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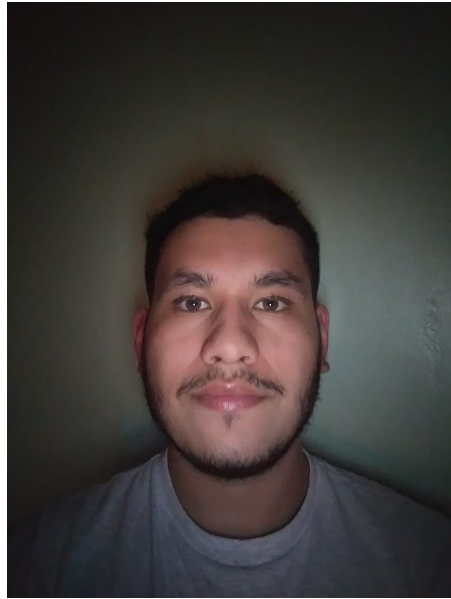
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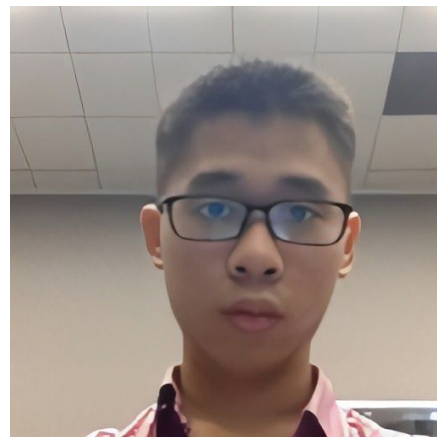


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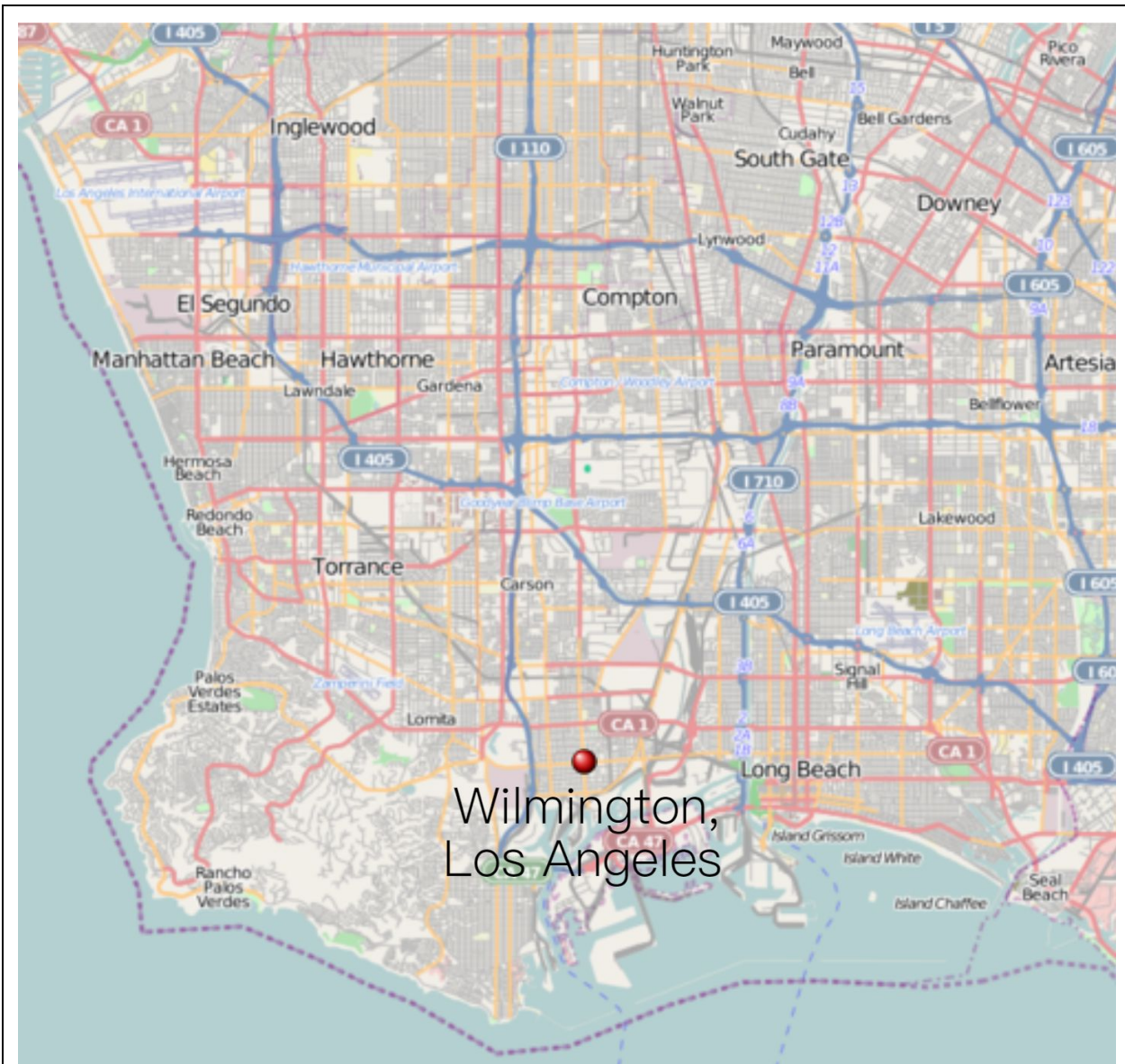


Figure 1. Location Map of Wilmington CA. (Screenshot by Haoyang Liu. Wikipedia, retrieved July 7, 2020).

INTRODUCTION

This case study report focuses on everyday, cumulative pollution in Wilmington, CA. 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

[Haoyang Liu]

Wilmington is a harbour neighbourhood located in the Los Angeles Harbour Region area of Los Angeles, Southern California, covering 23.7 square kilometres of land. The city borders Carson to the north, Long Beach to the east, San Pedro to the southwest and Harbor City to the northwest (see Fig. 3).

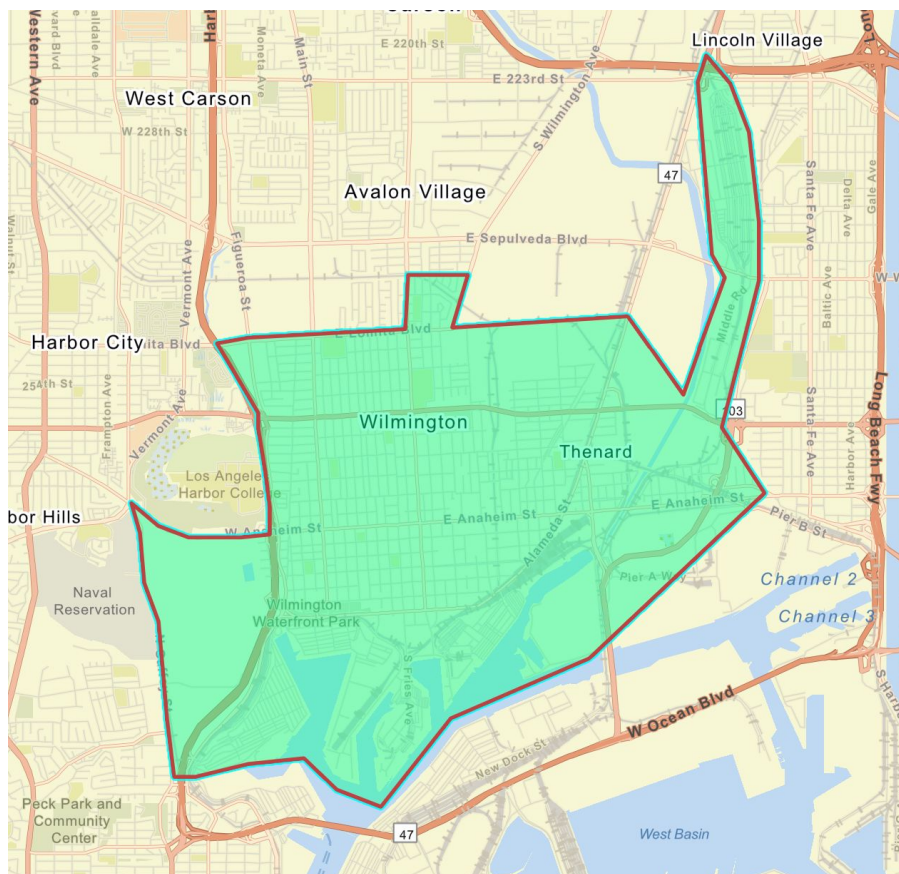


Figure 3. Selected area for Wilmington. (Screenshot by Haoyang Liu, July 2020. EPA EJScreen Report, retrieved July 9, 2020).

Wilmington is home to a heavy concentration of industry and the third-largest oil field in the continental United States.

The population of Wilmington consists of a high percentage of Latino and foreign-born residents nowadays, but the history of Wilmington dates back to a land grant in 1783. The city became separate in 1863 and joined the City of Los Angeles in 1909. The area that is now Wilmington was inhabited by the Tongva people of Native Americans with Archeological work in the nearby Chowigna excavation show evidence of inhabitants as far back as 7,100 years ago. (Greene and Curwen 2019).

Wilmington had a population of 51,517 within its 23.7 square kilometres of land in 2000 according to the U.S. Census Bureau, and an estimate of 54,512 in 2008 based on L.A. Department of City Planning ("Wilmington," n.d.). Averaging as few as 2300 people per square kilometre. According to the Ethnicity Diversity Ranking from Los Angeles Times's Mapping L.A. Project, Wilmington has a relatively low ethnically diverse index in the region of 0.245, falling behind South El Monte and View Park-Windsor Hills ("Diversity," n.d.). The percentage of Latino is high for the county at 86.6%, White followed after at 6.4%, then Asian at 2.7%, black at 2.6%, and others at 1.7% ("Wilmington," n.d.).

The city had a median household income of \$40,627, about average for the city of Los Angeles but low for the county, with a high percentage of household earning \$20,000 to \$40,000 or less, and 44.5% of residents were foreign-born, with Mexico (85.5%) and Guatemala (3.0%) being the most common source of foreign-born residents. 5.1% of residents 25 years and older have a four-year degree, low for the city of Los Angeles and low for the county, while the percentage of residents 25 years and older with less than a high school diploma (61.18%) is high for the county (see Fig. 4). The average household size in the region is 3.8 people, which is relatively high for the city of Los Angeles and high for the county.

("Wilmington," n.d.).

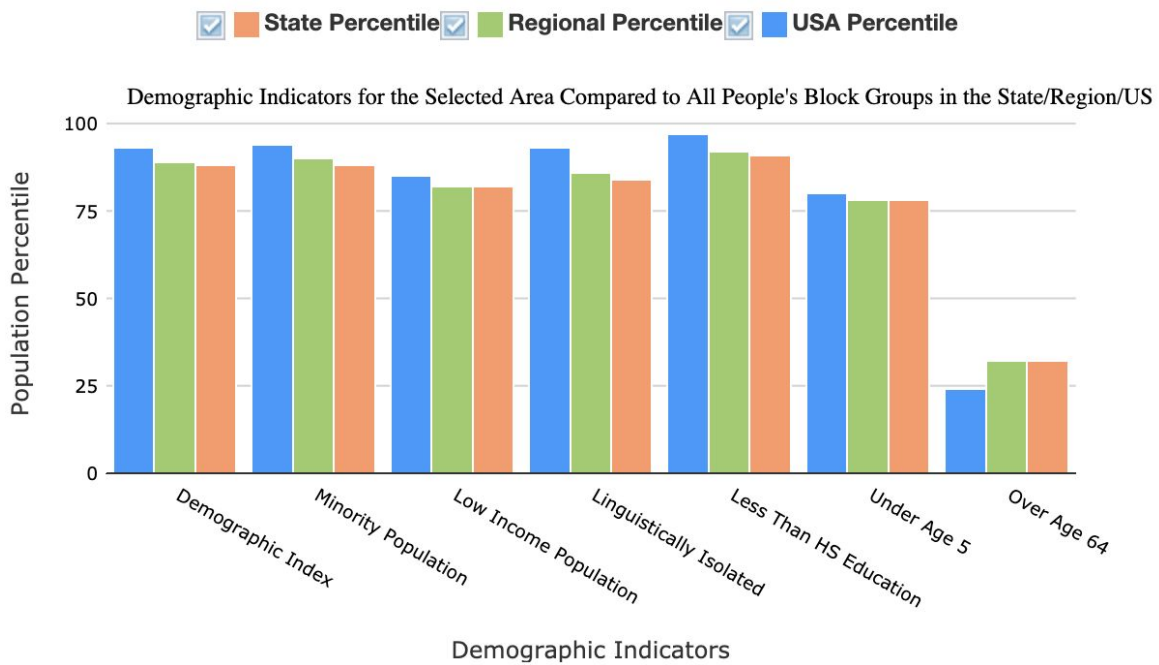


Figure 4. EJ Index for Wilmington Compared to All People's Blockgroups in the State/Region/US (Screenshot by Haoyang Liu, July 2020. From *EPA EJScreen Report*, retrieved July 9, 2020.)

Residents of Wilmington have relatively limited community assets. **Free internet** is only offered at 2 McDonalds and 4 Starbucks within a 3 miles radius from the centre of Wilmington (see Fig. 6). **Commercial hotspots** are available from operators such as Cox Communications in a greater deployment (Cox Communications, n.d.), but those paid services are not usually available to all residents. Wilmington has only one public park called **Wilmington Community Garden** (see Fig. 5), according to the Los Angeles Community Garden Council. The garden allows for the spread of information between community members and fosters unity between neighbours, which can also be used as an emergency shelter in case of natural disasters.

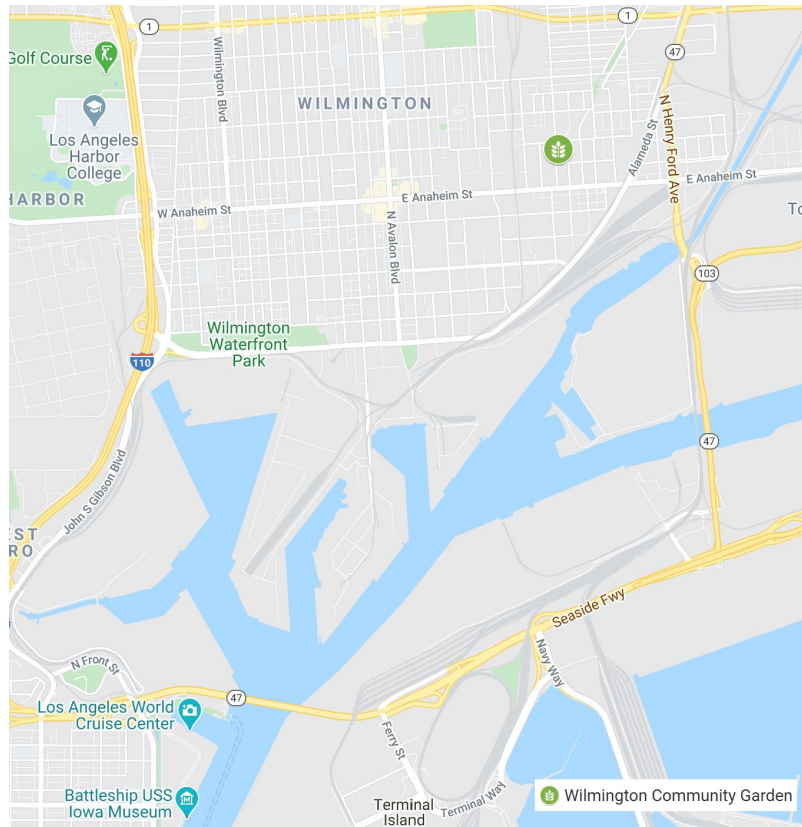


Figure 5. Map of Community Gardens in Wilmington. (Screenshot by Haoyang Liu, June 2020. *Los Angeles Community Garden Council*, retrieved June 29, 2020.)

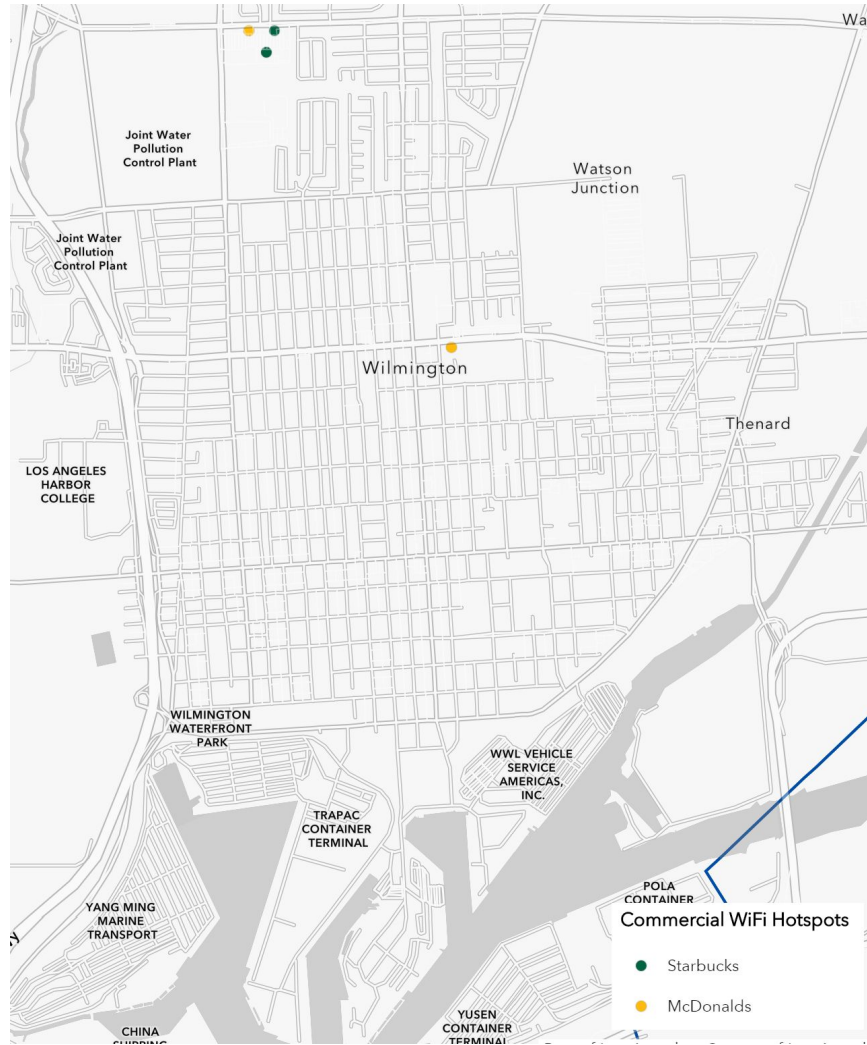


Figure 6. Map of Public Internet Access in Wilmington. (Screenshot by Haoyang Liu, June 2020. LA County Hotspot Locator, *County of L.A.*, retrieved July 9, 2020.

SECTION 2: Everyday Pollution as Slow Disaster [April Godinez and Depei Xu]

In the neighborhood of Wilmington of Los Angeles, California we see a history of oil refineries and chemical plants polluting the air in the area and consequently affecting the residents in the neighborhood. In 2017, Wilmington was the second most polluted area in the Northeast. According to reports, "The downtown area of Wilmington experienced the worst air pollution in Delaware, with 97 days of heavy smoke pollution and 212 days of ash unhealthy conditions." (Mendelson 2017). This explains the cause of the serious air pollution in Wilmington. The pollution from these plants and refineries are slowly affecting the residents in the area, "Toxic air pollutants can cause adverse health effects individually and collectively. Some of the health effects include cancer, asthma, respiratory problems, and other serious illnesses" (Community Air 2003) (see Fig. 7 and 9). Based on the study of air quality from the California Environmental Protection agency (EPA), the air in Wilmington contains a number of toxic pollutants such as "1,3-butadiene, Particulate matter, Benzene, Ozone, Acetaldehyde, Carbon monoxide, Formaldehyde, Oxides of nitrogen, Perchloroethylene, Carbon tetrachloride, Methylene chloride, Para-dichlorobenzene, Hexavalent chromium, Polycyclic aromatic, hydrocarbons, Arsenic, Lead, Mangan" (Community Air 2003).

One example of a major polluter in the area is the Phillips 66 refinery. They were fined multiple times in all facilities, totaling more than \$600,000,000 (Good Jobs First, n.d.), but they still did not meet the RCRA standards set by the EPA. In the past five years, Phillips 66 has failed to repair leaking equipment at its Southern California refinery more than six hundred times. These failures have caused and continue to release uncontrolled and unreported emissions into the Las Angeles Air. The Air Force's own research Determined that Phillips 66 refinery had leaked 200 times more benzene (a known carcinogen) than it reported. (Amaya and Perez 2020) According to the data provided by

EJScreen, Wilmington’s PM2.5 Percentile is all at the level of 60-80, and more. The scary thing is that about one-third of the city's PM2.5 Percentile is 70-80, basically located in the west and north of the city, according to CalEnviroScreen (see Fig. 8). If the refinery does not properly dispose of their diesel we can see a major disaster happening like that of Richmond, California, where a Chevron refinery exploded and left an estimated 600 nearby residents hospitalized, “with symptoms of nausea and a metallic taste in their mouths or a burning sensation in their throats” (LaBar 1999). Chevron later stated that the explosion ignited in a hydrocracking Unit, that converts gas oil into gasoline and jet fuel. Imagine the number of toxic fumes in the air and the poor residents of Richmond suffocation under this cloud of fumes. Something similar can happen in Wilmington if the Phillips refinery doesn’t meet the RCRA standards of the EPA if they continue to fail to report the amount of fumes they release in the air.

Wilmington Hazardous Waste

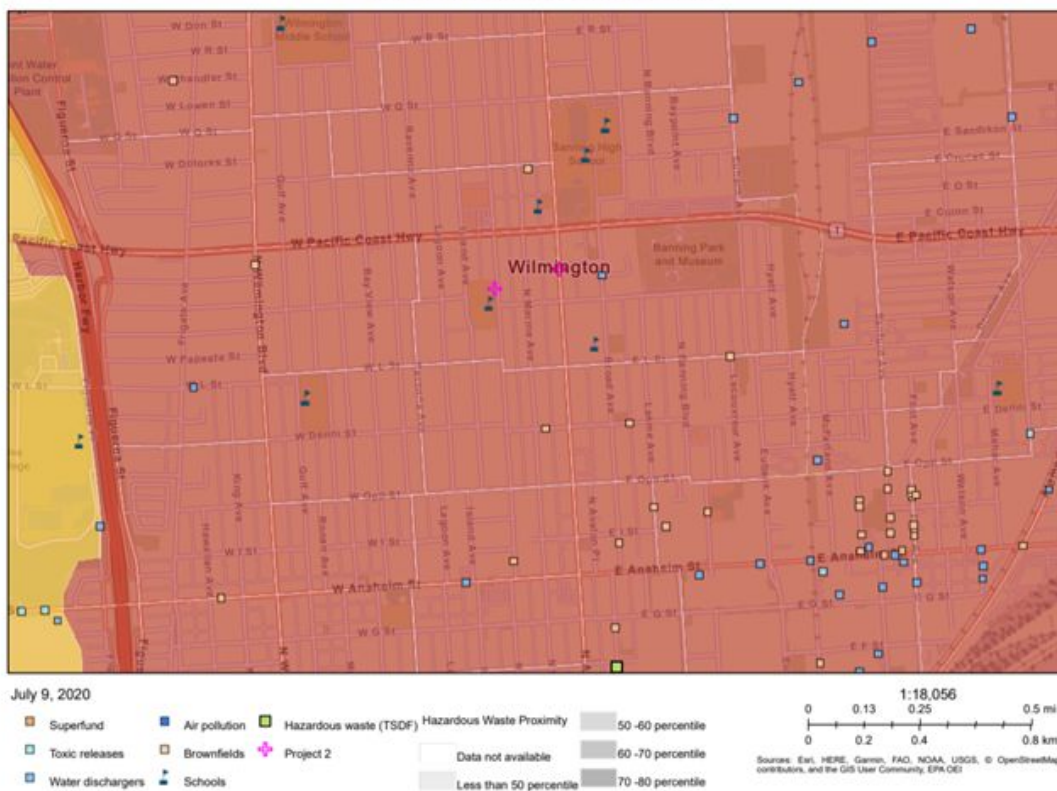


Figure 7. Overview of Hazardous Waste sites and sites reporting to the EPA (Screenshot by April Godinez, June 2020. EPA EJScreen, retrieved June 29, 2020).

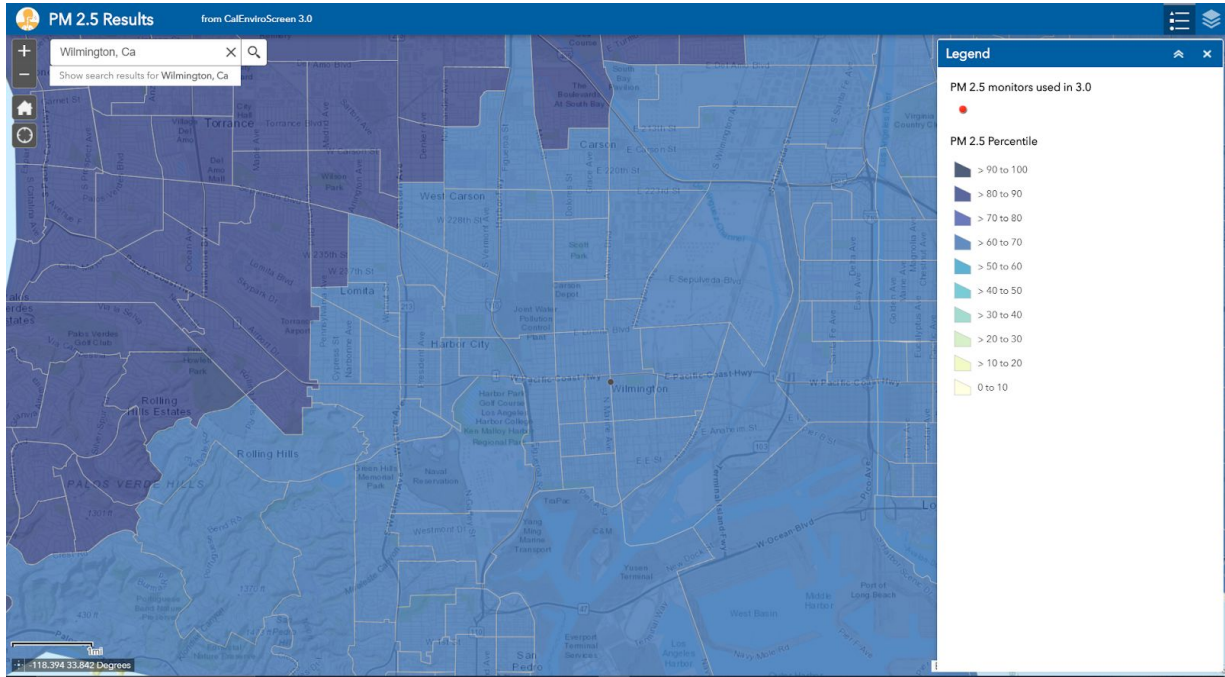


Figure 8. High Scoring Census Tracts for PM 2.5 in Wilmington (Screenshot by Timothy Do, July 8, 2020. CalEnviroScreen 3.0, retrieved July 8, 2020).

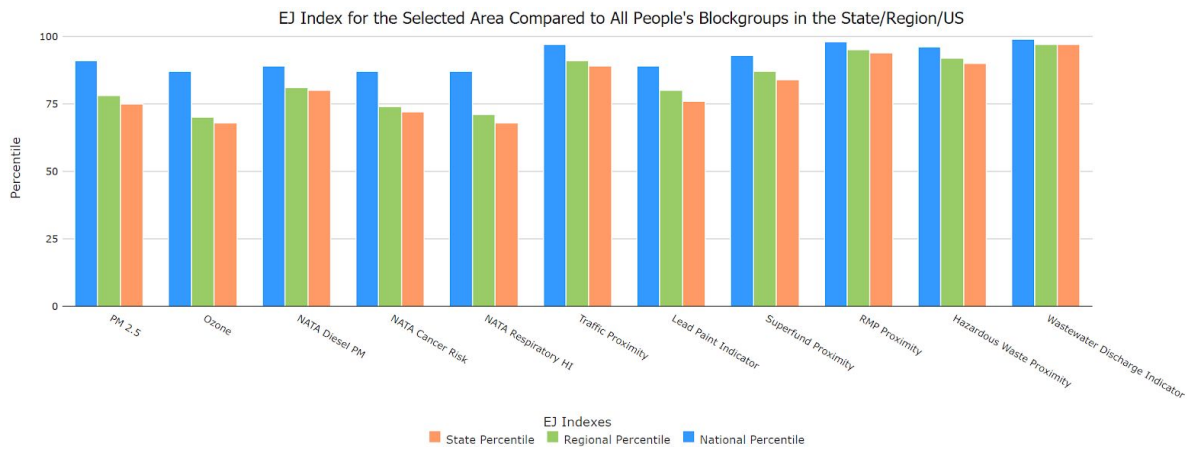


Figure 9. EJ Indexes for the area of Wilmington California Graphing the Environmental indicators of the area in comparison to the state and US. . (Screenshot by April Godinez, July 2020. *EPA EJScreen*, retrieved June, 2020).

Pollution in the air continues to plague Wilmington, in a 2017 report, it pointed out: the area is ranked second in the Northeast region with 97 days in 2015 when the smog was the most severely polluted. The Sussex and Dover metropolitan areas experienced 49 days and 40 days of smog pollution, respectively the days with the most serious soot pollution in the Wilmington Metropolitan Area ranked fifth in the United States. The ash levels in the area were unhealthy for more than a year and a half (Mendelson 2017). In Addition, the developed highways and airports around Wilmington provide convenient transportation conditions for the establishment of factories. And the places with developed traffic must have a lot of inevitable exhaust emissions. There is a lot of traffic on freeway 710 (freeway near Wilmington) Diesel PM is above 80-percentile for most of Wilmington, with it increasing from North to South of Wilmington. (EJSCREEN, 2020) (see Fig. 10). When benzene and exhaust gas or even large amounts of carbon dioxide cause people to suffer from respiratory diseases and even cancer, the possibility becomes even greater. In recent times, COVID-19 will also be easier to spread because of poor air quality. (Amaya and Perez 2020).

Unfortunately, pollution in the air isn't the only thing the residents of Wilmington should worry about. The EPA announced that they have discovered amounts of lead in the drinking water at some of the schools in the area (see Figure 11). A little exposure of lead should be nothing to worry about for an adult but for a child that is a whole different story, The EPA says that, "In children, low levels of exposure have been linked to damage to the central and peripheral nervous system, learning disabilities, shorter stature, impaired hearing, and impaired formation and function of blood cells" ("Basic Information about Lead..." n.d). If left unchecked the lead in the water could increase and irreversibly affect the children of wilmington. Residents are left vulnerable against all of these

environmental injustices in Wilmington, some of their solutions can be demanding these companies to follow regulations set by the EPA, have the Military come in and clean up sites (see Fig. 12), and create community organizations to keep track of violations.

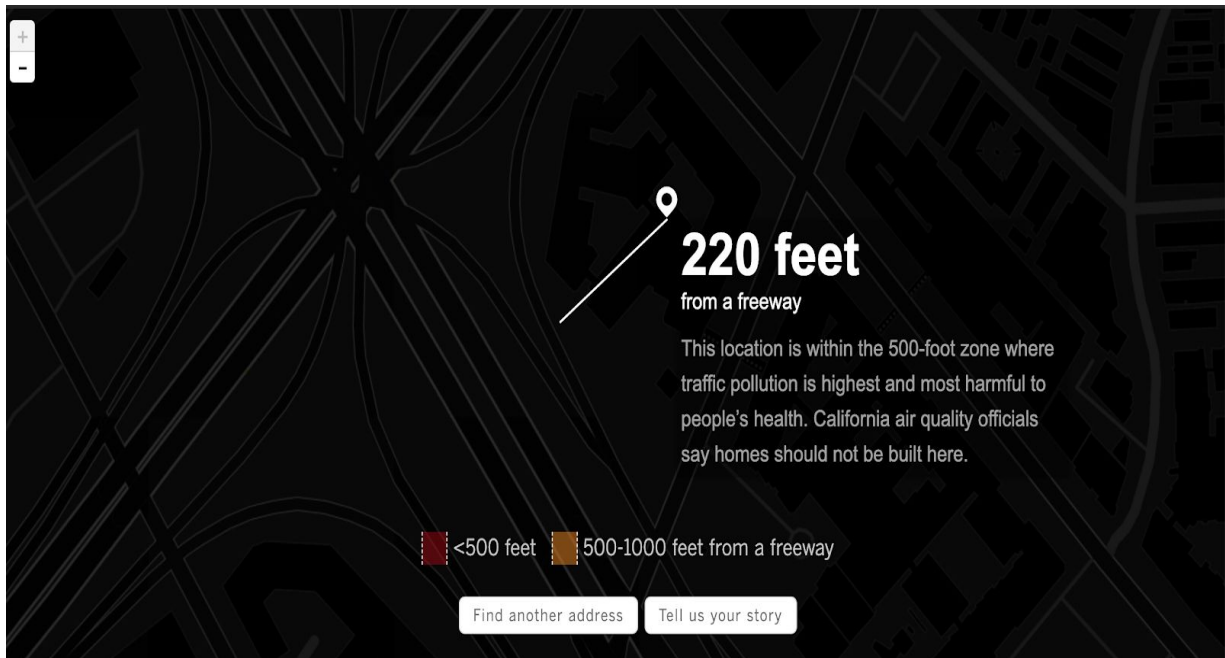


Figure 10. Freeway proximity for Wilmington. (Screenshot by Depei Xu, July 8, 2020. From How close do you live to the freeway? Los Angeles Times, retrieved June 29, 2020)

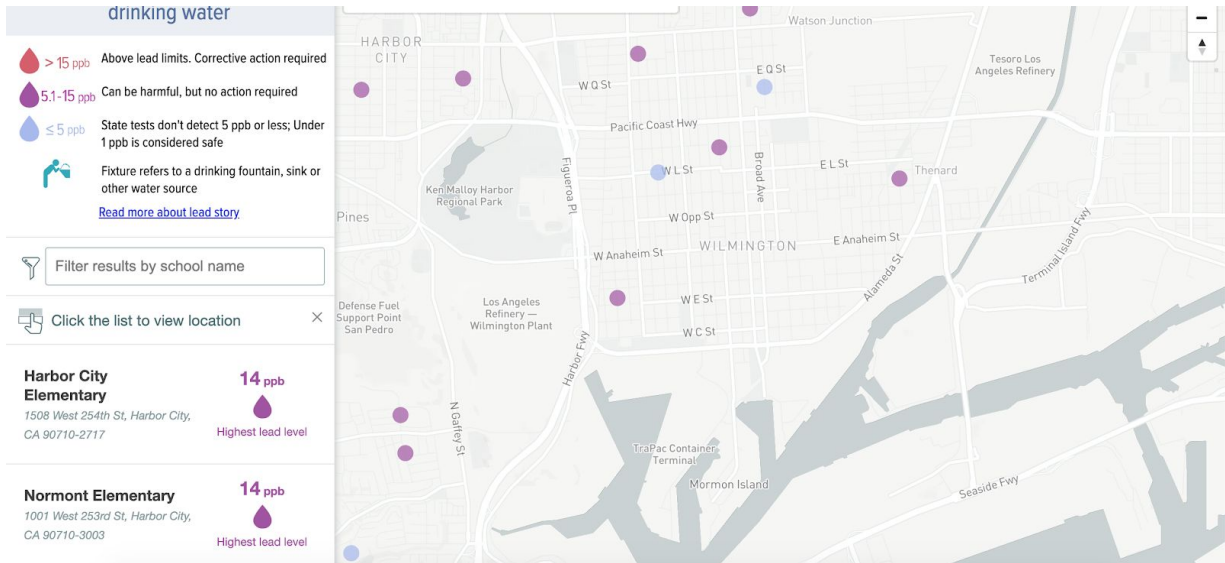


Figure 11. Lead Levels in Wilmington School Drinking Water from the EdSource website. (Screenshot by Depei Xu, July 8 2020. *EdSource*, retrieved June 29, 2020. <https://edsource.org/2018/interactive-map-lead-levels-found-in-california-schools-drinking-water/602769>)

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.



Not all sites in the DOD data include location information, so there may be sites listed below that are missing from the map. The risk level of a site refers to a relative risk assessment made by the DOD to prioritize the cleanup of sites.

Figure 12. Military Clean-Up Sites in Wilmington. The above image is the Hazard Waste site in Wilmington, CA that the U.S. army corps of Engineers cleaned up in 2004. (Screenshot by April Godinez, June 2020. Bombs in Your Backyard Series, *ProPublica*, retrieved June 29, 2020. <https://projects.propublica.org/bombs>)

SECTION 3: Compound Vulnerabilities [Tahis

Alcantar]

The U.S Census reports that the city of Wilmington has a population of over fifty thousand people with eighty-four percent of the population being comprised of Latinx ("Wilmington," n.d). With almost half of the population being foreign-born and the median household income (see Fig. 13) coming up to forty thousand, this city is considered low-income ("Wilmington," n.d.). With this in mind, it is clear that low-income cities like Wilmington, face structural barriers when improving their cities and fall into an endless cycle due to their difficult living environment (Adelman 2008). This cycle described by health psychologist Laura Kubzansky involves the lack of investment into the community because those succeeding economically decide to move into better areas, which leads to schools losing funding (Adelman 2008). This would explain the city's low results of college and high school graduates ("Wilmington," n.d.). The Census reports that only five thousand residents who are twenty-five and older have a high school degree ("Wilmington," n.d.). The absence of educated people could lead to other problems in the community such as high crime rates, in which the city is reported to have a high rate ("Wilmington," n.d.).

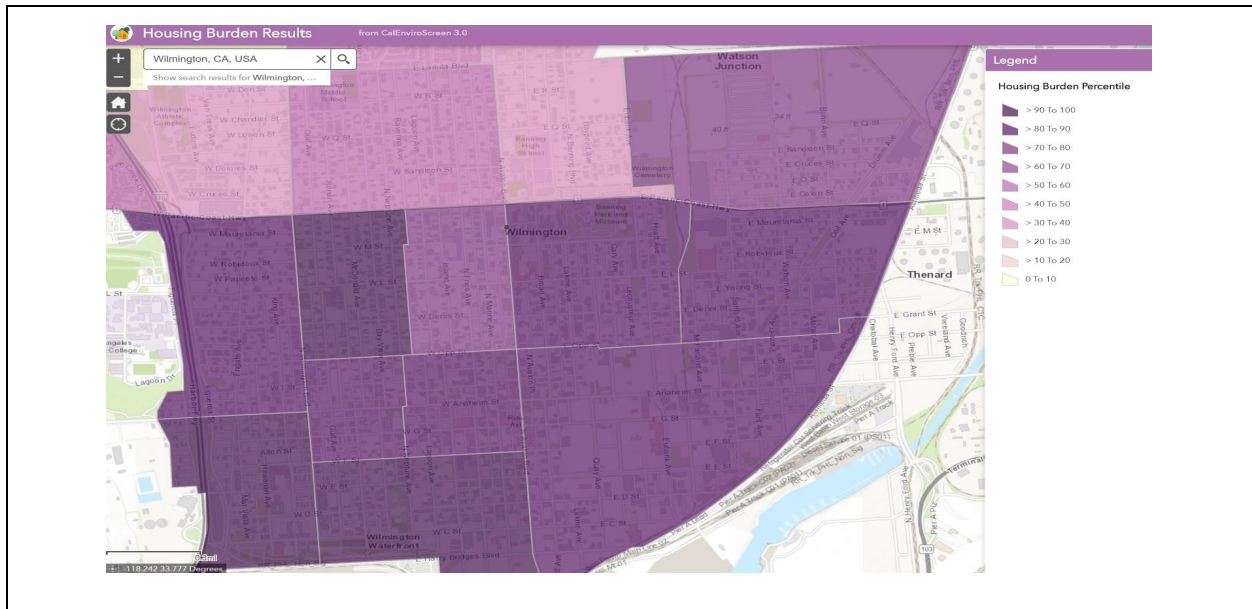


Figure 13. *The [time lapse in LA County's Corona Cases](#) is higher in this housing burden community.* The median household income in Wilmington is \$40,000, and according to CalEnviroScreen 15 - 35% of residents in Wilmington census tracts are classified as housing burdened (Housing Burden - Wilmington screenshot by Tahis Alcantar, *CalEnviroScreen 3.0*, Retrieved July 8, 2020).

The city is struggling with economical and social problems, but the cause of these problems can be linked to the ports, diesel trucks, oil extractors, refineries, and industries polluting the air. Wilmington environment activists have banded together since the nineties to create a “Resource Guide,” to empower the residents about fighting for a better quality of life and encouraging their voice (Communities for a Better Environment 2012, 1). Ports located in Los Angeles and Long Beach cause the majority of the air pollution in Wilmington since the city itself is upwind from the ports. The inhalation of these pollutants has led to the residents of Wilmington having a 2,000 in a million cancer risk (see Fig. 14) when Southern California has a cancer risk associated with air pollution of 1,200 in a million (Communities for a Better Environment 2012, 5). The ports contribute to twenty

percent of the Air pollution in four counties: Los Angeles, Orange, San Bernardino, and Riverside (Communities for a Better Environment 2012, 5).

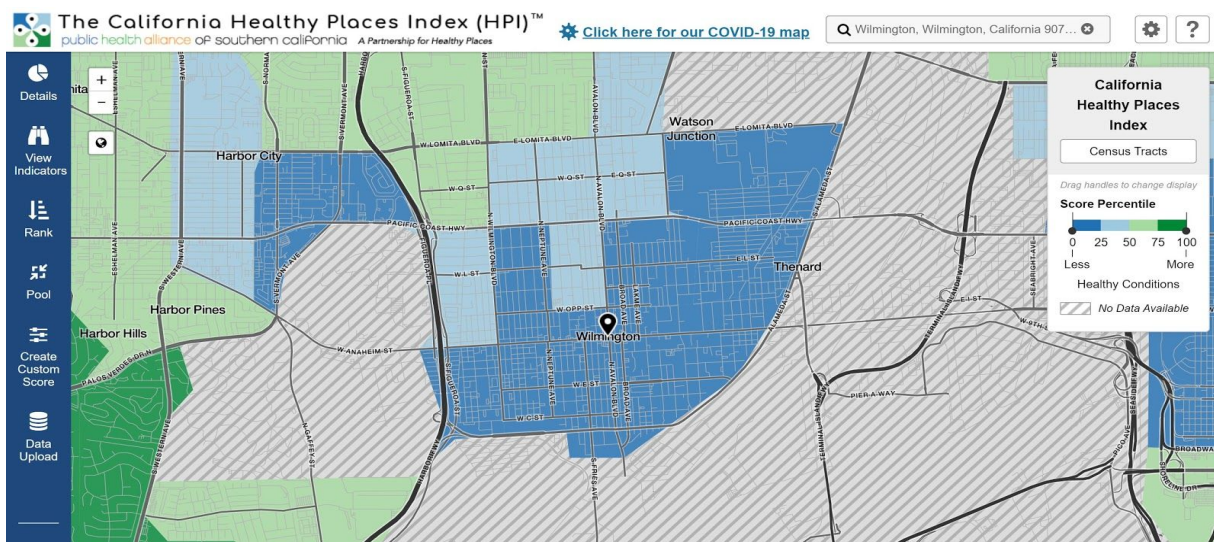


Figure 14. Healthcare Access Indicators for Wilmington, CA. Given the higher cancer risk and egregious health care access, Wilmington will find it harder to be healthy and treat health issues such as cancer. (Screenshot by Tahis Alcantar, July 2020. *The California Healthy Places Index*, retrieved July 8, 2020).

Another problem is that the companies producing environmental hazards are also donating to low-income cities in Los Angeles county like Wilmington. This makes it more difficult for environmental activists to get the residents on their sides because the companies are buying their support. "Twenty-four-year-old activist Ashley Hernández remembers getting free backpacks and pencils with oil company logos as a kid" (Hardman 2018). Companies like Philip 66 and Tesoro Refinery get involved with the community and fund events. This social impact is a greenwashing way of caring for the residents because the reality is that the companies are bribing the residents so that they do not take action against them.

Almost half of the residents in Wilmington are foreign-born and according to

CalEnviroScreen, 10 - 26% Wilmington residents do not speak English well with respect to census tract (2011-2015) (see Fig. 15), which means there is a language barrier between the half of the residents and their Government. The disconnection between the community leaders and community members can lead to the members not wanting to speak up about their situations and remaining silent.

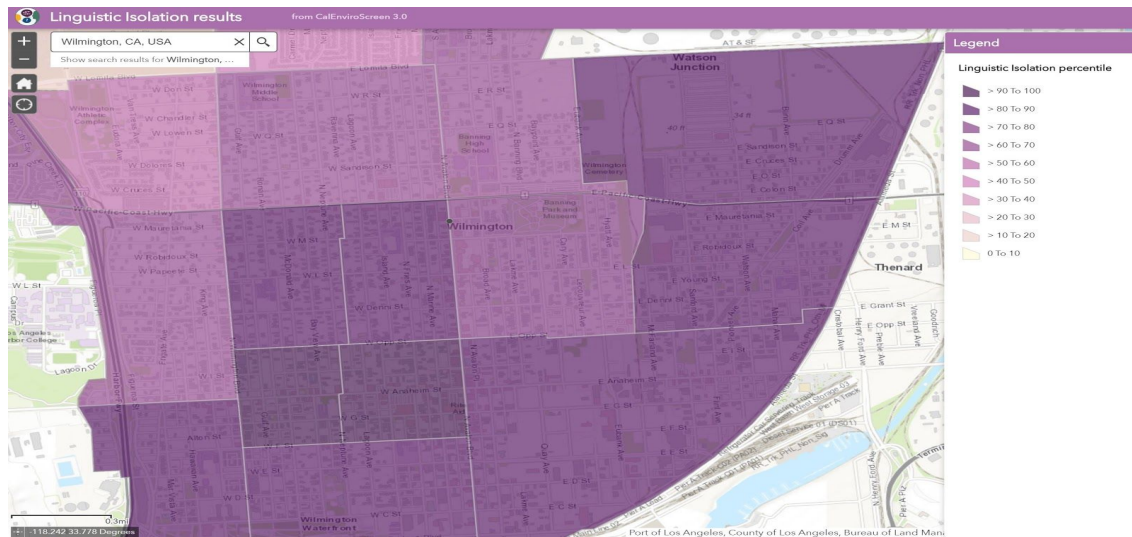


Figure 15. High Scoring Census Tracts for Linguistic Isolation in Wilmington, CA (Screenshot by Tahis Alcantar, July 2020. *CalEnviroScreen 3.0*, retrieved July 8, 2020).

SECTION 4: Stakeholder Analysis [Jiaqi Wu]

Phillips 66 (See Fig. 16) is an oil refinery that should have brought huge economic effects to nearby residents, but due to its negligence of management and its indifference to pollution emissions, this company is bringing a disaster to Wilmington. Environmentalists, local residents and the South Coast Air Quality Management District (AQMD) have joined in the fight against pollution caused by Phillips 66.

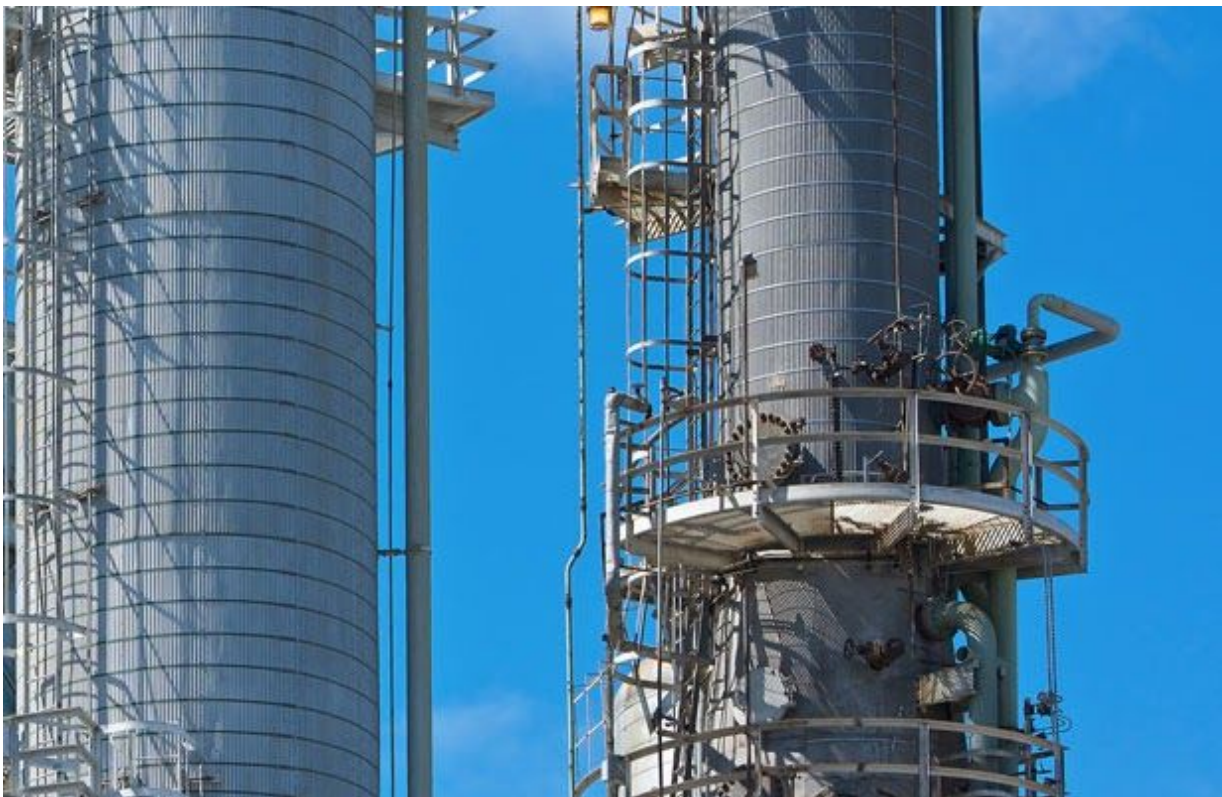


Figure 16. Phillips 66 plant in Wilmington. The Phillips 66 Refinery is a violator of the Resources Recovery and Conservation Act and the Clean Air Act. An ongoing lawsuit brought against the plant by environmental advocates is currently being fought (Photo from Phillips 66 Company, n.d., retrieved July 9, 2020).

To Phillips themselves, they seem to be doing "good". In their own performance report, they said: "Phillips 66 is proud to be one of the energy industry's safest and most reliable companies. We believe that a zero process safety incident and zero injury workplace is achievable" (Phillips 66 Company 2020). They believe that their company has made a tremendous contribution to sustainable development.

However, environmental organizations and local residents have completely different opinions. On April 29, 2020, Los Angeles County Environmental Rights issued a warning to Phillips 66, claiming to prosecute the environmental pollution it caused in Wilmington. Environmental groups say that Phillips 66: "Already at risk of the coronavirus, to hundreds of tons of known carcinogens, leading to increased cancer and other health risks" (City News Service 2020). At the same time, the South Coast Air Quality Management District discovered another startling fact: "the Wilmington refinery is leaking 202 times more benzene than it has reported — meaning 102,616 pounds of the carcinogen." (CITY NEWS SERVICE 2020) This neglect of public safety Deception and concealment of pollution stimulate public anger.

One catalyst is the outbreak of Covid-19: this respiratory disease can cause fibrosis of lung tissue, which can greatly increase the mortality rate when the patient has respiratory disease itself. For the original residents, difficulty breathing is commonplace. One resident said: "We thought it was normal for the air to feel thick when it entered our lungs, that it was normal to struggle to breathe, and that it was normal to experience strange odors and unexplained headaches." (Amaya and Perez 2020) The outbreak of the virus made residents of Wilmington more worried about their physical condition and more intolerable of pollution caused by

Phillips 66.

Another fuse is the two fires caused by Phillips 66 in 2019. The fire became the headline at the time, but it did not arouse people's attention to the slow leakage of chemicals. At the same time, Phillips 66 did not strictly comply with the agreement on repairing chemical leaks. "In fact, in the last five years, Phillips 66 failed to repair leaking equipment at its Southern California refineries over six hundred times." (Amaya and Perez 2020)

SECTION 5: Stakeholder Actions [Vince Marin]

The owners of the Wilmington refinery, Phillips 66, have done little to remedy the situation in Wilmington. The company does not comment on pending lawsuits, however they do provide vague and ambitious responses on their policies and procedures (CITY NEWS SERVICE 2020.). Phillips 66 downplays any foul-play and minimizes the severity of incidents that have occurred within the Wilmington refinery. A 2015 inspection from the Environmental Protection Agency revealed that Phillips 66 has failed to properly store, treat, and dispose of hazardous waste (Phillips 2019). The liquid form of selenium, a toxic pollutant, was leaking from the facility into a nearby county wastewater treatment plant (Phillips 2019). Since the inspection Phillips 66 has yet to apply for a permit that would allow them to store hazardous waste (Environmental Integrity Project 2019).

Under normal circumstances the Environmental Protection Agency would hold Phillips 66 accountable for their numerous violations however, the EPA has seen an alarming change under the Trump administration. In 2018, the EPA had the lowest number of pollution cases, 166 cases, in 30 years, along with the lowest amount of federal convictions since 1995 (Knickmeyer 2019). Data also reveals that the EPA has relaxed punishments and fees for violators and has slashed the number of federal inspections and evaluations of industrial facilities (Phillips 2019). A 2017 violation from the EPA to Phillips 66 resulted in inaction from both parties (Phillips 2019). This dramatic shift in attitude and mismanagement within the EPA, worries environmentalists that violations from these companies will be more frequent and will put residents of Wilmington in greater risk.

Various nonprofit groups including the Environmental Advocates, Environmental Integrity Project (EIP), and Communities For a Better Environment (CBE) have taken legal action to protect Wilmington residents. CBE has various lawsuits against Phillips 66, the EPA and the South Coast Air Quality Management District. A recent case claims that SCAQMD's 1315 rule, approved by the EPA in 2012, is a violation of the Clean Air Act, the rule does not require the Air Quality Management District to review documents relating to reduced emissions (COMMUNITIES FOR A BETTER ENVIRONMENT, n.d.). In 2018 the EIP sent a letter to the EPA asking that both, the Phillips 66 company and the EPA, properly enforce and address the violations at the Wilmington refinery (Green 2018). The letter claimed that the Resource Conservation and Recovery Act, which prevents public exposure to toxic chemicals, was violation, neither Phillips 66 nor the EPA responded.

Nannette Diaz Barragán is the U.S. Representative for California's 44th congressional district, which includes Wilmington and its neighboring communities. Barragán, a native to the Wilmington area, is aware of the environmental injustices caused by Phillips 66 and other polluters. On July 1, 2020, Barragán sent a letter to Speaker Pelosi and Minority Leader McCarthy, urging them to pass an economic relief bill that would make green jobs a priority. The proposed bill would directly benefit frontline communities, like Wilmington, by providing cleanup of contaminated areas, and modernizing water and wastewater systems (Nanette Diaz Barragán 2020).



Figure 17. Nanette Barragán, the U.S. Representative for California's 44th congressional district, has advocated for the creation of Green jobs in the U.S. She represents the Wilmington community in the House of Representatives. Her actions represent actions on the federal level to make effective changes to the Wilmington community (Photo by Genaro Molina, June 18, 2018, retrieved July 9, 2020).

SECTION 6: Role of Media and Big

Environmental Organizations [Huiqi Mai]

With the environmental injustice that the community is facing, it is necessary to have support from the media and organizations and to bring the public to the attention of those in need. One international environment group, Greenpeace, has been pinning the environmental issues in Wilmington for the past two years. In 2018, they had their first environmental justice tour in the Port of Los Angeles and Long Beach, the key geographic features of the city. They came to visit various business companies that may cause environmental problems, including storage tanks, refineries, and shipping terminals. They noted that the activities of the companies did not have equipment that would help to reduce emissions of toxic chemicals. In order to combat these issues, they planned to partner with East Yard communities, an organization established by the residents of Los Angeles who were willing to promote environmental justice in their cities. Throughout these years, Greenpeace has been allying with multiple environmental organizations in an effort to raise awareness of this climate impact zone (Strange 2018).

Aside from national support, local environmental groups are also paying close attention to this problem. For example, Coalition for a Safe Environment is an organization that intended to focus on the environmental health impacts in Wilmington. Their mission is to promote and restore the pollution in air, land, and water ("Organization History" n.d.). One recent contribution they did to the community is encouraging residents to participate in environmental justice. On

March 7, 2020, they held a booth at Banning Park in Wilmington, where participants can get an opportunity to learn about their organization and the local environmental problems. They also get free seeds for planting edible fruits at home ("The Coalition For A Safe Environment for the first time..." 2020). Not only the local residents, but they also partnered with other environmental groups from other cities in California like USC Environmental Health Centers and East Yard Communities to improve the environment in Wilmington. One thing they have achieved together is that they have successfully halted the incoming railroad project near the Port of Los Angeles, which may cause major air pollution ("Environmental Justice Lawsuit WIN" 2016).

One of the famous local newspapers in California, the Los Angeles Times, also helps bring awareness of the pollution near the city (see fig. 18). However, instead of concentrating on the city itself, the *L.A. Times* pays more attention to the pollution of Southern California as a whole. Most titles in the environmental newspapers would not mention the word "Wilmington," but they will use the locations like "L.A." and "Southern California." Rather than placing it in the article, they will include it in the list of cities affected by the polluters in Los Angeles. For example, with the title of "Southern California's most toxic polluters will pay more under air board's fee hike," they mentioned that "the Phillips 66 refinery looms over a neighborhood in the Wilmington neighborhood of Los Angeles" (Barboza 2019). While this type of coverage is likely to be ineffective in paying full attention to Wilmington, it will definitely allow local residents to get to know their nearby communities, which face the same challenges as they do, and help raise awareness within themselves. Though the *LA Times* reported few environmental issues in Wilmington, there were no reports from other local newspapers such as *LA Independent*, *LA Weekly*, *L.A. Watts Times*, and *Beverly Press*.

SCIENCE



A Wilmington neighborhood is an island in a sea of petroleum



Jesse Ceja and his grandfather, Paulo Torres, 69, stand on Emden Street in Wilmington, where they live next to the Phillips 66 refinery seen in the background. (Rick Loomis / Los Angeles Times)

By JOE MOZINGO | STAFF WRITER
MARCH 6, 2016 | 3 AM

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Figure 18. The *Los Angeles Times* describes the residents' lifestyle in Wilmington city and the everyday struggles they have to experience. The author specifically highlights their potential health risks and their incapacity to change anything. (Article reported by Joe Mozingo, on March 6, 2016, retrieved by July 8, 2020)

SECTION 7: Recommended Local Actions

[Timothy Do]

There are many approaches to deal with environmental injustice in the Wilmington Community. Members of the Wilmington Community have been suffering from an increased risk of health problems, such as asthma and bronchitis. Many of these residents find these health problems to be unjust: “We have a human right to have clean air, clean water, clean soil...The pollution should leave.” (Pearson 2018, 3:03). Based on the demands of residents, an immediate obligatory proposition of legal action to enforce air quality regulations would be ideal for a safer living environment for the community of Wilmington, as well as additional measures taken by the community.

Currently, the amount of voter turnout in the general election is at a staggering low, not even reaching the 25th percentile compared to the rest of the nation according to the Healthy Places Index (2016). In order to gain support on the environmental injustices in the Wilmington community, it is important to educate its residents on why toxic emissions in the air are a major concern for their health. For children in schools, a possible method to enable them to tackle problems in the environment is through the program Youth Empowerment Strategies (YES). Developed for the Richmond community (with similar toxic emission problems), YES helps students have hope and work together to create solutions for the positive community (Adelman 2008, 18:15). Students in groups create a series of posters, first identifying what the problem is (e.g. oil refineries), going into the history of the industry, and then propose solutions to fixing the problem (see Fig. 19 for a student example). By being engaged in YES, students will feel proactive and not feel hopeless, by being part of a positive change for the community. This can also be incorporated into after school clubs, like the Boys and Girls Club, for kids to interact

with each other for more unity in the community. By incorporating Youth Empowerment in the education of the children of Wilmington, they will be more aware of the issue and will be more eager to vote. Having civic engagement increases voter participation, where in a study in Kansas City it increased voter turnout by 2.1 percent in 18-year olds and their parents. (“Increasing Voter...” 2018, 4).

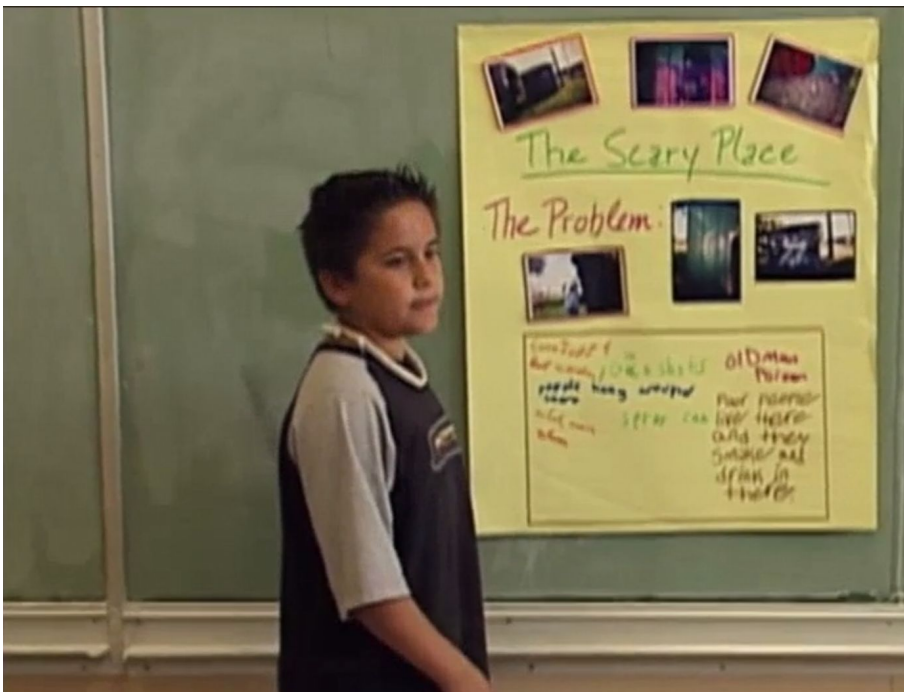


Figure 19. Students Presenting Environmental Problems In Their Community with the YEP Program. K-12 students will improve awareness on community issues, proposing potential solutions to these problems. (Photo from film *Place Matters*, 2008, retrieved July 1, 2020)

Even though the media has widely covered environmental issues regarding Wilmington, there is a sense of linguistic isolation between the news and the majorly hispanic community. As the majority of the Wilmington community speak Spanish, there is a language barrier between them and the newspapers in English,

leaving residents uninformed of the dangers at hand. Some articles, like those from the Los Angeles Times, have been translated into Spanish but not all of them. To effectively relay all the necessary information to non-English speakers, work with local ESL centers to translate community impactful L.A Times and other news agency articles to Spanish. Then, news agencies will be contacted to publish the translated versions online. In regards to access to the internet, the city of Los Angeles is planning to provide 90 percent of its residents with gigabit internet access by 2020 (Gleason 2017). More residents, knowing Spanish or not, will be connected and informed on what's going on in the community.

Many residential homes in the Wilmington community are within walking distance to an oil operation, which could be hazardous to residents in the case of accidents and long term effects of toxic pollution. One possible solution to mitigate the pollution effects for residents is to place filters in residents' homes to filter out possible particles like P.M. 2.5. A model implementation could be based on the filters they use in housing facilities in Richmond, which have special features for asthma patients, a major disease in the city of Wilmington. (Adelman 2008, 24:15). It's meant to bring fresh air from the outside, filtering out particles that could cause breathing problems. If a proposition to fund these filters were to be passed by City Council, a lot of residents would benefit, as staying inside would be healthier than before, reducing the amount of pollution in their homes.

In the elementary schools of Wilmington, there has been the presence of high levels of contaminants of lead found in the tap water in their water fountains. So far, the LAUSD has shut down water facilities with lead levels greater than 15 ppm (parts per million), where in Wilmington Park Elementary, 4 water sources have been shut down: one over double the concentration of lead at 38 ppm. (OEHS n.d.). Even so, lead has been shown to have serious effects at even lower levels, affecting IQ level, attentiveness, and academics (Centers for Disease... n.d.). Parents of these children would be concerned about the stuff in the water their children

drink. To inform and resolve the concentration levels from rising, organize a parent-teacher association, to petition the school district to flush out the water pipes daily, rather than when lead levels are too high to eliminate any kind of lead poisoning for the students.

From a political and essential standpoint, one of the legal actions environmental activists and the community can take to draft regulation to regulate the high amounts of toxic emissions in the area. Currently, the community of Wilmington is at the 93rd percentile for the number of toxic emissions compared to the rest of the nation (see Fig. 8 for specific P.M. Levels). This unusual amount of toxic emissions is not being held accountable for, especially during the administration of a conservative party. The Trump administration in 2018 repealed many of the EPA regulations established by the Obama administration, including canceling “a requirement for oil and gas companies to report methane emissions”, loosened regulation for major polluters to “limit toxic emissions”, and “letting states set their own rules” on carbon emissions from power plants (Popovich, Albeck-Ripka, and Pierre-Louis 2020). If at the city level, these regulations are proposed to be reestablished to the district attorney of Los Angeles county, then refineries and other polluting organizations will be held accountable for their dangers to the environment.

SECTION 8: Recommended Extra-Local

Actions [Andrew Ramirez]

One of the biggest issues that exists in the Wilmington area, is the mismanagement of hazardous waste from the Los Angeles Refinery Wilmington Plant. In other words, the highest priority action is to improve the enforcement of the Resources Conservation and Recovery Act, or RCRA for short. The RCRA sets guidelines as to how hazardous waste must be managed, and gives the EPA authority to enforce the Act ("Resource Conservation...", n.d.). The refinery itself has committed numerous violations of the act, including two in 2019 ("CONOCOPHILLIPS...", n.d.). They have been non-compliant for 4 quarters, with 7 non-compliance violations, but they have only had informal intervention twice in the last five years. Generally speaking, the refinery has had way too many violations, more of which will be talked about shortly, but have not suffered any repercussions. Thus, they are allowed to continue their practices at the cost of the local community. This means that the EPA needs to enforce the RCRA more strictly; that may mean shutting down the refinery as it is a repeat offender that has not shown any progress to fix its issues.

Following on from that issue is the related Clean Air Act, which the refinery has also violated numerous times. South Coast AQMD is responsible for enforcing the Clean Air Act in the LA region, and they've made rules regarding the procedure to address leaks: find it, fix it, make sure it's actually fixed (Amaya and Perez 2020). However, within the last five years, they have failed to do this over 600 times. This in turn means that they have released around 200 times more benzene than they report. Despite these massive safety hazards, South Coast AQMD has failed to hold the refinery and its parent company, Phillips 66, accountable (Amaya and Perez 2020). Thus, one of the best things that can be done in this area is to actually

enforce the laws that are already in place, and to deal appropriate punishments when they aren't met. To do this, it may be important for the EPA, or another governmental entity to directly enforce the laws, as South Coast AQMD has not properly held the LA refinery Wilmington Plant accountable for their breaches of safety regulations.

Although those are two major things that need to be addressed, there are a few other things to worry about as well. One is the lead levels in the schools in the area. There are 4 elementary schools, and 1 middle school with relatively high lead levels, all between 6 ppb and 11 ppb ("Interactive Map: Lead Levels Found in California Schools'..." n.d.). At those levels, no action is required, however, they can still be harmful, especially to children. It would make sense for the EPA to change the lead levels that require action; from the current 15 ppb, it should be lowered to 10 ppb at least, although preferably somewhere around 7 or 8 ppb. The EPA proposed a new "trigger level" of 10 ppb, which would mean that water systems would need to identify actions to reduce lead levels, but it doesn't actually change the existing 'action level' of 15 ppb ("EPA Proposes Updates to Lead..." 2019). Stronger actions should be set in place by the EPA to improve the quality of water in the community.

There is also a potential issue with lack of access to information, which stems from a few sources: linguistic isolation, lack of libraries or bookstores in the neighborhood, and lack of access to public internet spaces, and general lack of education in the area. Around 44.5% of the people in Wilmington are foreign-born ("Wilmington," n.d.). A significant portion of the population, over 70%, is linguistically isolated, meaning their ability to speak and understand English is limited ("Maps & Data" 2015) (see Fig. 14). Along with that, around 61.2% of adults have less than a highschool diploma ("Less Than High School" n.d.). All of these issues mean that information may be hard to come by for the majority of the population. Thus, with regards to potential pollution, it should be required for

nearby facilities to send reports in multiple languages to the local community detailing what they do, what pollutants are released, and what the potential risks of those pollutants are (see Fig. 20). As it stands, that information is somewhat available if you know how to look for it, but the companies should directly provide reports to the people. The EPA could add this as part of the requirements for the RCRA and/or the Clean Air Act. This would help the community be more aware of some of the dangers they may unknowingly face, and let them take further action from there.



Figure 20. Children walking to school in Wilmington, California near a refinery. The flare shown in the background indicates a toxic release. The wind is almost blowing the smoke directly over them, which can be harmful depending on the chemicals being burned (Photo by Jesse N. Marquez, March 7, 2018, retrieved July 8, 2020).

SECTION 9: Recommendations for Future Research [Wonhee Lee]

As the majority, 90% of the population in Wilmington is Latinx, the social group we will mostly study and interact with would be Latinx people (Statistical Atlas, 2018). From those people, I want to focus more on children under 18 (see Fig. 21). As Wilmington is a third largest oil field in the U.S. in terms of cumulative oil production, air quality is one of the issues in the region (City News Service 2020).



Figure 21. Wilmington students playing recorders in music class. The children of Wilmington are at the focus of future research in Wilmington, and their respiratory capacity is at the heart of it. (Photo from *Saints Peter and Paul School*, 2008, retrieved July 9, 2020)

For quantitative study, measuring the concentration of Volatile Organic Compound (VOCs) in the air within the operating oil refineries area would be a good start to provide data of the air quality of Wilmington. Air quality is one of the important factors that plays a big role in children's lung growth, and air pollution

can also affect children before they are even born (American Lung Association, 2020). According to the American Lung Association, there is a higher risk for preterm birth when there are higher particle pollution levels (American Lung Association, 2020). Using this fact, examining the lung growth and size of children in Wilmington and comparing their lung size with that of another region can be done to measure how seriously the air quality is affecting children's respiratory systems. As 31% of the population, 160,000 of people, in Wilmington is children under 18, there would be many children who are affected by the pollution and research can be done with more accurate data since there are more people to do research. Moreover, social survey of frequency of inhaler used in Wilmington residents with Asthma can also be helpful research as particles in air might irritate respiratory systems of residents with asthma. In *Homo Toxicus*, Ada Lockridge and her colleague Naomi Oliver gathered data through a survey and plotted them on a big piece of paper to see how many people have medical issues with their certain body parts (Poliquin, 2008). They did this by gender, but I want to separate it in more categories, for example, in age, gender, etc. It will be useful to know which age group is most affected by the pollution in Wilmington, and what symptoms are caused by the pollution. If possible, we want to compare the data with other neighborhoods with similar environments, where there are many oil refineries to be specific.

For qualitative study, we want to ask families who have children under 18 in Wilmington whether they think the air emissions of oil refineries in Wilmington stunt the development of their children's lungs, as we mentioned the effect of air quality to children's lung growth. We want to contact Wilmington Neighborhood Council through Facebook and ask for volunteers to participate in our research. As a privacy protection, we can provide fake aliases to prevent employers and government agencies like ICE from identifying the study respondents. During the interview, it will be possible to see whether the children are receiving proper health

care by looking at the oral hygiene quality of the children or checking whether they are exposed to second-hand smoking through neighbors or family members who use cigarettes. We also want to create focus groups for fathers and mothers to ask about whether they take their children to 'Smilin' Jack', Wilmington's giant pumpkin-shaped oil tank. The answer for this question from their paternal and maternal view would give us a sense of how they are thinking about the oil tank and refineries. The California Department of Health Services can find these studies useful as they can use this information when they provide services or make policies that fit the local situation.

SECTION 10: Injustice Analysis [Daniel Jilani]

Wilmington is a community deprived of rights other California neighborhoods have easy access to and suffering from volatile health issues. Social issues in the community diminish the quality of life and health of residents of Wilmington. The failure on the part of local, state, and federal legislative and enforcement agencies have left the Wilmington community at risk of pollutants that are exposed to every day. However, the irresponsibility of the Phillips 66 Company and other waste management facilities and generators also contribute to the environmental devastation of the neighborhood. Here we will examine and discuss different types of injustices the Wilmington community suffers on a daily basis.

Race and Poverty Injustice

The racial make-up of the Wilmington Community is 88.6% Latinx according to City-Data (Advameg, n.d.). Wilmington follows a similar trend in other polluted communities: a largely black, Hispanic, and/or non-white groups living close to areas of high and unhealthy pollution (Katz 2012). Compared to white individuals, Latinx individuals breathe in more dangerous chemicals such as nitrates, Vanadium, and Zinc (Katz 2012). According to CalEnviroScreen, Wilmington possesses 10 toxic release facilities (n.d.) unequivocally exposing the mostly latinx population to toxic emissions. The placement of the Latinx population near dangerous oil refinery facilities, such as Phillips 66, is an unnecessary decision that now negatively affects the health of many Latinx residents in Wilmington.

A large portion of the population of Wilmington residents are also classified as poor. According to the Healthy Places Index (HPI), most of Wilmington's census tracts are below the 25-percentile for residents "above poverty," meaning they

made above 200% of the U.S federal poverty level (2011-2015). Deeper analysis of HPI shows that in most of the census tracts in Wilmington the majority of the population lives in poverty (2011-2015). Poverty is an important social determinant of health that puts the residents of Wilmington at increased risk of mental illness, chronic disease, increased mortality rate, and lower life expectancy (U.S Department..., n.d.). For example, Mexican American children living in poverty are at the highest risk of cavities possibly due to the cost of dental care products (U.S Department..., n.d.). Minorities living in poverty also feel a great deal of mistrust towards health providers due to feelings of discrimination because they are insured through Medicaid (Seervai 2019). According to HPI, Wilmington census tracts had between 52.1% and 72.9% adult residents that were insured (2011-2015), this data may not include undocumented immigrants. Other deterrents to see a primary doctor for low-income patients include surprise bills and cost (Seervai 2019). This leads to these patients ignoring health issues until they are severe enough to warrant entry into the emergency room (Seervai 2019). Given a large portion of Wilmington residents live in poverty, steps should be taken to bridge the gap in trust and care between primary care providers and low-income families to prevent the number of severe health issues in the neighborhood.

Health Injustice

Asthma is a chronic respiratory condition in which the lungs are swollen resulting in a difficulty to breath (Wolstein, Meng, and Babey 2010, 3). There are approximately 70.22 asthma-related emergency room entries per 10,000 emergency room visits in most Wilmington census tracts, according to the Healthy Places Index (2011-2013). Compared to the state of California, only 21.3% of California census tracts had more asthma-related ER entries than the majority of Wilmington census tracts, according to HPI (2011-2013). In California, the rate of hospitalizations for low-income residents compared to high-income residents for

asthma was 5 times higher (Wolstein et. al 2010, 2). Furthermore, these low-income asthma patients are less likely to be given a way to manage their symptoms of asthma (Wolstein et. al 2010, 2). The higher prevalence of asthma and lack of controlling methods in poor communities results in further social damage such as missed days of work and school. Children between 4 and 17 below 200% of the federal poverty level on average missed 2.8 days of school per year due to asthma, missed days of school decreases as income increases (Wolstein et. al 2010, 9). Improving health care access for low-income families in Wilmington and accommodating for the low-income residents of Wilmington with asthma using easier access to management plans will greatly decrease the amount of asthma-related hospitalizations in Wilmington.

Reproductive Injustice

Planned Parenthood clinics offer an assortment of reproductive health products for free or at the lowest cost possible for all services (“Payment and insurance...”, n.d.). Clinics offer services such as birth control, emergency contraceptives, HIV services, sexual education, pregnancy testing and support, STD testing and treatment, LGBT support, abortion services (not all facilities), some general care services, etc. (“Our Services”, n.d.). The nearest Planned Parenthood clinic to Wilmington is approximately 4 miles away in Long Beach, according to Planned Parenthood’s clinic locator (“50 health centers...”, n.d.). The closest clinic that offers services on weekends is in Westminster approximately 16 miles away (“50 health centers...”, n.d.). The distance and operating times of these clinics greatly limit the Wilmington neighborhood’s ability to access these facilities. In 2018, Long Beach and L.A. County respectively had reported incidents of Chlamydia at 3,974 and 68,021 per 100,000 people (California Department..., n.d.). Wilmington is nearby to Long Beach, although there is no data for Chlamydia in Wilmington we can estimate it to be close to or larger than Long Beach’s data given the missing

Planned Parenthood clinic. Nevertheless, Planned Parenthood facilities would offer sexual wellness services to the community that would greatly improve the quality of life in Wilmington.

Procedural Injustice

According to the Healthy Places Index (HPI), during the 2016 election cycle voter turnout (see Fig. 22) was between 42% and 65% for all census tracts within Wilmington (2016). However, HPI also shows that all census tracts were below the 25-percentile in terms of turnout. For reference, the 50-percentile (average) was about 73%, according to HPI (2016). Approximately 93 million Americans who were eligible to vote in the 2016 election didn't, and a further 6 million were barred from doing so due to a felony (Root and Kennedy 2018, 1). Elections are a key tool that can be used to elect individuals that share a community's desires to a position of power and representation (Root and Kennedy 2018, 2). The groups that are most discouraged from voting are communities of color, youths, and low-income Americans through various polling station limitations (Root and Kennedy 2018, 8). In 2016, 72% of all white Americans were registered to vote compared to 57% of Hispanics (Root and Kennedy 2018, 13); this shows an inequity and inequality in the representation of these two race groups which puts communities like Wilmington at a disadvantage. The Center for American Progress recommends improving or implementing civics education and courses in schools as well as designing civic tools to be more engaging, especially to alienated voters (Root and Kennedy 2018, 1 & 3). By following the Center for American Progress' recommendations on voter turnout, Wilmington can be better represented in L.A. city council, California, and in the U.S.



Figure 22. A photo of american voters lining up for the 2016 election. Voter turnout in Wilmington was far below the average of the state. Turnout is important for electing officials that will represent the Wilmington community's desires. (Photo by Mark York, March 22, 2016, retrieved July 8, 2020)

Epistemic (Knowledge) Injustice

Phillips 66 Company operates a refinery in Wilmington that violates both the Resource Conservation and Recovery Act and Clean Air Act ("CONOCOPHILLIPS LOS ANGELES...", n.d.). The investors for Phillips 66 Company have a right to know the environmental damage, lawsuits, and violations against the company in order to evaluate the risk of it as an asset. In their sustainability report for 2020, Phillips 66 claims to be proactive in environmental protection and mitigating environmental impact (Phillips 66 Company 2020, 27). The report also claims they have invested 6.8 billion dollars between 2015 and 2019 into environmental protection projects, but cite minor changes such as installing LED lights and reducing packaging waste

(Phillips 66 Company 2020, 27). These are not the issues that cause the most damage to the environment and affected peoples, and can be classified as the greenwashing sin of irrelevance. The sin of irrelevance is when a company makes an environmental claim that may be true but otherwise isn't relevant in the grander scheme of what the target audience (investors in this case) is looking for in environmental protections (UL, n.d.). According to Violation Tracker, the company has been fined a total of \$631,807,178 million dollars for 178 environmental violations since the year 2000 for all facilities (Good Jobs First, n.d.). Investors have the right to be presented with this information and the impact of Phillips 66 facilities on local communities so that they are informed about the possible risks of their Phillips 66 assets.

However, the Wilmington community where Phillips 66 has placed a refinery deserves to be educated in the same way as investors. During Halloween, the Phillips 66 refinery has a 65-year-old tradition of painting a 3 million gallon refinery tank as a pumpkin called, "Smilin' Jack" (Littlejohn 2017). The event includes children in costume entering the facility with their family and the facility employees toss caramel corn to them (Littlejohn 2017). "Smilin' Jack" has been ingrained into the community as a tradition. Wilmington Middle School advertises to go see the giant pumpkin (Wilmington Middle..., n.d.), which we do not know if was paid for by the company or done by the school itself. Even more disturbing is Dan Hoffman, the executive director of Wilmington's chamber of commerce, describing the event as a tradition and fun for the community (Littlejohn 2017). While there is no issue with Phillips 66 reaching out to the community, it's concerning that the Wilmington community and council are influenced by the event. The community should be educated about the damage caused by the Phillips 66 company and the potential and current health problems caused by hazardous waste improperly managed by the facility.

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APPENDIX

Appendix 1: SKETCH: Community Assets

EQ 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 the University of Minnesota webpage. For data, see the Civic Data Dashboard created for this class.</p>		
Asset	Data source	How is this a community asset?
<p>Asset Yellow - Asset does not exist</p>		
Community Gardens	LA Gardens Council	<p>Only 1 garden in Wilmington</p> <p>The Wilmington Community Garden, which is an asset for members to gather together and enjoy nature.</p> <p>Allows for the spread of information between community members, and fosters unity between neighbours. Can be used as an emergency shelter in case of natural disasters.</p>
Public Internet	LA County Public Wifi Map	<p>There are 2 Mobilis and 4 Starbucks within a 3 mile radius from the center of Wilmington that have public wifi.</p> <p>There is public wifi in the library in the neighboring city of Carson (2 miles away)</p> <p>Gives the community access to information, forming online communities with a common problem. Additionally, the internet is a resourceful tool to research the problems in their community. You can register online for voting.</p>
Planned Parenthood Clinics	Do a google search	<ul style="list-style-type: none"> - Nearest Planned Parenthood clinic is in Long Beach (4 mi). - Prevent the spread of STDs through distribution of contraceptives at no cost and tests for STDs and STIs. - Prevent teen pregnancies through sex education and birth control distribution. - Access to legal abortion
PrEP Assistance Program: Clinical Providers and Enrollment Sites	California State Department of Public Health	<p>There is a Kaiser Permanente which takes enrollments in Harbor City.</p> <p>Latino's account for 27% of HIV infections. Providing PrEP can significantly reduce transmission.</p>
Bookshops	Public Map Book Web	<p>Only a single book shop in Wilmington.</p> <p>Bookshops allow the community to buy books, which can improve literacy among the linguistically-isolated (in-English) hispanic community</p>
Union Halls	Google Maps UnionHalls	<p>Union Halls are meeting places for Union members.</p> <p>They are places to communicate and discuss issues with companies and industries in the area, and allow mobilization to take action.</p>
Public Transit	LA Bus Station / Google Maps	<p>There is a bus route going around the city.</p> <p>The nearest train stop is the light rail station in Long Beach (Pacific Coast Highway)</p> <p>Public transit is essential for community members without cars to get around the city, reducing gasoline emissions</p>
Local Libraries	LA County Library LA Public Library	<p>Update: The Los Angeles Public Library has a Wilmington Branch.</p> <p>Gives community access to information by providing free internet access and allows people to borrow books</p>

Appendix 2: SKETCH: Environmental Hazards

EQ COMMUNITY ENVIRO-HAZARDS SKETCH		
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 Guidance Resources created 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).		
Hazard type	Data source	Community data
worst-case scenarios	https://risk.cslbny.org/2018/02/06/	In their RMP report, Los Angeles Refinery Wilmington had two accidents, one in 2011 and one in 2015. Compared to the rest of the United States, Wilmington is above the 95 percentile in terms of RMP proximity.
legal toxic releases	2018 TRI Database	15.4 million pounds of waste managed in 2018 for all Tri Facilities in Zip Code 90744 (Wilmington)
vehicle pollution (car pollution)	City Data City Data	A lot of traffic in freeway 710 (freeway near Wilmington) Method of Transportation - 73.7% Drive Alone - 1.2% Carpool - 5.2% Bus - 3.9% Motorcycle Commute Time (min) - 11-19 (60%) - 20-24 (61%) - 30-34 (54%) Diesel PM is above 85 percentile for most of Wilmington, with it increasing from North to South of Wilmington.
ground level ozone (air pollution)	Airnow.org	Good Ozone Percentile (33rd Percentile)
particulate matter (PM 2.5) (air pollution)	Airnow.org	Moderate PM 2.5 Levels (64th percentile)
lead in drinking water	Lead Levels for California Schools WILMINGTON PUBLIC SCHOOLS	4 elementary schools and 1 middle school in Wilmington have levels of lead that are harmful but do not require action.
Military waste	Remediation.com	Inactive Completed Cleanup in Wilmington in 2004.
Air Quality	American Lung Association	particle pollution in LA has been decreasing, but still above the recommended level, same with ozone levels.
How close do you live to a Freeway?	LA Times Freeway Map Map	110 Interstate to the left, 710 Interstate to the right 405 Interstate to the north- averages 370,000 vehicles per day going near a road that averages more 100,000 vehicles per day can pose health risks

Appendix 3: SKETCH Compound Vulnerabilities

B3 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 and SDG Indicators , who 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 cases	LA County COVID Dashboard CDC	Covid-19 Rate for New Cases is 1.20%. The state rate for new Covid-19 cases is 0.68% (EDC)
Police Killings	LA Times Police Killings Database	10 police killings since 2002. 7 of those deaths were Latino, 2 were white, and 1 was black.
Linguistic Isolation	californianscan	There is very high linguistic isolation in the neighborhood around 80th percentile in the south of the city, around 70th in the north.
Housing Burden	California Census	Central and north-central mostly have a housing burden in the above 80 percentile compared to all California census tracts.
Asthma ER Admission	Healthy Places Index	pretty low percentile, around 22 for the neighborhood.
Crime Rates	Statista LA	5.1 Crimes per 10,000 people
Mental Health Not Good	Healthy Places Index	Most of the Wilmington census tracts have issues with mental health that are below or near the 20 percentile compared to California.

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 enable 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 undermine 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, Greenwashing	Phillips 66 Company	Violations of RCRA, CAA, etc.
Community activist, college activist	Environmental Activists (Brandon Molina)	College study, Not full-time
Took action on air quality regulators in Wilmington	Communities for a Better Environment	Large group not based in California
Litigating Party	Environmental Integrity Project	Large group not based in California
Established in Wilmington, established local trust	Coalition for A Safe Environment	
Investigative agency	U.S. EPA / California Department of Toxic Substances Control	Government limitations / inaction
Can present and vote on policies that can help Wilmington	L.A. City Council Representative (Nanette Diaz Barragan)	Limited power and influence
Can make amendment to RCRA and CAA for better enforcement practices	Congress	Time, lobbying
Involved in Resident Management System (RMS), Construction of Research and Test Facilities	Socal Army HQ	Only clean up superfund sites
Help sue Phillips 66	Earthjustice attorney Oscar Espino-Padron	

Appendix 5: SKETCH: Stakeholder Actions

EJ 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)
Local Power Plant	None identified.	Failed to respond to a list of demands from local community members.
Phillips 66 Company	LED light bulbs, recycling cardboard waste	Failed to comply with RCRA. See https://www.epa.gov/region-9/section-1
Environmental Activists (Brandon Molina)	Proposed new Green Bills to better the Wilmington Community.	Couldn't go through with his bill (he wasn't elected)
Communities for a Better Environment	United residents to resist the Tereos Crude Invasion. Sued the EPA and Phillips 66	
Environmental Integrity Project	Created lawsuit against Phillips 66 Company in Wilmington and Carson on behalf of Communities for a Better Environment	
Coalition for A Safe Environment	Investigated Part of Los Angeles Expansion Projects	
U.S. EPA / California Department of Toxic Substances Control	Compliance investigations	Failed to enforce formal actions. https://www.epa.gov/region-9/section-1 (Pages 29-33) https://www.epa.gov/region-9/section-1 (Shows numerous violations for RCRA and CAA, serious violations for CAA)
L.A. City Council Representative/Congressman for District (Nanette Diaz Barragan)	Wrote a message addressing environmental injustice/racism in both English and Spanish. Advocated for green energy economy and creation of green jobs within her district.	Has yet to pass any real legislation that would benefit the area.
Federal Legislative and Executive branch	Created/Approved Resource Recovery and Conservation Act, Clean Air Act. Assigned authority to EPA	Reginal of Environmental Protection. https://www.epa.gov/region-9/section-1
District Attorney		
California Attorney General		

Appendix C: SKETCH: Media & Enviro Org Coverage

EJ 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 discussed environmental problems.		
MEDIA OR ENVIRO-ORG: Sierra Club url:	1. https://www.sierraclub.org/conservation/2019/09/why-we-need-to-ban-mxf-now-in-ca-refineries	
•	YEAR: 2019	ARTICLE or ACTION: WHY WE NEED TO BAN MXF NOW IN CA REFINERIES
MEDIA OR ENVIRO-ORG: Green Peace url:	1. https://www.greenpeace.org/usa/your-environmental-justice-also-will-protect-the-planet/ 2. https://www.greenpeace.org/usa/news/democrats-will-lead-the-charge-to-protect-communities-in-wilmington-ca-on-march-at-11-am/	
•	YEAR: 2018	ARTICLE or ACTION: Environmental justice is Alive and Well in California — And So is the Resistance
•	YEAR: 2020	ARTICLE or ACTION: JANE FONDA & GREENPEACE BRING FIRE DRILL FRIDAYS TO CLIMATE IMPACT ZONE, RALLY IN WILMINGTON, CA ON MARCH 6 AT 11 AM
MEDIA OR ENVIRO-ORG: South Coast AQMD url:	1. https://www.aqmd.gov/about-us/about-us-417-ab-134/interactive-exhibit/what-is-aqmd/what-is-aqmd-417-ab-134-2019-07-22-15-00-00	
•	YEAR: 2019	ARTICLE or ACTION: Actions to Reduce Community Air Pollution
MEDIA OR ENVIRO-ORG: NIEBC url:	1. https://www.niebc.org/media/2003-03-20	
•	YEAR: 2003	ARTICLE or ACTION: City of Los Angeles and Community and Environmental Groups Reach Record Settlement of Challenge to China Shipping Terminal Project at Port
MEDIA OR ENVIRO-ORG: LA Times url:	1. https://www.latimes.com/local/lanow/la-az-los-angeles-neighborhood-air-pollution-20190929-story.html 2. https://www.latimes.com/local/lanow/la-az-los-angeles-neighborhood-air-pollution-20190929-story.html 3. https://www.latimes.com/local/lanow/la-az-los-angeles-neighborhood-air-pollution-20190929-story.html 4. https://www.latimes.com/local/lanow/la-az-los-angeles-neighborhood-air-pollution-20190929-story.html	
•	YEAR: 2020	ARTICLE or ACTION: Project to monitor air pollution near Wilmington refinery
•	YEAR: 2020	ARTICLE or ACTION: Southern California's most toxic polluters will pay more under air board's fee hike
•	YEAR: 2020	ARTICLE or ACTION: Port ships are becoming L.A.'s biggest polluter. Will California force a cleanup?
•	YEAR: 2016	ARTICLE or ACTION: A Wilmington neighborhood is an island in a sea of petroleum.
Wikipedia: Wilmington, CA		

<p>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).</p> <div data-bbox="203 1060 657 1354"> </div>	<p>Are environmental problems discussed on the talk page of your community's Wikipedia article? If yes, which issues do users discuss?</p> <div data-bbox="820 1060 1364 1354"> </div>
No	No

Appendix 7: SKETCH: Possible Local Actions

<p style="text-align: center;">83 LOCAL ACTIONS SKETCH</p> <p>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.</p> <p>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. Focus in the sketch focused on extra-local actions (the middle and right columns would be different). Try to identify possible solution pathways of local level (By putting problems you have identified on both sketches).</p> <p>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.</p>		
<p>Community: Wilmington, CA Highlighted Hazard: Slow Disaster</p>		
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.
Residents live very near high risk industrial facilities.	Introduce filters for houses which filter out substances like PM 2.5 and diesel. (Inspired by Place Matters)	The filters will mitigate the amount of PM 2.5. And diesel from getting into the inside of people's homes.
Community members think that environmental health hazards can't be reduced.	Youth and young adult environmental education programs. (NAACP, Youth Intersectionality and Environmental Justice in our classrooms) Child Care Centers & schools can incorporate activities (like Youth Empowerment Strategies in the film Place Matters) about public health so kids can learn about diseases in their community and how to treat them.	Are there local schools to partner with? Any with prior work along these lines that could be built on? We can partner with Wilmington Park Elementary School, who incorporated a Boys and Girls Club in their after school facilities.
Hazards of local oil and gas production and processing facilities. LOCAL DETAILS (See Link/Link)	The Department of Toxic Substances reports violators of subtitle C of the Resources Conservation and Recovery Act to the California Attorney General (usually civil litigation or District Attorney (usually criminal charges). (See page 29)	Have campaigns to advocate representatives (like Norsette Barragan) with environmental goals to bring up complaints to the Department of Toxic Substances.
Lack of access to information (from linguistic isolation, lack of public internet access)	Some news articles in the L.A. Times are written in Spanish as well. However, some environmental articles haven't been translated to Spanish. The City of L.A. is rolling out plans to expand public internet to 90% of residents by 2020. 1 billion dollars has been put into the program. Wilmington is part of the city of L.A. jurisdiction. (Public)	The majority of the Wilmington community speaks Spanish. Work with local ESL learning centers to translate community impactful L.A. Times and other news agency articles to Spanish. By contacting the L.A. Times and other news agencies can put translated articles online.
Relatively high lead levels in 4 elementary school, and 1 middle school's drinking water; the maximum allowed lead levels are still harmful to children	Flushing the water pipes daily to wash out any contaminants. LAUSD has shut-off water facilities that have high concentrations of lead. See Wilmington Park Elementary School Drinking Water Quality Link .	Organize parent-teacher association to petition the school district to flush the pipes of the schools in LAUSD daily, which eliminates contaminants in the water.
No Planned Parenthood Clinic (Sexual/Reproductive Health and Wellness)	N/A	Promote sexual wellness education in schools, and provide contraceptives at fire station, home rooms in schools, LGBT club in schools.
Majority of the Wilmington Community are in poverty.	N/A	N/A
Missing data in certain areas of Wilmington (i.e. Terminal Island)	N/A	N/A
Not much voter turnout in local elections	Have popup stands to inform the community on measures on the ballot.	Have these popup stands in areas affected by oil refineries.
Higher prevalence of mental health issues	LAUSD offers mental health programs . Using Telehealth to continue offering these services during COVID-19	Create a community support group for discussing issues with mental health, meeting every week at the Wilmington library to talk through issues. Program can be sponsored by the library.

Appendix E: SKETCH Possible Extra-Local Actions

EE EXTRA-LOCAL ACTIONS SKETCH		
<p>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.</p> <p>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 least even by posing problems you have identified on both sketches.</p> <p>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.</p>		
<p>Community: Wilmington Highlighted Hazard: Slow Disaster</p>		
Identify a Problem	Identify ways this problem is being addressed through state, national and international initiatives – laws and regulations, court/claim requirements, federally supported jobs, federal investment in research or needs capacity, etc.	Tailor these solutions to your community.
Ignoring Hazardous waste laws, mismanaging waste, and polluting the environment	EPA has the Resource Conservation and Recovery Act (RCRA) which should give them control over how hazardous waste should be handled	The EPA has given the Los Angeles Refinery Wilmington Plant a notice of violation in 2017, but has not enforced it. In this case, enforcing the existing law is all that needs to be done.
Relatively high lead levels in 4 elementary school, and 1 middle school's drinking water; the maximum allowed lead levels are still harmful to children	EPA has proposed to lower the "trigger" level of safe lead levels from 15 ppb to 10 ppb, although this doesn't seem to actually lower the level that is required for drinking water to be considered "safe."	Ideally, the allowed levels of lead in drinking water should be set to a maximum of 10 ppb. This would mean that children will have less exposure to lead, and hopefully have less long-term problems.
Extreme air pollution; sources from refinery, nearby freeway, etc.	The Clean Air Act sets the standard for how many pollutants can be in the air; among other things, it also has rules in place for safety leaks	South Coast AQMD is responsible for making sure the guidelines of the Clean Air Act are met in the LA region. They've found numerous violations by the LA refinery Wilmington Plant over AQMD, but no result has happened in consequence.
Lack of access to information (from linguistic isolation, lack of library/bookstore, lack of public internet access)	Should propose to open up more resources in the area.	Local polluters should provide attached reports directly to the community through community meetings; that may otherwise not have a way of accessing the information.

EQ RESEARCH RECOMMENDATIONS SKETCH	
<p>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.</p>	
RECOMMENDED QUANTITATIVE STUDIES	
What kinds of pollution research are needed in this community?	Measuring the concentration of VOCs in the air within the operating refinery area
What kinds of health research are needed in this community?	Examining the lung growth/size of the children in Wilmington
What kind of quantitative social survey data is needed in this community?	Frequency of inhaler use in Wilmington residents with asthma
RECOMMENDED QUALITATIVE STUDY	
<ul style="list-style-type: none"> • What is your research question? Do parents think oil refinery air emissions stunt the development of their children's lungs, and why? • What social groups will you study and interact with? Families who have children under 18 in Wilmington • How will you gain access to the social groups you'll focus on? What privacy protections will be needed? Contact the Wilmington Neighborhood Council through Facebook and ask for volunteers to participate in our study. Provide fake aliases to prevent employers and government agencies (such as ICE) from identifying study respondents. • How could you use participant observation to answer your research question? Looking for signs of second-hand smoking such as the use of cigarettes by neighbors, use of cigarettes inside the home, etc. The quality of oral hygiene in the children can also be a telling sign if they are receiving proper health care and/or primary care. • How could you use in-depth interviewing to answer your research question? What questions would you ask? Ask about family history related to respiratory issues such as asthma. • How could you use focus groups to answer your research questions? What discussion prompts could you use? Create two focus groups for fathers and mothers to explore paternal and maternal views. Do you take your children to see "Smiling Jack" for Halloween, do you think it's dangerous? • Who would fund this research study? California Department of Health Services 	

Appendix 10: SKETCH: Multiple Forms of Injustice

EQ 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?	Certain areas in Wilmington are not included in the HPI map, most important and notably Terminal Island.	Must either manually collect missing data and add it to the map, or find reason for why certain data has been "excluded" from the map (See Health Injustice)
ECONOMIC INJUSTICE: Does poverty or uneven wealth exacerbate environmental hazards in this setting?	The amount of people above poverty (>200% income above U.S. Federal poverty level) is the metric measured. According to HPI, most of Wilmington is below the 25 percentile of this metric, with the worst area being the 2 percentile	Research needs to be done to see how much access people that are not above poverty have to health services. Also see their willingness to petition the pollution of nearby of refineries.
EPISTEMIC INJUSTICE: Are some ways of understanding environmental hazards and harms discounted or silenced? Is environmental sense-making actively undermined?	The Phillips 66 Company issued a sustainability report that included a section on environmental stewardship. The chapter directs potential and current investor attention away from its EPA track record. Investor Report (See Ch3) Site of Contamination EPA Facility Report (Wilmington scope) Wilmington Tracker (Phillips 66 Company scope) Local Middle School is advertising to visit the refinery to see watering . Refinery is appealing to the community as friendly.	Phillips 66 Company investors need to be properly told about the companies environmental issues. This should be either enforced by Shareholders demand to be presented this information from the company, or federally regulated as law. Either way awareness needs to be raised in the investment world about being presented greenwashed information. There needs to be an environmental education curriculum in the middle school and high school. Children shouldn't be easily influenced to believe the refinery is friendly.
GENDER INJUSTICE: How do gender hierarchies shape both exposure to environmental hazards and capacity to address them?	There are noticeably more men between ages 18 - 40, than women. Infographics	Need research into why this difference is occurring, and what environmental and social sources contribute to it.
HEALTH INJUSTICE: Are there health disparities or uneven access to health care in this setting? Check out the asthma resource information page for your community.	According to HPI, most of Wilmington has an asthma ER admission score of 21.3 percentile. On Terminal Island this score is much worse: 13.7 percentile.	Action must be taken to reduce the amount of particulate matter in the air. Enforcement or litigation using the CAA may be the best pathway to achieve this. Notify the district attorney for litigation against CAA violating entities.
INTERGENERATIONAL INJUSTICE: Will future generations be impacted by environmental hazards and exposures in this setting today?	Life Expectancy at Birth Men: in HPI Map shows most of Wilmington is below the 50 percentile, with a few census tracts below or near the 20 percentile. Life expectancy is less than 75 years	The standard of living in Wilmington must be improved in order to help residents born in Wilmington live longer. The data should probably be resampled by a California organization (data was taken by Livable Communities Institute, Center for Social and Health)
MEDIA INJUSTICE: Is there adequate news coverage of the environmental hazards in the setting? Does news convey the perspectives and vulnerabilities of all stakeholders?	The Wilmington area is heavily environmentally polluted compared to other California areas. Although there are many news sources reporting on environmental issues in Wilmington, the community would struggle to understand them since they are not in Spanish.	Offer ESL services more personally to the community through churches, high school, library, etc. Ask media services to offer a Spanish translation of their articles. L.A. Times does offer Spanish editions, but missing articles on Wilmington pollution in English.
PROCEDURAL INJUSTICE: Have all stakeholders had fair access to government support and law to address environmental hazards in this setting?	Bill (action on the part of the California State Assembly to tackle environmental issues in law of economic growth) . Response from the community was a Coalition for a Smoother Economy Scaffolding lack of 2016 registered voters voting according to HPI. All areas of Wilmington score less than 25 percentile.	Need for public awareness of environmental issues and their effects. Media campaign for environmental justice in Wilmington. Raise awareness about the importance of voting in improving the quality of life in Wilmington. Neighborhood issued highlighting candidate stances, proposition effects, etc.
RACIAL INJUSTICE: Do environmental hazards in this setting disproportionately impact particular social groups, especially communities of color?	According to Infographic in 2017, 88.8% of Wilmington residents identified as Hispanic. According to HPI, residential segregation among Latinos is some high in the community with percentile scores below 25.	Interview residents of Wilmington and find if they believe their racial group is being represented politically in their community. L.A. City Council, California State Assembly, etc.
REPRODUCTIVE INJUSTICE: Do environmental hazards in this setting undermine possibilities for safely parenting children?	No planned parenthood facilities in Wilmington. Closest facility is in Long Beach (Approx. 4 miles). Limits some people from access to planned parenthood facilities for reproductive services. Joseph Mize Planned Parenthood Map	Planned parenthood facilities should be built in Wilmington.
OTHER FORMS OF INJUSTICE?	N/A	N/A

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

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