on East Sandison Street which is within a mile of three refineries clamor and belch. Her two younger sons have asthma but a 20-year-old son from a previous union does not. The air condition attacked her 8-year-old son and put him in the hospital and the youngest son always had a hard time breathing as "he starts turning purple, and it's like he's going to faint" (Morris n.d). Residents in Carson could be influenced by the effects of the crude-processing complex. Researchers showed that the shortness of breath and asthma can be caused by factors such as tobacco, smoke, mold, and diet but the respiratory condition acts as the most important factor.

Even though the 202 air quality report for Carson is not available right now, many companies under Tesoro Refining have been closed or resolved in Carson, Wilmington, and West Long Beach due to the air, chemical and water emissions

after the implementation of CERP.

There is an action that has not been done due to the emissions and chemical exposure concern. As CBS Los Angeles mentioned, the chemical company has toxic chemicals stored in their facility in Carson without a permit (see Figure 17). Lots of residents in Carson do not know how and why this chemical facility moved into the city. The concern is if the chemical spews from the facility, lots of stakeholders will get exposed because there are many community resources such as parks, elementary schools, and libraries near that facility. The nearest park is called Dolphin Park, where lots of visitors or families go for exercising. "They should not be operating today," Jesse Marquez said to the chemical facility with concerns of chemical exposure.

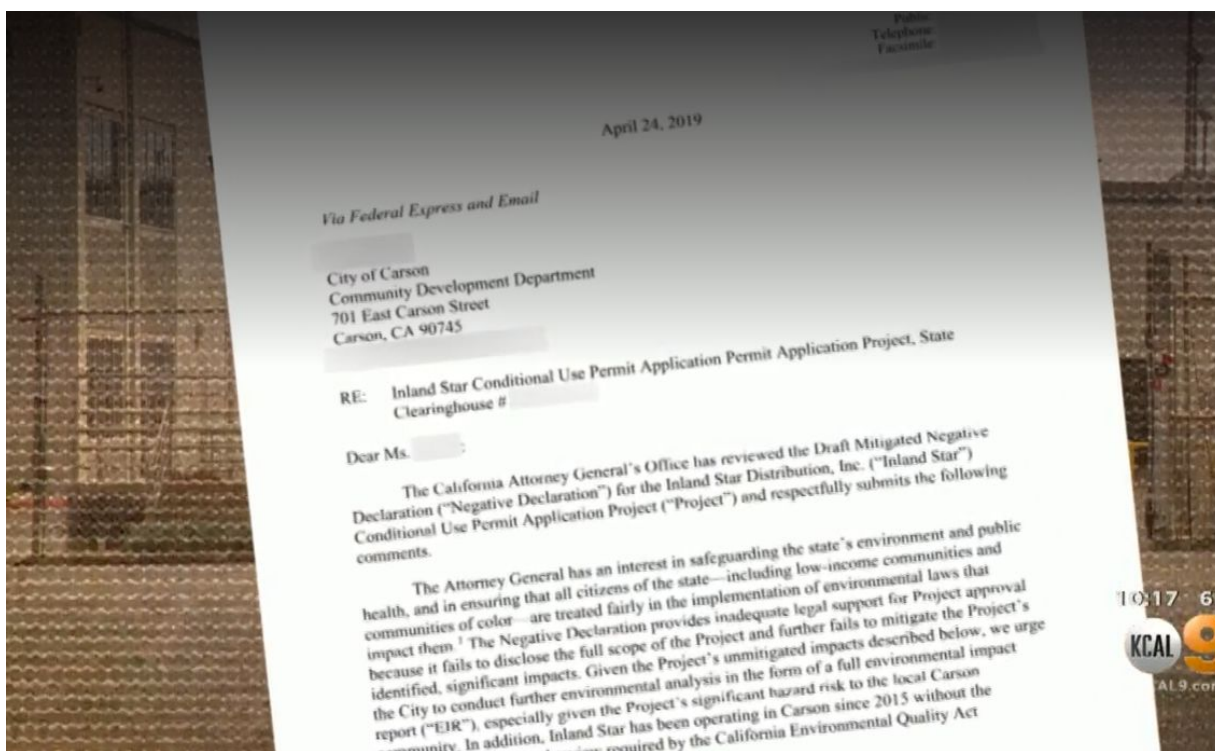


Figure 17. (Letter from city by CBS Los Angeles, 04/26/19, retrieved 07/09/2020)

As part of the stakeholders, this company should get a permit and notify the residents in Carson regarding the Chemical threats. the workers in this facility will suffer the most when the chemical spews out. This company has been open in California for 23 years with a permit but didn't notify the residents that they have toxic chemicals stored in the facility without a permit. The toxic chemical did not expose before does not mean it will not happen in the future. Residents have a right to stay away from exposure. On the other side, this facility is still handling at least two chemicals that are extremely toxic and dangerous to the resident's health.

SECTION 6: Role of Media and Big Environmental Organizations [JiJi Hamdan]

Carson has received a great amount of coverage on its refineries and environmental issues from major media outlets such as the LA Times, local newspapers like the Daily Breeze, national environmental organizations such as the Sierra Club, and local environmental groups like the Palos Verdes South Bay Group. Carson has high levels of air and water pollution that endanger public health and safety even today, and so ensuring that there is an abundance of media coverage on their environmental issues is extremely important. Through spreading awareness and information, this creates an opening for more support from other communities, the state of California, and even on a national level.


There are countless large and well-known media outlets present in Los Angeles County due to their large population. The most impactful of these media outlets is the LA Times, who has reported on Carson quite a few times over the years, but more so in February 2020 due to the massive fire at Carson's refinery. One of the articles regarding this accident discusses how residents have dealt with consistent upsets throughout the years from refineries and are concerned for their health and safety, but are provided with a lack of information on such refinery situations (Rust et. al 2020). Similarly, another LA Times article titled *Refinery Neighbors Are Used to Fires But the Carson Explosion Was 'Scary'* discusses how that same explosion in a Carson refinery affected the air quality in the community and how the refineries have been ordered to monitor air pollution levels (Money 2020). Other environmental issues within Carson have also been covered, such as the article *Toxic Soil Lurks Beneath Carson Neighborhood*, which describes how an old chemical plant in the neighborhood has caused benzene and other petroleum

products to leak into the soil and therefore has also leaked into Carson's groundwater, polluting the city's drinking water (Gottlieb 2010). Big media outlets such as the LA Times are essential in reaching a large crowd to bring attention to major environmental issues in the area and initiating change.

Local newspapers, such as the Daily Breeze, have also been effective in covering environmental injustices in the South Bay cities of Los Angeles County like Carson. For example, one Daily Breeze article titled *Environmentalists tell Phillips 66 of intent to sue over pollution concerns in Carson Wilmington* covers the actions taken by San Francisco's organization "Earthjustice" to address health concerns in Carson and other nearby communities. This article emphasizes how Earthjustice has been working to file a complaint on the Phillips 66 refinery due to how their VOC emissions have been endangering public health. Additionally, the news agency "Scope LA" explores the Southern Los Angeles Area in which Carson is situated by discussing the environmental injustices present in the area. For instance, one article titled *Between the 110 and the 405: Environmental Injustice in South Los Angeles* describes how the asthma hospitalization rates within the communities are one of the highest in the country and the importance of supporting local environmental groups to eliminate the environmental injustice in the area (SCOPELA 2017). Such articles play a significant role in gaining support from their communities and spreading awareness on various injustices to persuade people to do what they can to help.

In addition to media outlets, environmental organizations also play an important role in providing environmental activists and other community members to voice their concerns on environmental issues to spread awareness and take initiative to implement change. One major environmental organization in the nation is the Sierra Club, which aims to empower and educate the public on how to protect and restore environmental justice and influence public policy through activism and research. As seen in Figure 18, the Sierra Club covers Carson's 2020

refinery fire and also mentions how change must be made immediately to protect public health, especially seeing that Carson has had countless refinery fires in the past as well (McWhinney 2020). Furthermore, the article discusses how the Sierra Club's chapter, the Torrance Refinery Action Alliance (TRAA), and other organizations are working together to force local refineries to completely ban the use of MHF in their operations to save lives in the case of an explosion. In addition to sharing ways they are taking action, they provide readers with a platform to voice their thoughts on the situation and information on how they can take action, for example by making their voice heard through contacting the TRAA and other leaders for ways to help.



CARSON REFINERY EXPLOSION REIGNITES FEARS

Posted on 28 February 2020 By Will McWhinney

On Tuesday, February 25th, a major fire broke out at the Marathon Petroleum Refinery in Carson that was sparked by an explosion in one of their cooling towers. It raged out of control for six hours.

The refinery is the largest on the West Coast. As a result of the fire, the Los Angeles basin, home to millions of people, was filled with soot and harmful gases. The 405 Freeway had to be closed. Marathon Oil Corporation, which earned \$480 million in profit in 2019, claimed that ["no risk to the community has been identified"](#), despite the plumes of flames lighting up the night sky. Even after the uncontrolled fire was extinguished, the refinery engaged in emergency flaring of flammable gases, emitting particulate matter (soot), as well as harmful chemicals such as [SOx, NOx, and VOCs](#).

The South Bay, home to several large refineries, has [the worst air quality in the U.S.](#) Just last year, the Phillips 66 refinery in Carson was the site of [two accidents leading to fires](#).

LA County Fire Dept at Carson Refinery Explosion & Fire @LACoFDPIO

Figure 18. In this news article by the national environmental organization the Sierra Club, the writer Will McWhinney discusses the environmental risks to public health in Carson due to the city's massive refinery explosion in February 2020 (Photo by Jiji Hamdan, [Carson Refinery Explosion Reignites Fears](#), February 28, 2020, retrieved July 8, 2020)

Furthermore, local environmental groups in and near Carson, such as the Palos Verdes South Bay Group, have the power to meet together in real life to build a connection and discuss various environmental issues that impact their community. This environmental group is a smaller chapter within the Sierra Club that resides in Carson and other nearby cities. Their in-person meetings where they discuss environmental news, share their personal experiences with environmental injustice, and listen to presentations by guest speakers are especially powerful in providing the community with a safe place to voice their opinions and inspire them to want to make a change (Palos Verdes South Bay Group 2020). However, such local environmental organizations need to gain more public attention seeing that there are very few in the city and not much support for those that exist.

SECTION 7: Recommended Local Actions

[Cristabel Portillo]

There are several actions that could be taken in order to reduce environmental vulnerability and injustice in Carson, and it all starts with the community. After doing research, my peers and I found that there was no environmental justice (EJ) group that was founded in Carson, and that prioritizes Carson's environmental needs. We strongly believe that the most important local action that should be implemented is to create an environmental justice group in Carson. That's not to discredit the other EJ groups that have worked in alliance with Carson such as Communities for a Better Environment, EarthJustice, and East Yard Communities for Environmental Justice (EYCEJ). EarthJustice is a San Francisco organization that on behalf of EYCEJ (a Commerce based organization) intends to sue the Phillips 66 refinery that affects not only Carson but also surrounding cities. These EJ groups are suing Phillips 66 for the violation of the federal Clean Air Act (Figure 19), and emitting volatile organic compounds (VOCs) that place significant health burdens on the surrounding communities (Daily Breeze 2020).



Figure 19. Karla Perez, an East Yard Communities for Environmental Justice (EYCEJ) organizer walks through her community in Carson where Phillips 66 refineries pollute amidst the COVID-19 outbreak. EYCEJ and other EJ groups have notified Phillips 66, SAQMD, and US UPA about their intent to sue for violations of the federal Clean Air Act. (Photo by EarthJustice (courtesy of EYCEJ), May 13, 2020, retrieved July 8, 2020).

The support for Carson is appreciated, however, Carson can take action by creating its own environmental injustice group that will be able to prioritize its needs. Not only that, but this environmental group can inform and educate its own residents about the hazards, health threats, and safety measures that should be taken since they are in close proximity to multiple refineries. Through this group, it will encourage the community to disclose their concerns, questions, and measures that could be taken to promote a safer environment. Lastly, this is the highest-priority action since it would not only create a group that takes on its city's

environmental issues, it would also promote a sense of community bonding and togetherness that is needed for changes to take place.

Another local action that would be important is to re-elect or elect local politicians and city council members that acknowledge environmental issues and have plans to better it. An example of this is mayor Albert Robles who strongly stands with the residents of Carson. After the city attempted to sue Air Quality Management District (AQMD) for approving a joint refinery between Wilmington and Carson, the company offered \$45 million dollars for parks and road repair that the “cash-poor” city took and then later dropped the charges (Morris 2017). Robles stated that, “the settlement reflected the city’s lack of faith in officials who blessed the project,” and that he finds it “incomprehensible” that the regulatory body approved of the refinery in his overburdened city (Morris 2017). Mayor Robles also says “the time has come, for Carson to be treated fairly” after research showed that Carson brings in 5 million dollars in tax from multiple refineries while other cities bring in double the amount with a single refinery (Morris 2017).

Although this a setback, the mayor decided to counterattack by placing a measure on a ballot of increasing taxes on all of the petroleum operations in the city. With the \$45 million dollars the city received and the increase in tax money from the refineries, the city of Carson should have money to allocate for programs; even fund an environmental justice group.

Another local action that should take place is to publicize more and make known to residents about the air quality. Publication and more media coverage through local newspapers, TV news, and even the radio could motivate residents to take on their city’s environmental issues. An important factor to include is that the majority of Carson’s population is Hispanic or Latino, making the media coverage in Spanish would also allow residents who don’t speak English to acquire information.

Mayor Albert Robles has also been persistent about his residents being informed about the bad air quality that his city faces. He states that the city has been waiting decades for an air-quality monitoring system to be installed and recently, the city threatened to sue AQMD if they don't install pollution monitors on the Andeavor refinery (Mazza 2018). Robles has even said that he's willing to use the city funds to have the monitors installed immediately, as long as the refinery reimburses the city (Mazza 2018). If this action by the mayor is recognized more by the residents it might drive them to pressure the refinery, AQMD, and other government agencies to install the air quality monitoring system that they need. The city inhales many volatile organic compounds and other pollutants, if the community comes together they can get much done.

With the community getting together, perhaps an EJ group will emerge that will fight for pollution monitors to be installed and more. It's going to be extremely difficult to go against a big corporation, but even one environmental justice group can inspire the community that they have the power to demand that refineries regularly enforce laws and regulations that are put on them, or that government agencies frequently inspect their plant to ensure that they are following safety protocols.

SECTION 8: Recommended Extra-Local Actions

[Fariha Karim]

A city's environmental problems like Carson's affect not only Carson residents but also surrounding areas in similar situations, collectively adding to the environmental injustice of the state and even the country. Several California cities are included in the American Lung Association's top ten lists of U.S. cities contributing to the most particle pollution and ozone pollution in the country (American Lung Association 2020). As a highly polluted state, California needs to actively reduce overall environmental vulnerability by enforcing stricter regulations on pollution and mobilizing environmental voters. Furthermore, to directly support affected communities, community projects dedicated to relieving environmental burden should be state and federally funded.

Pollution at a state level needs to be regulated better in order to reduce the overall pollution of the country. California's Low Carbon Fuel Standard "currently requires a gradual reduction in carbon intensity of 10 percent" but this can easily be increased ("Scientists Say California Can Aim Higher On Clean Fuels" 2018). This can be done by promoting greener alternatives like electricity and renewable gas, possibly also expanding onto transportation options. The Clean Vehicle Rebate Project (CVRP) "rebates of up to \$7,000 for the purchase or lease" of eligible zero-emission vehicles in California ("About CVRP" n.d.). People are able to not only save money but also pollute less while driving. Programs such as CVRP should earn more support and promotion in efforts to increase the Low Carbon Fuel Standard.

Voicing community concerns to representatives and other policymakers is important in order to provide an idea of what problems representatives should

focus on. The best way to do this is for community members to vote on policy relevant to the environmental injustices they face on a daily basis. The main problem in this idea is the injustice most community members face when trying to vote. There are many roadblocks such as voter-ID requirements and the inability to take time off from work to vote that disproportionately affect many people of color (Newkirk 2018). Many highly polluted areas like Carson contain people of color who may also be forced to face these obstacles when voting, leading to voter turnout. The Environmental Voter Project is an organization aiming to increase environmental voter turnout in order to prioritize environmental issues for politicians to recognize (“Our Mission” n.d.). Voters often “rank environmental issues among their lowest concerns” so politicians tend to not give them the attention they need. An initiative like this can also help all voters of color overcome the obstacles they face when voting. By mobilizing all voters who prioritize environmental issues that impact them everyday, such as those in communities similar to Carson, politicians can more accurately gauge what issues to focus on.

The highest priority action to be taken is offering grants to polluted communities in efforts to directly support them. State and national organizations/agencies can involve and empower local residents to take part in reducing the environmental vulnerability in their area through grants. The U.S. Environmental Protection Agency (EPA) supported 5 community groups in California with environmental justice grants (Adamic 2019). These grants supported communities like Carson in projects dedicated to educating residents and relieving local economic burdens (Fig 20). Consistently providing these grants to several communities suffering from high pollution around the country will help relieve environmental injustices.



Figure 20. EPA awarded a \$5.86 million grant to 10 communities in Texas and New Mexico for water projects. The funds were distributed among communities to directly benefit the development and improvement of local water systems in a sustainably cost-effective way. The EPA can expand their outreach to more communities struggling with pollution like Carson. (Photo by North American Development Bank, October, 31, 2018, retrieved July 8, 2020)

SECTION 9: Recommendations for Future Research [Gerald Lee]

In searching for data and research to address environmental dangers, many immediately turn to view the air quality and the amount of pollutants in the air. Sites such as AirNow provide the Air Quality Index (AQI) scores for each pollutant, and AccuWeather provides the overall AQI score with the addition of viewing exactly how much pollutant is involved; both including information about Particulate Matter (PM) 10 and 2.5, Ozone, NO₂, SO₂, and CO (AirNow, AccuWeather). This kind of information is general and available to everyone, however, the information isn't useful for big generators of pollution such as the refineries. In order to understand how much the refineries are a threat to the environment, there needs to be information about exactly what is being emitted from the plant on a daily basis so that a correlation can be made to connect the refinery pollutants to the current air pollution. Thus research should be invested into gathering information about exactly what is being produced.

This leads to one issue: data tracking. This does not just apply to tracking pollution either, as shown by the record of the 2005 BP refinery explosion in Texas City. Despite 15 workers being killed in the accident, the Occupational Health and Safety Administration (OSHA) reports that there was "no death in that blast attributed to BP" (Lupkin 2010). To make matters worse, "not all fatal accidents are coded as accidents . . . [It] was coded as a "referral" on the record created the date it occurred" (Lupkin 2010). Not only is this poor recording on OSHA's end, but also poor reporting on the company's end, and making an extremely painful and long process to get data for worker's compensation. Considering this was reported by ProPublica in 2010, the expectation is that the reporting and recording system is more user friendly, right? Incorrect, as attempting to go to the OSHA records and

search for BP facilities in Texas resulted in only two citations, one labeled REFERRAL and the other UNPROG REL which means “Unprogrammed Related” and neither of which report has any detail about deaths, spills, or anything related to the impact of the event other than the amount of money paid (OSHA Search, OSHA Archives). This does however offer an opportunity to research how the data is recorded and accounted for. The quantitative research issue can be solved by providing reports that are better tracked, including numbers specific to what is being released (i.e. amount of different types of pollutants being sent out) and detailed recordings (i.e. what had spilled at what time, containment breach, employee records including their employers and job description details and transfers). With more reliable numbers, there can be more in depth comparisons to previous years and can be used to highlight the improvement or lack thereof of preventing pollution.

However, research also needs to be invested in the community; the people need to be educated and updated to ensure that they understand exactly what they are breathing and living in. The final location of research needs to be more qualitative, as this is simply surveying the community to see how this pollution has affected them in normal lives and opinions about the governments and refineries around them. It allows for ideas and proposals that appeal to a bigger set of people and makes clear on exactly what the people want from the government and big corporations. In order to produce a good qualitative study, both community citizens and government officials should be included so that a comparison can be made on how pollution is affecting their own mentality and actions (see Appendix 9). Participation will be solely voluntary, and being asked questions relating to their knowledge of the pollution around them, including asking what they believe is in the air, what they think pollution does to their everyday lives if at all, the technology they deal with to cope with the pollution, etc.

Notable focus groups would be asked these kinds of questions based on the quantitative data of community demographics. Those having respiratory conditions

such as asthma, those with cancer, and disadvantaged groups including those in low-income, fence line communities should be targeted since these groups are immediately affected by the pollution pouring out of the factories. In addition, more participant observation can be utilized by attending community meetings and taking note of the community's reaction to the proposals (see Figure 21). With this wide variety of views and opinions, the biggest obstacle will be organizing this information to produce an opinion-based set of data. This data is useful to many environmental activists, environmental justice groups, and health professionals so that they can tailor their method of information education better to fit the community. It also gives the city officials an understanding of what the community knows, and what the community wants from the local governments (see Appendix 9).



Figure 21. Community meetings such as these are important to gather public opinion data and are perfect locations for participant observation. (Photo by Maria Allard, May 14, 2019, retrieved by Gerald Lee July 8, 2020) Source:

<https://www.candgnews.com/news/town-hall-meetings-on-district-reconfiguration-process-continue-113345>

Another aspect of research can be what other communities are doing to help combat the spread of pollution. There are already some technologies in the making that can help prevent pollution, some that we already incorporate and strive to use more often. The use of Hydrogen Fuel Additives is one that benefits the consumer as well as the environment, as tests in recent years showed that its use "increases fuel efficiency, whilst reducing emissions of NO_x, PM, Hydrocarbons and Carbon Monoxide" (Howard 2016). One such Hydrogen additive is called Ezero1 by a company CGON, which "has shown reductions of 91.3% in PN . . . a 47.9% reduction of NO_x and a 50.6% reduction in NO₂" meaning that the amount of pollutants exiting from the car has been reduced "by up to 80% and offer fuel savings of up to 20%" (Automotive World 2017). Using this kind of data, a comparison can be made to current vehicular pollution to produce ideas similar to this one. Since this fuel cell has been released in 2017, its application has been broadened into hydrogen fuel cell power plants which produce "190 megawatts (MW) of (net summer) electric generation capacity" from hydrogen taken from landfill gas at a zero-emission result (EIA 2020). Not only could this information push for plants and factories to use hydrogen power cells but also for transitioning vehicles to a more healthy and efficient mode of transport.

SECTION 10: Injustice Analysis [Emil Zublin]

In my view, what is ethically wrong and unjust in this case is the proximity of most of these oil refineries and drills compared to the neighborhoods. The children of these neighborhoods have to grow up their entire lives with only a 10-minute walk separating them from the source of pollution. In Wilmington, a community that is only a couple miles from Carson, some oil wells are only 1,500 feet from schools and homes (Hardman, 2018). An example of this proximity is seen in Figure 22, where a large field of fuel tanks sits just behind a local neighborhood (Figure 22). This is very concerning because the long term effects of the exposure of these polluting chemicals will not be good for these children's health. Along with the children, air pollution will also affect those with predisposed breathing issues and the elderly. According to data provided by the CHHS, the asthma hospitalization rates for Los Angeles County for the total population was 5.5 cases per 10,000 residents in 2017 (CHHS). Compare that to the black population and their cases were 14.6 per 10,000 residents. This fact outlines the health and racial injustices in the greater LA County area, which includes Carson.



Figure 22. The photo shows the alarming proximity of a field of fuel tanks relative to local neighborhoods and how easily pollution can leak into neighborhoods by simply being near them. It outlines the injustices that Carson faces by the oil refineries and how they are negatively impacting the residents' health. (Photo by Axiom Images, 2/4/2013, retrieved July 8, 2020)

Source: https://www.axiomimages.com/aerial-stock-footage/view/AX0017_008

Another thing that is ethically wrong and unjust is how certain governmental agencies disregard or ignore the concerns of the community. In 2017, the South Coast Air Quality Management District accepted a project that would combine a Tesoro oil refinery in Carson with the Wilmington refinery, disregarding the concerns voiced by community members and even city officials (Valdez, 2017). In fact, Wayne Nastri, the head of the current AQMD Executive Officer, was a former industry consultant, working closely with the people who pollute our cities in the name of profits (Barboza, 2016). This is an example of epistemic injustice, where the AQMD forsake the people's concerns, knowing full well what it could mean for

their health if they greenlit the refinery merger. The government's main responsibility should be to protect the people, and if that means they have to give up some profits, then they should by all means. The disregard for public health in favor of economics and business shows the dangers of misguided government. These factors might go to show that the governmental agencies seem to not be working in the best interest of the people and that is ultimately unjust.

In addition to ignoring the community members, an AQMD study found that local refineries were severely underreporting the volume of emissions from their facilities (Guerin, 2016). The fact that the AQMD knows that the refineries are under-reporting their emissions, yet still allowed the merging project to be completed is a travesty to the people of the community, who will never know if the companies are being truthful, or if they are leading to a decreased quality of life. This is an example of data injustice because the community is not being allowed to access correct data, which could lead to their worries being undermined.

The Carson and Wilmington refineries contribute 32% of the total VOCs (Volatile Organic Compounds) in the South Bay area, according to Earthjustice, an environmental advocacy group based in San Francisco (Daily Breeze, 2020). The group also states that these VOCs are dangerous to humans and can significantly impact their lung capacity and irritate asthmatics. In addition to the effects of VOCs, a Korean study found that VOCs also can significantly negatively affect the birth weight of newborns (Chang et al., 2011). This is an example of reproductive injustice because the low birth weight of babies born in Carson might be indicative of future health complications. The air quality is dangerous to birthing mothers and newborns.

All these injustices encompass a wide range of varying causes and effects, but one thing is clear: We cannot allow these injustices to exist any longer. In a time

of unprecedented technological momentum and social change, we have the means to end the problems. Sadly, the only thing holding us back to solve the issues is ourselves. But, there is hope as progress is being made everyday and we are creeping closer and closer to true environmental justice across the globe. We must keep fighting for the right to clean air, so we can live healthier lives, can raise our children without worry, and to leave a positive impact on the planet for generations to come.

BIBLIOGRAPHY

"About CVRP." Clean Vehicle Rebate Project. Accessed July 8, 2020.

<https://cleanvehiclerebate.org/eng/about-cvrp>

AccuWeather. "United States Weather > Carson, CA, Air Quality" *AccuWeather*.

Accessed July 8, 2020.

<https://www.accuweather.com/en/us/carson/90745/air-quality-index/332067>

Adamic, Denise. "Five California community groups receive EPA environmental justice grants." EPA.

<https://www.epa.gov/newsreleases/five-california-community-groups-receive-epa-environmental-justice-grants>

AirNow. "Current Air Quality, Carson CA" *EPA and Partners*. Accessed July 8, 2020.

<https://www.airnow.gov/?city=Carson&state=CA&country=USA>

Allison, E., and B. Mandler. "Air Quality Impacts of Oil and Gas Emissions from Production, Processing, Refining, and Use." *American Geoscience Institute*, 2018.

American Lung Association. "Nearly half of US breathing unhealthy air; record-breaking air pollution in nine cities." *EurekAlert*. April 21, 2020.

https://www.eurekalert.org/pub_releases/2020-04/ala-nho041720.php

Automotive World. October 10, 2017. "CGON: New hydrogen additive technology slashes engine emissions by up to 80% and increases fuel efficiency by up to 20%" *Automotive World*. Accessed July 7, 2020.

<https://www.automotiveworld.com/news-releases/cgon-new-hydrogen-additive-technology-slashes-engine-emissions-80-increases-fuel-efficiency-20/>

California Healthy Places Index Map. Accessed July 9, 2020.

<https://map.healthyplacesindex.org/>.

Carson, California Oil Refinery Map Health & Safety Issues . (n.d.). Retrieved July 09, 2020, from <https://www.refinerymaps.com/Carson.html>

"Carson, California." Accessed July 8, 2020.

<http://www.city-data.com/city/Carson-California.html>.

"Carson, California Oil Refinery Map Health & Safety Issues . (n.d.). Retrieved July 09, 2020, from <https://www.refinerymaps.com/Carson.html>

"Carson, California Population 2020." Carson, California Population 2020 (Demographics, Maps, Graphs). Accessed July 7, 2020.

<https://worldpopulationreview.com/us-cities/carson-ca-population/>.

"Carson." Los Angeles Times. Los Angeles Times. Accessed July 7, 2020.

<http://maps.latimes.com/neighborhoods/neighborhood/carson/>.

CBS Los Angeles. (2019, April 26). Concern Raised By Warehouse In Carson That Contains Toxic Chemicals. Retrieved July 08, 2020, from <https://losangeles.cbslocal.com/2019/04/26/concerned-raised-by-warehouse-in-carson-that-contains-toxic-chemicals>

Chang, Moon-Hee, Eun-Hee Ha, Hyesook Park, Mina Ha, Young Ju Kim, Yun-Chul Hong, Yangho Kim, et al. "The Effect of VOCs Exposure During Pregnancy on Newborn's Birth Weight in Mothers and Children's Environmental Health (MOCEH) Study." *Epidemiology* 22, no. 1 (January 2011): S162.

<https://doi.org/10.1097/01.ede.0000392172.64135.11>

CHHS Open Data. "Asthma Hospitalization Rates by County - Asthma Hospitalization Rates by County - California Health and Human Services Open Data Portal." Accessed July 8, 2020.

<https://data.chhs.ca.gov/dataset/asthma-hospitalization-rates-by-county/resource/96a383fc-2aa5-4c3c-beed-64d9c010b55d>

City News Service. "Environmentalists tell Phillips 66 of intent to sue over pollution

concerns in Carson, Wilmington." Daily Breeze. April 29, 2020.

<https://www.dailybreeze.com/2020/04/29/environmentalists-tell-phillips-66-oil-intent-to-sue-over-pollution-concerns-in-carson-wilmington/>

Community Emission Reduction Plan. (n.d.). Retrieved July 09, 2020, from

<http://www.aqmd.gov/nav/about/initiatives/community-efforts/environmental-justice/ab617-134/wilm/cerp-docs>

"Coronavirus/COVID-19." City of Gardena, July 8, 2020.

<https://www.cityofgardena.org/coronavirus-covid-19/>

"Coronavirus(COVID-19) Update," 2020. <http://ci.carson.ca.us/coronavirus.aspx>

"Educational Attainment." oehha.ca.gov, 2018.

<https://oehha.ca.gov/calenviroscreen/indicator/educational-attainment>

Gottlieb, Jeff. 2010. "Toxic Soil Lurks beneath Carson Neighborhood." Los Angeles Times. Accessed July 7, 2020.

www.latimes.com/archives/la-xpm-2010-apr-27-la-me-carousel-shell-20100427-story.html

Groeger, Lena, et al. 2017. "Bombs in Your Backyard." ProPublica. ProPublica.

November 30. <https://projects.propublica.org/bombsking-water/602769>.

Guerin, Emily. "LA Refineries Underreport Toxic Chemical Emissions, Study Says."

Southern California Public Radio, 54:03 800.

<https://www.scpr.org/news/2016/12/29/67663/la-area-refineries-emit-up-to-12-times-more-toxic/>

Hardman, Jesse. "A New Generation of Activists, Born next to an Oil Refinery." High Country News – Know the West, March 7, 2018.

<https://www.hcn.org/articles/pollution-a-new-generation-of-activists-born-next-to-an-oil-refinery>.

"Housing Burden." oehha.ca.gov, 2018.

<https://oehha.ca.gov/calenviroscreen/indicator/housing-burden>

Howard, Richard. May 5, 2016. "6 New Technologies Which Could Improve Urban Air Quality" *Policy Exchange*. Accessed July 7, 2020.

<https://policyexchange.org.uk/6-new-technologies-which-could-improve-urban-air-quality/>

Lead poisoning and health. (n.d.). Retrieved July 09, 2020, from

<https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health>

"Linguistic Isolation." oehha.ca.gov, 2018.

<https://oehha.ca.gov/calenviroscreen/indicator/linguistic-isolation>

Lupkin, Sydney. 2010. "Why Tracking BP Worker Deaths Is Tricky" *Propublica*. Accessed July 8, 2020.

<https://www.propublica.org/article/why-tracking-bp-worker-deaths-is-tricky>

Mazza, Sandy. 2018. "Carson to air quality regulators: Install pollution monitors near Andeavor refinery or face lawsuit." *Media News*. Daily Breeze. November 21.

<https://www.dailybreeze.com/2018/02/07/carson-to-air-quality-regulators-install-pollution-monitors-near-andeavor-refinery-or-face-lawsuit/>

McWhinney, Will. 2020. "Carson Refinery Explosion Reignites Fears." Sierra Club Angeles Chapter. Accessed July 8, 2020.

angeles.sierraclub.org/news/blog/2020/02/carson_refinery_explosion_reignites_fears.

Money, Luke. 2020. "Refinery Neighbors Are Used to Fires. But the Carson Explosion Was 'Scary'." Los Angeles Times. Accessed July 7, 2020.

www.latimes.com/california/story/2020-02-26/carson-refinery-fire-nearly-con

[tained-as-crews-get-a-handle-on-blaze](#)

Morris, Jim. "The Fear of Dying' Pervades Southern California's Oil-Polluted Enclaves." The Center of Public Integrity. October 30, 2017.

<https://publicintegrity.org/environment/the-fear-of-dying-pervades-southern-californias-oil-polluted-enclaves/>

"National Environmental Public Health Tracking Network - CDC - Info By Location External." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention. Accessed July 8, 2020.

<https://ephtracking.cdc.gov/showInfoByLocationExt.>

"NativeLand.ca." Native. Accessed July 8, 2020. <https://native-land.ca/>.

Newkirk, Vann. "Voter Suppression Is Warping Democracy." The Atlantic. July 17, 2018.

<https://www.theatlantic.com/politics/archive/2018/07/poll-prri-voter-suppression/565355/>

Occupational Safety and Health Administration. "Establishment Search Results" *United States Department of Labor*. Accessed July 8, 2020.

https://www.osha.gov/pls/imis/establishment.search?p_logger=1&establishment=BP&State=TX&officetype=all&Office=all&sitezip=&p_case=all&p_violations_exist=all&startmonth=07&startday=08&startyear=2009&endmonth=07&endday=08&endyear=2011

Occupational Safety and Health Administration. "OSHA Field Inspection Reference Manual CPL 2.103 Section 5 - Chapter I. Pre-Inspection Procedures" *United States Department of Labor*. Accessed July 8, 2020.

https://www.osha.gov/Firm_ose_data/100005.html

"Our Mission." Environmental Voter Project. Accessed July 8, 2020.

<https://www.environmentalvoter.org/our-mission>

Palos Verdes South Bay Group. 2020. "Group Meetings." Sierra Club Angeles Chapter. Accessed July 8, 2020.

[angels.sierraclub.org/palos-verdes-south-bay-group/group-meetings.](https://www.sierraclub.org/palos-verdes-south-bay-group/group-meetings)

"RMP Facilities." 2020. *The Right To Know Network*. The Right To Know Network. Accessed July 06.

[https://rtk.rjifuture.org/rmp/location_search/search_by_location/?city=&county=Los+Angeles&state=CA.](https://rtk.rjifuture.org/rmp/location_search/search_by_location/?city=&county=Los+Angeles&state=CA)

Rodriguez, Matthew. "Major Accomplishments 2011-2018." California Environmental Protection Agency. Accessed July 8, 2020.

[https://calepa.ca.gov/wp-content/uploads/sites/6/2019/03/CalEPA_Accomplishments_Report_2011-2018_a.pdf.](https://calepa.ca.gov/wp-content/uploads/sites/6/2019/03/CalEPA_Accomplishments_Report_2011-2018_a.pdf)

Rust, Susanne, Tony Barboza. 2020. "Fire exploded from part of Carson refinery recently cited for workplace safety issues." LA Times. Accessed July 8, 2020.

<https://www.latimes.com/environment/story/2020-02-27/carson-refinery-fire-california-workplace-safety-violations#:~:text=The%20fire%20that%20broke%20out,Cal%2FOSHA%20officials%20confirmed%20Thursday.&text=Cal%2FOSHA%20fined%20the%20company%20%243%2C000%2C%20%24750%20for%20each%20violation>

"Scientists Say California Can Aim Higher On Clean Fuels." Union of Concerned Scientists. March 21, 2018.

<https://www.ucsusa.org/about/news/california-can-aim-higher-clean-fuels>

SCOPELA. 2017. "Between the 110 and the 405: Environmental Injustice in South Los Angeles." Accessed July 8, 2020.

<http://scopela.org/between-the-110-and-the-405-environmental-injustice-in-south-los-angeles>

"Southern California Air Board Appoints Executive, Declines to Reconsider Beach Bonfire Rules - Los Angeles Times." Accessed July 8, 2020.

<https://www.latimes.com/local/lanow/la-me-ln-air-board-executive-20161202-story.html>

“Sulfur Dioxide” 2020. *The American Lung Association*. The American Lung Association. Accessed July 06.

<https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/sulfur-dioxide>

“Tribal History.” Gabrielino. Accessed July 9, 2020.

<http://www.gabrielinotribe.org/historical-sites-1/>.

U.S. Energy Information Administration. January 21, 2020. "Hydrogen explained, Use of hydrogen" *Independent Statistics and Analysis U.S. Energy Information Administration*. Accessed July 7, 2020.

<https://www.eia.gov/energyexplained/hydrogen/use-of-hydrogen.php>

Valdez, Lauren. “AQMD Approves Tesoro Project, Activists and Elected Officials Continue Opposition – Wilmington Wire.” Accessed July 7, 2020.

<https://www.wilmingtonwire.com/aqmd-approves-tesoro-project-activists-and-elected-officials-continue-opposition/>

“U.S. Census Bureau QuickFacts: Carson City, California; United States.” Census Bureau QuickFacts. Accessed July 8, 2020.

<https://www.census.gov/quickfacts/fact/table/carsoncitycalifornia,US/PST045219>.

“Volatile Organic Compounds.” 2020. *The American Lung Association*. The American Lung Association. Accessed July 06.

<https://www.lung.org/clean-air/at-home/indoor-air-pollutants/volatile-organic-compounds>

“What Is Anhydrous Ammonia?” 2013. *CNN*. Cable News Network. April 18.

<https://www.cnn.com/2013/04/17/us/anhydrous-ammonia-dangers/index.html>

[ml.](#)

"Wilmington/West Long Beach/Carson." AB 617 - 2018-Designated Communities. South Coast AQMD. Accessed July 7, 2020.

<http://www.aqmd.gov/nav/about/initiatives/community-efforts/environmental-justice/ab617-134/wilm>.

Xie, Yuxuan, et al. 2019. "Interactive Map: Lead Levels Found in California Schools Drinking Water." *EdSource*. EdSource. May 16.

<https://edsource.org/2018/interactive-map-lead-levels-found-in-california-schools-drinking-water/602769>.

(n.d.). Retrieved July 09, 2020, from

<https://www.bestplaces.net/health/city/california/carson>

FIGURES

Fig. 1 MAP OF COMMUNITY

Fig. 2 INTERDISCIPLINARY ENVIRONMENTAL INJUSTICE CASE STUDY QUESTIONS

Fig. 3 EPA EJSCREEN: COMMUNITY PARAMETERS

Fig. 4 EPA EJSCREEN: DEMOGRAPHIC DATA

Fig. 5 MAP OF COMMUNITY GARDENS

Fig. 6 MAP OF PUBLIC INTERNET ACCESS

Fig. 7 EJSCREEN HAZARDOUS WASTE & REPORTING SITES

Fig. 8 LEAD LEVELS

Fig. 9 BOMBS IN YOUR BACKYARD

Fig. 10 FREEWAY PROXIMITY

Fig. 11 CALENVIROSCREEN 3.0: PM 2.5

Fig. 12 EPA EJSCREEN INDEX BAR GRAPH

Fig. 13 CALENVIROSCREEN 3.0: Linguistic Isolation

Fig. 14 CALENVIROSCREEN 3.0:Housing Burden

Fig. 15 HPI INDEX: HEALTHCARE ACCESS

Fig. 16 COMMUNITY ORGANIZING

Fig. 17 STAKEHOLDER ACTIONS

Fig. 18 EIJ IN THE NEWS

Fig. 19 LOCAL ACTIONS 1

Fig. 20 LOCAL ACTIONS 2

Fig. 21 NEEDED QUALITATIVE RESEARCH

Fig. 22 MANY FORMS OF INJUSTICE

APPENDIX

Appendix 1: SKETCH: Community Assets

Eij COMMUNITY ASSETS SKETCH		
<p>In this sketch, list and describe assets in your community (including people, organizations, social networks, technical infrastructure, public spaces, etc) that can be leveraged to solve problems and develop effective pathways for community development. Community assets include libraries, schools and other community spaces, the skills of the people in the community, and their infrastructure (Internet connectivity, transportation, etc). The history of a community can also be an asset, especially if people actively recall it. For ideas, see this University of Memphis resource. For data, see the Civic Data Resources curated for this class.</p>		
Asset	Data source	How is this a community asset?
History	https://ci.carson.ca.us/AboutCarson/History.aspx	In the early 20th century, Oil Refineries invaded the city and took over the economy. Understanding of this social contract between the people and companies will allow people to understand that they are indeed receiving the short end of the stick.
Community Gardens	LA Garden Council	Community Gardens promote togetherness and community strength. This is essential when going up against a corporation who would seek to have the public divided on topics such as the benefits of factories.
Public Internet	LA County Public Wifi Map	The ability to spread ideas, awareness, and personal narratives on an accessible platform gives people a unique perspective on their community around them
Planned Parenthood Clinics	Do a google search	Access to healthcare, especially in working class areas, is an essential. Not being discriminated against for income levels the playing field in many terms.
PrEp Assistance	California	Helping people get access to the coverage they

Program: Clinical Providers and Enrollment Sites	State Geoportal PrEP support	need will help people know that converting from fossil fuels to clean energy won't cost them their lives.
Bookshops & Union Halls	Indie Map Book Web	Both give a safe space for meeting and gathering information around their community. Understanding a community's history, and seeing how best to approach a problem takes strategizing and teamwork, both provided by these assets.
Local Libraries	LA County Library	

Appendix 2: SKETCH: Environmental Hazards

EIJ COMMUNITY ENVIRO-HAZARDS SKETCH		
<p>In this sketch, list and provide evidence for diverse environmental hazards in your community. Identify and provide evidence for at least five sources of environmental hazards. For ideas, see the Civic Data Resources curated for this class and to support movements for environmental justice. The items in the chart below are examples that you can build on (but you don't have to).</p>		
Hazard type	Data source	Community data
worst-case scenarios	https://rtk.rjifuture.org/ https://ejscreen.epa.gov/mapper/	There are 14 RMP facilities with 5.4 facilities per km in the area, placing it in the 97th percentile in the state nationally
(legal) toxic releases	https://rtk.rjifuture.org/)	There are 44 TRI facilities within 10 miles of Carson, with approximately 10 to 20 of them producing hundred thousand to million or more than a million pounds released
vehicle pollution (air pollution)	https://www.airnow.gov/?city=Carson&state=CA&country=USA https://ejscreen.epa.gov/mapper/	The air quality is a moderate 66 on the Air Quality Index. With 5800 daily vehicles/meters distance placing it in the

		97th percentile in the state
ground-level ozone (air pollution)	https://ejsscreen.epa.gov/mapper/	The ozone level is 41.3 ppb placing it in the 35th percentile nationally and 26th in the state.
particulate matter (PM 2.5) (air pollution)	https://ejsscreen.epa.gov/mapper/	The PM 2.5 level is 11.4 ug/m3 placing it in the 96th percentile nationally and 69th in the state.
lead in drinking water	Lead Levels for California Schools	Caroldale Learning Community has 25.2 ppb, which is above lead limits and requires action immediately. Most schools have a lead range between 5.1 to 15 which can be harmful, only three schools have safe lead levels
Military waste	Bombs in your backyard	Near the Torrance Unified School District, there used to be the Naval Material Redistribution and Disposal Center
Air Quality	American Lung Association	Air Quality is horrendous as they have grade of F in their Ozone, Particle Pollution 24-hour, and the Particle Pollution Annual
How close do you live to a freeway?	LA Times Freeway Maps	900 feet meaning it is extremely hazardous to the resident's health

Appendix 3: SKETCH: Compound Vulnerabilities

EIJ Intersecting Vulnerabilities Sketch

In this sketch, list and provide evidence for diverse stresses and vulnerabilities in your community that likely intersect and compound with the stresses of environmental health hazards. Identify and provide evidence for at least five sources of stress and

vulnerability. For ideas, see these lists of [social determinants of health](#). [CITY DATA](#) also has useful indicators. The items in the chart below are examples that you can build on (but you don't have to).

Community stressor	Data source	Evidence of community stress
COVID-19 rates	City of Carson Website City of Gardena Website Los Angeles County total COVID numbers LA County Undocumented Resident Data	<p>Carson currently has 750 reported cases of COVID and a resulting 30 deaths from this figure. Though this is a small chunk of the 123,000 reported cases in LA county it is much lower than the neighboring city of Gardena which reported only 583 cases to date. However, LA county is home to 1.1 million undocumented residents, who may fear seeking medical attention in these contentious times and thus this number could be much higher.</p>
<p>police Killings</p>	LA Times Police Killings Database Darrick Maurice Collins	<p>There is not much data regarding officer involved shootings specifically in Carson. However, Carson does not employ their own police station and instead uses the Los Angeles County Sheriff's Department who is notorious for their flagrant use of excessive and deadly force. More specifically, troubling instances are reported such as the 2009 murder of Darrick Maurice Collins, who was only 36 when he was shot and killed by police. Sheriffs mistook Collins for a robbery suspect and shot him running up his own</p>

		<p>driveway when the officer claimed he reached into his waistband. Collins was unarmed. Having a police presence such as the ones routinely attributed to Los Angeles, especially South-East Los Angeles, where Carson sits, is a compounding factor for any POC resident. As stated previously POC make up a majority of Carson residents.</p>
Linguistic Isolation	CalEnviroScreen	<p>According to CalEnviroScreen Carson had a higher percentage of households that do not speak English well than 73% of the rest of California, specifically in the fence line zone of Marathon Oil Refinery. This is incredibly telling in that there is clearly somewhat of a language barrier in Carson that contributes to their vulnerability. Especially considering that the leading foreign language spoken is Tagalog. It is commonplace to see dual messages regarding COVID-19 and environmental stressors in English and Spanish. However, Tagalog is a much less underrepresented language meaning that these Carson residents are particularly vulnerable to aforementioned emissions due to the fact that a lot can get lost in translation, or lack thereof.</p>
Housing Burden	CalEnviroScreen	The housing burden feature

		<p>of CalEnviroScreen allows us to see the interaction between those that are considered both low income and are severely burdened by housing costs (50% or more contribution of wages). In some areas of Carson their percentile ranked 76%, this translates to being severely burdened by housing costs more than 76% of other Californians. In this particular area of Carson, it is no coincidence that the neighborhood afflicted with the highest housing burden again directly neighbors Marathon Oil Refinery.</p>
<p>Educational attainment</p>	<p>CalEnviroScreen</p>	<p>Again, according to CalEnviroScreen in the neighborhood that directly parallels the Marathon Oil Refinery 34% of adults in this neighborhood have less than a high school education. This places this neighborhood at a staggering 80th percentile, translating to this low level of educational attainment surpassing 80% of other California residents. This can directly translate to a lack of higher education, which in LA County is where curriculum centered around environmental issues starts to become more relevant, thus translating to a lack of exposure and information.</p>

Appendix 4: SKETCH: Stakeholder Analysis

Stakeholder Analysis Sketch		
<p>In this sketch, list diverse environmental injustice stakeholders in your community in the center column. In the left column, list catalysts -- things (money, honorable reputation, etc) that <i>enable</i> this stakeholder group to get what they want. In the right column, list corrosions -- things (lack of money or status, youth, gender, poor organizational skills) that <i>undermine</i> this stakeholder group's capacity to get what they want. In sketching this, you quickly draw out who has power, who doesn't and where change might be possible (or difficult).</p>		
"catalysts"	stakeholders	"corrosions"
money, some political influence	Andeavor company	reputation
motivation	People of Carson	political power, difficult to organize, resources
resources, reputation, can threaten litigation	Communities for a Better Environment	political power
first-hand experience of facility practices	Refinery workers	difficult to organize and speak against employers
motivation, cares about the community	Youth protesters	Age, resources, political power
can enforce local environmental regulation	South Coast AQMD	very lenient on corporations, poor reputation
enforces state-wide environmental regulation	California EPA	poor reputation of enforcement

Appendix 5: SKETCH: Stakeholder Actions

Eij Stakeholder Action Sketch

Building from the "Stakeholder Analysis" Sketch, use this sketch to list stakeholders in environmental injustice in your community, their actions, and their failures to act. This sketch may be difficult to complete. Fill in at least five stakeholders and as many of the other boxes as you can.

Stakeholder	What actions have this stakeholder taken to address environmental injustice in this community?	What actions have this stakeholder NOT taken to address environmental injustice in this community? (Provide evidence)
South Coast Air Quality Management Direct	Implement the Community Emissions Reduction Plan (CERP)	Did not educate residents in Carson about the protection from the emissions.
TESORO REFINING	Closed many companies in Carson due to the Air, water, oil, emission.	Fail to provide information to residents about the air and oil exposure.
Residents in Carson	Report the Chemical threats to the City Council.	Did not form organization for the particular Chemical threats in the community
CBS Los Angeles	Report the Chemical threats to the Carson residents by social media(news).	Did not follow up the Chemical threats in 2020.
Carson City Council	Notice the residents by providing the city letter of the chemical companies which have toxic chemical stored.	Form campaign to educate residents about the importance of air quality.

Appendix 6: SKETCH: Media & Enviro Org Coverage

EIJ MEDIA & ENVIRO-ORG COVERAGE SKETCH

Use this sketch to assess the coverage your community has received from big media and environmental organizations. Include the LA Times in your search, and at least five large environmental organizations from [this list](#) (selecting the most likely ones for your search). Also include local media outlets and environmental organizations if you can find information about these. For each media or environmental organization, identify a series of articles they have published or actions they have taken in different years over the last decade.

Also analyze how Wikipedia covers your community. Check to see if environmental hazards and problems are mentioned in the Wikipedia article about your community. Also check the "talk" tab to see if readers have discuss environmental problems.

MEDIA OR ENVIRO-ORG: LA Times

Url: <https://www.latimes.com/>

- **YEAR:** 2020 **ARTICLE or ACTION:** "Refinery Neighbors Are Used to Fires. But the Carson Explosion Was 'Scary'"
- **YEAR:** 2010 **ARTICLE or ACTION:** "Toxic Soil Lurks beneath Carson Neighborhood"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Fire exploded from part of Carson refinery recently cited for workplace safety issues"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Large Fire Reported at Carson Refinery Temporarily Closes 405 Freeway"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Carson Refinery Fined for Workplace Safety Before Fire"

MEDIA OR ENVIRO-ORG: Daily Breeze

url: <https://www.dailybreeze.com/>

- **YEAR:** 2020 **ARTICLE or ACTION:** "Environmentalists tell Phillips 66 of intent to sue over pollution concerns in Carson, Wilmington"
- **YEAR:** 2018 **ARTICLE or ACTION:** "Carson to air quality regulators: Install pollution monitors near Andeavor refinery or face lawsuit"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Carson Marathon refinery cited in past for safety violations"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Carson refinery fire could cause gas prices to spike, underscores safety hazards"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Activists call for state investigation into use of toxic chemical at two South Bay refineries"

MEDIA OR ENVIRO-ORG: Sierra Club

url: <https://www.sierraclub.org/>

- **YEAR:** 2014 **ARTICLE or ACTION:** "Climate Change Rally: Hands Across the Harbor in L.A."
- **YEAR:** 2013 **ARTICLE or ACTION:** "EPA Begins Groundwater Remediation Project for DDT Superfund Sites"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Carson Refinery Explosion Reignites Fears"
- **YEAR:** 2020 **ARTICLE or ACTION:** "Palos Verdes South Bay Group"

MEDIA OR ENVIRO-ORG: Earth Island

url: <https://www.earthisland.org/journal/index.php/>

- **YEAR:** 2013 **ARTICLE or ACTION:** "Only a Moratorium on Fracking Will Help Protect California, say Green Groups"

MEDIA OR ENVIRO-ORG: National Resource Defense Council

url: <https://www.nrdc.org/>

- **YEAR:** 2014 **ARTICLE or ACTION:** "Coast to Coast, Legislation Protecting Communities Gains Momentum"
- **YEAR:** 2018 **ARTICLE or ACTION:** "A Fresh Chance to Achieve a Sustainable Water Future for CA"
- **YEAR:** 2012 **ARTICLE or ACTION:** "King Kong vs. Godzilla: Does Big Oil Get a Pass Because Big Coal is Bigger?"
- **YEAR:** 2017 **ARTICLE or ACTION:** "2015 CA Recycled Water Survey Shows We Have More Work to Do"

MEDIA OR ENVIRO-ORG: Environmental Defense Fund

url: <https://www.edf.org/>

- **YEAR:** 2015 **ARTICLE or ACTION:** "A Clean-Energy Breakthrough"
- **YEAR:** 2013 **ARTICLE or ACTION:** "Major California Refineries Logging Big Pollution Reductions Under AB 32"
- **YEAR:** 2014 **ARTICLE or ACTION:** "EPA Refinery Standards and California Carbon Limits Can Solve the Puzzle of Refinery Pollution"

MEDIA OR ENVIRO-ORG: EarthJustice

url: <https://earthjustice.org/>

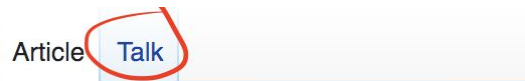
- **YEAR:** 2020 **ARTICLE or ACTION:** “Phillips 66 Refineries Are Poisoning Our Communities. We’re Ready to Fight Back”
- **YEAR:** 2015 **ARTICLE or ACTION:** “Community Advocates Bid Farewell to Senseless Oil Proposal in California”

Wikipedia: Carson, CA

How are environmental problems mentioned (or not mentioned) in the community’s Wikipedia article? You can also check the article in other languages (Spanish, for example).



Are environmental problems discussed on the [talk](#) page of your community’s Wikipedia article? If yes, which issues do users discuss?



Carson, California

From Wikipedia, the free encyclopedia

On Carson’s Wikipedia page, the oil refineries in the city are mentioned in the ‘History’ section and how oil became an important part of the industry. Furthermore, this section describes the incident where methane gas and benzene contaminated the soil and groundwater in 2011. Apart from this section, environmental issues in Carson are not mentioned.

On the talk page, many external links are available regarding Carson, but none of the links discuss environmental problems.

Appendix 7: SKETCH: Possible Local Actions

Eij LOCAL ACTIONS SKETCH

Use this sketch to chart out problems associated with **environmental hazards, solutions** that have been proposed or implemented in other places, and possible ways these solutions could be **implemented** in your community.

Focus on actions that can be carried out locally, based on local decision-making and political authority. Many problems that you identify should be in this sketch and

in the sketch focused on extra-local actions (the middle and right columns would be different). Try to identify possible solution pathways at both levels (by putting problems you have identified on both sketches).

Fill in at least ten boxes in the sketch (not necessarily a full row). It is okay to identify problems that you don't yet have solutions to, or possible solutions that you don't yet know how to leverage or implement at the local level. Add additional rows if needed.

Community: Carson

Highlighted Hazard: Slow Disaster

Identify a problem.	Identify ways this problem is being addressed in different places -- through educational programs, legal actions, land use policies, media campaigns, etc.	Tailor these solutions to your community.
Air Quality Regulators do not install pollution monitors on refineries	Being addressed through local new sources to inform residents	Carson is threatening to sue Air Quality Regulators if they do not install pollution monitors on refineries
Many poor-income residents of color live in close-proximity to more than 2 refineries	Have refineries/government agencies pay to move these residents farther from the plants	The city officials of Carson along with government agencies can reimburse/pay residents to move
Refineries release reports that are not accurate in terms of how much pollution is released from their plants	Could be addressed through legal actions such as getting EPA involved. Or funding from government agencies for cities to do independent studies on how much pollution is released	The city of Carson can have independent scientists/studies that will unbiasedly report on how much pollution is released from refineries
Community does not have an environmental injustice group tailored specifically for its city's needs.	Addressed through media, news calling for action to make an environmental injustice group	Carson itself does not have an environmental injustice group that will prioritize Carson and its needs. A solution would be for active members or even a school

		club to start one with support of the city council
Many residents are of Latino/Hispanic and are scared to talk out fear of deportation	Take legal action, have lawyers defend those that are in fear	Defend those that are in fear of speaking, giving them privacy from the public and legal help
Government agencies lack in holding refineries accountable for mass pollution	Community members advocate and protest for higher government to take action and hold refineries accountable	Carson in alliance with other cities and other environmental groups taking action through protest or even legal action
Residents are unaware of the chemicals or toxins that are released and the effect to their health	Make campaigns, have an environmental injustice group make meetings to inform residents	Environmental groups inform residents through flyers, pamphlets, or knocking at doors
Community members do not have a public place to safely disclose their concerns	City hall, schools, or even local library open up their place for community members to discuss	Many local schools/libraries have the means to open their place and allow residents to discuss. There's a local library called Carson public library in which members could meet up.
Schools do not inform or educate students about environmental issues surrounding them	Require students to take a certain number of environmental issues related courses in order to pass/graduate	Parents or the students themselves sign petitions for schools to make space for courses of environmental issues
Elected council members /local politicians are in the pockets of local refineries or government agencies	Community members vote to take those local politicians out of office, vote for more environmentally friendly politicians	Inform residents of their local politicians, which ones fight for the refineries and which ones fight for them. This could be done through the media.

Appendix 8: SKETCH Possible Extra-Local Actions

Eij EXTRA-LOCAL ACTIONS SKETCH

Use this sketch to chart out problems associated with **environmental hazards**,

solutions that have been proposed or **implemented** in other places, and possible ways these solutions could be implemented in your community.

Focus on actions that would be taken *away* from the community (at state, federal or international levels) that could be implemented or would have positive impacts at the community level. Many problems that you identify should be both in this sketch (focused on extra-local actions) and in the sketch focused on local actions (the middle and right columns would be different). Try to identify possible solution pathways at both levels (by putting problems you have identified on both sketches).

Fill in at least ten boxes in the sketch (not necessarily a full row). It is okay to identify problems that you don't yet have solutions to, or possible solutions that you don't yet know how to leverage or implement at the local level. Add additional rows if needed.

Community: Carson

Highlighted Hazard: Slow Disaster

Identify a Problem	Identify ways this problem is being addressed through state, national and international initiatives -- laws and regulations, curriculum requirements, federally supported job, federal investment in research or news capacity, etc.	Tailor these solutions to your community.
High hazard industrial production processes when there are known alternatives. LOCAL DETAILS:	"The Pollution Prevention Act of 1990 makes it the national policy of the United States to reduce hazards to public health and the environment through source reduction (such as substituting safer materials for hazardous ones) prior to any add-on pollution management and control." (Who's in Danger? Report)	With limitations on the pollution in Carson, air quality has a chance to improve along with the lives of the residents to be at least slightly relieved from the environmental burden.
Hazards of local oil and gas production and processing	Environmentalists of the community can hold these	When local refineries are held accountable for their

facilities. LOCAL DETAILS (see FracTracker)	facilities accountable if they produce overbearing pollution (EarthJustice intends to sue Phillips 66 over pollution concerns)	excessive pollution, Carson’s environmental vulnerability has the chance to be reduced.
Schools and residents are very near high risk industrial facilities.	Are there state or federal laws that require “set-backs” (Existing Scientific Literature on Setback Distances from Oil and Gas Operations) [focused on Los Angeles County]	Distancing schools and residents from the high risk industrial facilities is safer for their health as they wouldn’t be surrounded by its pollution.
Community members can’t do much on their own to deal with pollution in the area.	State and federal government should support these communities with grants that fund environmental projects. (Five California Communities receive environmental justice grants from EPA)	The people of Carson can come together and work on ways to protect themselves from the pollution and be funded by the government. Since they would know they’re area best, they can properly spend the money on specific needs.
Environmental problems aren’t a priority in policymaking	The Environmental Voter Project promotes and mobilizes environmental voters to vote (EVP focused on increasing voter turnout)	Carson residents can be encouraged to vote on policies most relevant to them.

Appendix 9: SKETCH: Data & Qualitative Research Design Proposal

Eij RESEARCH RECOMMENDATIONS SKETCH
Use this sketch to chart out research that needs to be done to better characterize and address the environmental hazards you have focused on in this case study. In the first section of the sketch, identify quantitative research needed to better understand pollution, health impacts and social variables in your community. In the second section of the sketch, propose a qualitative study that includes three methods widely used by anthropologists: participant-observation, interviewing and focus groups. See tips for rapid design of a qualitative study here .
RECOMMENDED QUANTITATIVE STUDIES

What kinds of pollution research are needed in this community?	Information on how much hazardous material there is in the air, how much of it is released every day, and how much is inhaled by the average person, what are other communities doing to prevent the spread of hazardous air
What kinds of health research are needed in this community?	How pollution over time has altered the amount of people with respiratory and body conditions, how pollution affects the function of people healthy or impaired with these conditions
What kind of quantitative social survey data is needed in this community?	Community Level of education, demographics, what people are doing to stop their own pollution

RECOMMENDED QUALITATIVE STUDY

- What is your research question?
 - How has pollution directly affected what people do in daily lives and in interacting with other people, daily actions, and how it impacts government and company opinions? How is pollution perceived to have an impact on their lives, and how often?

- What social groups will you study and interact with?
 - Those in pollution-affected areas, workers of plants, city leaders, anyone affected by a respiratory condition, disadvantaged groups, etc.
 - Inclusive of anyone able to speak or write. Most likely either recorded face to face or by a written document.

- How will you gain access to the social groups you'll focus on? What privacy protections will be needed?
 - Access will be voluntary, required parent/guardian written signature if the subject is under 18, otherwise verbal recorded consent is enough.
 - Privacy includes confidentiality of name, gender, other sensitive information, etc. and encrypted.

- How could you use participant observation to answer your research question?
 - Observing meetings to discuss construction projects and other environmentally threatening items to hear and see how the community (or members of the community that attend) react.
 - Observing public events to see how the community copes with conditions such as respiratory.

- How could you use in-depth interviewing to answer your research question? What questions would you ask?

- In-depth interviewing will be useful for getting perspectives from community officials, workers, and EijO associates.
- Questions: “How have you been working to help reduce pollution?”, “Do you know how much pollutant has been produced?”, “Who is responsible for the poor air quality and who should clean it up?” “How often do you consider the quality of the air around you?”, “Do you feel at risk when outside?”, “Do you use any technology to help yourself or others around you for respiratory conditions, and if so what have you used?”
- How could you use focus groups to answer your research questions? What discussion prompts could you use?
 - Focus groups could include those with asthma, those without, those with cancer, those who are in a disadvantaged group, fence line communities, union workers, etc.
 - Prompts will include: How does the pollution affect (insert focus group) compared to (insert another group)
- Who would find this research useful?
 - EijO groups, City Officials, Health professionals, the community, etc.

Appendix 10: SKETCH: Multiple Forms of Injustice

EIJ INTERSECTING INJUSTICES SKETCH		
Use this sketch to chart out the many forms of injustice that intersect and compound to produce environmental injustice.		
Type of environmental injustice	Example	Actions or research needed to respond to this type of environmental injustice.
DATA INJUSTICE: Do stakeholders have the data they need to understand and respond to environmental hazards in this setting?	Local refineries were withholding accurate data from the public in order to downplay environmental hazards (Guerin, 2016).	Third-party monitors ran by an environmental group dedicated to telling the truth and using open source data.
ECONOMIC INJUSTICE: Does poverty or uneven	Wealthy people generally have less health problems	Restructure city budget in order to provide equitable support to those at the

<p>wealth exacerbate environmental hazards in this setting?</p>	<p>than those living in poverty. Wealth allows for premium healthcare options and typically live further away from the refineries because they can afford it.</p>	<p>bottom of the poverty line.</p>
<p>EPISTEMIC INJUSTICE: Are there some ways of understanding environmental hazards and harms discounted or silenced? Is environmental sense-making actively undermined?</p>	<p>Conflict of interests in city councils usually lead to weakening environmental guidelines and allow the corporations to accrue more wealth. They understand the risks, but simply do not care. Happened in Carson when Wayne Nastri, a former industry consultant, was appointed to executive officer of the AQMD (Barboza, 2016).</p>	<p>Comprehensive, community-led review of hires for certain local government officials, especially those leading environmental responses. Ensures that an “industry plant” never gets hired as an environmental lead again, because of conflict of interests.</p>
<p>GENDER INJUSTICE: How do gender hierarchies shape both exposure to environmental hazards and capacity to address them?</p>	<p>Gender hierarchies lead to men and women having higher prevalence in certain lines of work. For example, a common stereotype is that construction workers are more likely male. Since not all jobs are split 50/50 with both genders, the levels of pollution that both genders are exposed to will not be 50/50 either.</p>	<p>Law should be put in place to heavily monitor high exposure jobs and work to reduce that exposure so that both genders can work without worry of being caused harm from certain environmental hazards.</p>
<p>HEALTH INJUSTICE: Are there health disparities or uneven access to health care in this setting?</p> <p>Check out the asthma hospitalization rate for your community.</p>	<p>There is definitely uneven access to health care in this setting because according to CHHS data, POC of color are disproportionately affected by asthma hospitalizations compared to white people in Los Angeles County (CHHS). This also outlines racial injustices in Carson.</p>	<p>One solution that has been talked about for many years that could solve uneven access to healthcare is universal healthcare. This would ensure that everyone has access to healthcare, making it a right, not a privilege, so that everyone, regardless of race, religion, gender, status, etc. is</p>

		treated equally in medical care.
<p>INTERGENERATIONAL INJUSTICE: Will future generations be impacted by environmental hazards and exposures in this setting today?</p>	<p>Environmental health hazards will most likely be compounded by generational exposure. The Korean study already showed that VOCs can have a negative effect on birth weight, which can lead to a skew of health problems down the line (Chang et al., 2011). The constant exposure to VOCs and the increasing health effects on present day parents could easily follow future generations during their births.</p>	<p>To fix this issue we must directly address the present day pollution, so that no child will have to suffer the consequences of our dirty air. This will take much more than one, simple, fix-all solution, but will require a cornucopia of solutions to address environmental health hazards at every level.</p>
<p>MEDIA INJUSTICE: Is there adequate news coverage of the environmental hazards in the setting? Does news convey the perspectives and vulnerabilities of all stakeholders?</p>	<p>From what I found, media coverage of the environmental hazards are being well-documented and thoroughly convey perspectives of the stakeholders in order to create an unbiased view of the situation.</p>	<p>There could always be more room for improvement, therefore news agencies could create specific branches from their reporters to focus on environmental issues and delve deeper into those issues in order to explain every detail.</p>
<p>PROCEDURAL INJUSTICE: Have all stakeholders had fair access to government support and law to address environmental hazards in this setting?</p>	<p>During my research I found that more often than not, protestors in the community have had their voices ignored many times, especially during the Tesoro refinery merger (Valdex, 2017).</p>	<p>City councils and environmental organizations need to listen to community members first and foremost. They should never be prioritizing businesses or the economy in regards to environmental injustices. This can be solved by making certain local government roles decided by public vote instead of being assigned their job by the council.</p>

<p>RACIAL INJUSTICE: Do environmental hazards in this setting disproportionately impact particular social groups, especially communities of color?</p>	<p>CHHS asthma hospitalization rates show that POC are disproportionately affected by asthma in Los Angeles County (CHHS).</p>	<p>City budgets should pay close attention to how environmental hazards affect POC and invest money into those neighborhoods in order to reduce and mitigate the environmental health hazards associated with living in POC neighborhoods.</p>
<p>REPRODUCTIVE INJUSTICE: Do environmental hazards in this setting undermine possibilities for safely parenting children?</p>	<p>Volatile Organic Compounds were found to negatively affect birth rates in a Korean study (Chang et al., 2011). VOCs are also a huge source of pollution in Carson because of all the oil refineries.</p>	<p>Steps should be taken to severely reduce the presence of VOCs in the air of Carson, so that no child will have to live with predetermined health conditions, simply because they were born in a Carson family. Research should also focus on the specific effects of VOCs on Carson newborns.</p>

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Do you consent to having your name listed as an author on the published case study?

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